WFHSS

DAS

14th World Sterilization Congress

&

8th National Sterilization Disinfection Congress of Turkey

6 - 9 November 2013

Susesi Convention Center, Antalya, Turkey

CONGRESS BOOK

www.das.org.tr/2013
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Invitation to the WFHSS-DAS Congress

Invitation to the WFHSS-DAS Congress

Wim Renders
President of WFHSS

Prof. Murat Günaydın, MD
President of DAS Society

It is a pleasure to invite you to the 14th World Congress for sterilization which will take place 6-9 November in Antalya, Turkey. It is organized by DAS, in close co-operation with the WFHSS.

Once again this congress is a historical event because we are once more pushing back our frontiers.

The main objectives of the congress are to build bridges between North and South and between East and West and to prepare the road for a global sterilization practice. For these reasons we have invited a number of prominent experts from all continents to address the participants about their areas of expertise. The ensuing exchange of ideas should lead to an evidence based best practice with standardization and innovation as the key concepts. Standardization has to ensure that the sterilization processes are run efficiently and safely, innovation that the CSSD adapts technologically, ecologically and economically to an ever changing hospital environment.

I trust that all of you, members of staff in CSSDs and in companies, will make this congress into the meeting place of the global sterilization world. This is also an ideal opportunity to experience for yourself the warm welcome Turkey extends to its visitors and the friendly hospitality of DAS.

Disinfection Antisepsis Sterilization Society (DAS)

Disinfection Antisepsis Sterilization Society (DAS)

The disinfection antisepsis sterilization (DAS) Society was established in 2004 in Samsun. It has currently 900 members.

The aim of our society is to carry out training and alert the related institutions in order to increase the sterilization and disinfection awareness in Turkey and reach "0 (zero) infection" rate in the hospital infections. In this regard, it cooperates both with the Ministry of Health and other institutions.

The web forum of our society holds approximately 5000 members. They share their knowledge, experience and opinions about sterilization disinfection antisepsis and infection control with the supervision of moderators.

Our society organizes congresses, symposiums and seminars about disinfection, antisepsis and sterilization and carries out all these activities in all parts of the country.

Our association gives importance to the DAS trainings not only in our country but also in the neighbour countries. DAS sessions have been organized in the EACID (Eurasia Infection Diseases) Congresses held in Kyrgyzstan, Kazakhstan, Azerbaijan, Bosnia-Herzegovina and Albania.

Our society will arrange the 8th International DAS Congress with the 14th WFHSS World Sterilization Congress this year. Approximately 1000-1500 people will participate the congresses.

We also organise daily seminars in various places wherever needed. Yet, 6000 people were trained in 24 different towns in Turkey.

Six DAS SCHOOL certificate programs have been completed and 1500 people got their certificates after the examination. These schools last six days with theoretical, technical and practical parts. They were organised together with the Ministry of Health.

Except these activities, symposiums, practical mini course programs have been arranged.

The congress books have approximately 6000 pages in which the scientific documents of the congress and other scientific activities are included. Our members can download these books and use them. In addition, the meeting lectures and slides can be watched online as "video-slide" from our web page.

DAS Society established a coworking group in the "Sterilization and Disinfection Guide" and published the "Turkey DAS Guide". The English, Arabic and Russian versions of the guide have also been published.

Our aim is to reach more people with the associated activities. Training is a must in the DAS area, like in all other areas. Our slogan is "knowledge increases by sharing".

In summary, we arrange trainings in accordance with this philosophy and share the knowledge without any fee.

EXECUTIVE COMMITTEE OF DAS SOCIETY

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About Turkey

About Turkey

Turkey (Turkish: Türkiye), officially the Republic of Turkey is a contiguous transcontinental country, located mostly on Anatolia in Western Asia and on East Thrace in Southeastern Europe. Turkey is bordered by eight countries: Bulgaria to the northwest; Greece to the west; Georgia to the northeast; Armenia, Iran and the Azerbaijani exclave of Nakhchivan to the east; and Iraq and Syria to the southeast. The Mediterranean Sea is to the south; the Aegean Sea is to the west; and the Black Sea is to the north. The Sea of Marmara, the Bosphorus and the Dardanelles (which together form the Turkish Straits) demarcate the boundary between Thrace and Anatolia; they also separate Europe and Asia. Turkey's location at the crossroads of Europe and Asia makes it a country of significant geostrategic importance.

Turkey is a democratic, secular, unitary, constitutional republic with a diverse cultural heritage. The country's official language is Turkish, a Turkic language, which is spoken by approximately 85% of the population as mother tongue. Turks constitute 70% to 75% of the population. Minorities include Kurds (18%) and others (7-12%). The vast majority of the population is Muslim. Turkey's growing economy and diplomatic initiatives have led to its recognition as a regional power.

Banking & Currency

In Turkey the currency is the Turkish Lira (TL). Foreign currencies can be exchanged at the airport as well as at the private exchange offices throughout the city which are open from 08.30 to 20.00 hrs. Local banks, where Traveler's cheques and Eurocheques can be cashed, serve between 08.30 and 17.00 hrs. All major credit cards (such as Visa, MasterCard) are accepted in most of the Turkish restaurants, shops etc.

Credit Cards

Most major credit cards are accepted in hotels, restaurants and stores but visitors are always advised to check with the vendor before a purchase is made. Cash machines with 24-hour access are available in many convenient locations.

Electricity

The electric current is 220V AC with a frequency of 50 Hertz. European Standard Type C plugs with two round pins are used.

Insurance

The registration fees do not include the insurance of participants against personal accidents, sickness, cancellations by any party, theft, loss or damage to personal possessions.

Participants are advised to take out adequate personal insurance to cover travel, accommodation, cancellation and personal effects.

Time Zones

Turkey is two hours ahead of Greenwich Mean Time and seven hours ahead of Eastern Standart Time.

Tipping

Tax and service charges are included in the cost of all goods and services. Although it is not mandatory, a small tip is expected for good service. As a guideline, add about 10 % to the total bill. Normally you are requested to leave a cash tip when paying by credit card.

Turkish Cuisine

It is said that three major kinds of cuisine exist in the world; Turkish, Chinese, and French. Fully justifying its reputation, Turkish Cuisine is always a pleasant surprise for the visitor. In addition to being the refined product of centuries of experience, Turkish cuisine has a very pure quality. The variety and simplicity of the recipes and the quality of the ingredients are guarantees of delicious meals. There are many good restaurants in Istanbul where you can taste Turkish Cuisine and local drinks. Usually the food in Turkey is quite cheap, but there are fine and expensive restaurants as well especially along the Bosphorus and in some of the neighbourhoods.

International Relations

Turkey is a founding member of the United Nations (1945), the OECD (1961), the OIC (1969), the OSCE (1973), the ECO (1985), the BSEC (1992), the D-8 (1997) and the G-20 major economies (1999). On 17 October 2008, Turkey was elected as a non-permanent member of the United Nations Security Council. Turkey's membership of the council effectively began on 1 January 2009. Turkey had previously been a member of the U.N. Security Council in 1951-1952, 1954-1955 and 1961.

Historical Places

Aspendos boasts one of the best preserved ancient theatres of antiquity. The theatre of Aspendos was build in 155 AD during the rule of the Roman Emperor Marcus Aurelius and could seat between 15.000 and 20.000 spectators. Because the stage area was later used as a caravanserai (a roadside inn) in Seljuk times, it was continuously repaired and maintained. Thus, the Aspendos Theatre has been able to survive to this days without losing almost any of its original qualities.

With its six minarets and sweeping architecture the Sultan Ahmed or Blue Mosque in Istanbul impresses from the outside. While still used as a mosque, the Blue Mosque has also become one of the most popular tourist attractions in Istanbul. It was built between 1609 and 1616 and like many other mosques contains the tomb of the founder. Inside the mosque, the high ceiling is lined with the 20.000 blue tiles with different patterns that give the mosque its popular name.

Located in Istanbul, the Hagia Sophia was originally a basilica constructed for the Eastern Roman Emperor Justinian I in the sixth century. A masterwork of Roman engineering, the massive dome (31 meters or 102 feet in diameter) covers what was for over 1000 years the largest enclosed space in the world. The church was looted by the fourth Crusaders in 1204, and became a mosque in the 15th century when The Ottomans conquered the city. The Hagia Sophia was converted into a museum in 1935 and is now one of the top attractions in Turkey.

Cappadocia is famous for its weird and wonderful natural rock formations and unique historical heritage. One of the best places to see these strange formations is the town of Goreme, which is located among a large number of tuff cones, termed fairy chimneys. The fairy chimneys have been formed as the result of wind and water erosion of two different volcanic layers: a thick layer of tuff (consolidated volcanic ash) covered by a thin layer of basalt that is more resistant to erosion. Due to the ease of carving into the tuff, many of the fairy chimneys at Cappadocia have been hollowed out over the centuries to create houses, churches and storage facilities.

Nemrut is a 2134 meter (7001 ft) high mountain in southeastern Turkey, near the city of Adiyaman. In 62 BC, King Antiochus I Theos of Commagene built a tomb-sanctuary flanked by huge statues of himself, two lions, two eagles and various Greek, and Persian gods on the mountain top. Since their construction, the heads have toppled

from the bodies and lay scattered throughout the site. The summit of Mount Nemrut provides a great view of the surrounding mountains. The main attraction is to watch the sunrise from the eastern terrace which give the bodyless heads a beautiful orange hue and adds to the sense of mystery of the place.

Ephesus which was established as a port, was used to be the most important commercial centre. It played a great role in the ancient times with its strategic location. Ephesus is located on a very fertile valley. Ephesus, once, the trade centre of the ancient world, a religious centre of the early Christianity and today, Ephesus is an important tourism centre in Turkey. The ancient city Ephesus is located in Selcuk, a small town 30 km away from Kusadasi.

Culture

Turkish music and literature form great examples of such a mix of cultural influences, which were a result of the interaction between the Ottoman Empire and the Islamic world along with Europe, thus contributing to a blend of Turkic, Islamic and European traditions in modern-day Turkish music and literary arts. Turkish literature was heavily influenced by Persian and Arabic literature.

Climate

The coastal areas of Turkey bordering the Aegean Sea and the Mediterranean Sea have a temperate Mediterranean climate with hot, dry summers and mild to cool, wet winters. The coastal areas of Turkey bordering the Black Sea have a temperate Oceanic climate with warm, wet summers and cool to cold, wet winters. The Turkish Black Sea coast receives the greatest amount of precipitation and is the only region of Turkey that receives high precipitation throughout the year. The coastal areas of Turkey bordering the Sea of Marmara (including Istanbul), which connects the Aegean Sea and the Black Sea, have a transitional climate between a temperate Mediterranean climate and a temperate Oceanic climate with warm to hot, moderately dry summers and cool to cold, wet winters. Snow does occur on the coastal areas of the Sea of Marmara and the Black Sea almost every winter, but it usually lies no more than a few days. Snow on the other hand is rare in the coastal areas of the Aegean Sea and very rare in the coastal areas of the Mediterranean Sea.

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Speakers and Moderators

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Scientific Programme

Wednesday, November 6th 2013

Time	HALL A
09:00-17:00	Arrival and Registration Free bus to Side-Aspendos (every hour, latest return 16:30)
13.30-16.00	WFHSS BOARD MEETING
17.30-20.30	**OPENING CEREMONY** **Opening Speech** **Murat Günaydın,** DAS president **Wim Renders,** WFHSS president **Ali İhsan Dokucu** Chairman of Public Hospitals Institution of Turkey **Mehmet Müezzinoğlu** Rebuplic of Turkey, Minister of Health **Turkish Music** **Murat Salim Tokaç** **Opening Conference** **Bilal Kuşpınar, Turkey** **"Art of being human: Mevlana"** **Sema Performance** **Opening reception**

Thursday, November 7th 2013

Time	HALL A	HALL B	HALL C
07:30-08:30			**Session C-1 (Breakfast Session)** Moderator: Ramin Bayramlı Azerbaijan Salih Hoşoglu, Turkey Meet the Expert : "Microbiology: Starting from Russia, onwards in Azerbaijan" **Zakir Karayev, Azerbeycan**
08:30-09:45	**Session A-1** Moderator: Bülent Gürler, Turkey The role of surface disinfection in infection prevention **Martin Exner, Germany** Quality assurance of new surgical instruments. Don't accept our rejects **Tom Brophy, United Kingdom**	**Session B-1 (Discussion - I)** Moderators: Mustafa Gül, Turkey İrfan Şencan, Turkey Sterilization is required for endoscopes and laparoscopes. **Gülden Ersöz, Turkey** High level disinfection is good enough for endoscopes and laparoscopes **Emine Alp, Turkey**	
09.45-10.30	**Coffee Break**		
10.30-12:00	**Session A-2** Moderator: Güven Külekçi, Turkey Adsorption of prion and tissue proteins to surgical stainless steel surfaces and the efficacy of decontamination following dry and wet storage conditions **C. William Keevil, United Kingdom** Key points of infection control in dental practices **Axel Kramer, Germany** Does a representative soil test exist for the reprocessing of dental instruments? **Alexander Franz, Austria**	**Session B-2 (Interactive)** Moderator: Ali İhsan Dokucu, Turkey The economic and administrative aspects of procurement process in public institutions related to sterilization and disinfection: more quality -less expense **Tuncay Palteki, Turkey** **Şaban Esen, Turkey**	
12.00-14.15	**Lunch** 12:15-13.00: HALL B Workshop-2 (medical) · HALL C-D Workshop-3 (STERIS) · HALL E-F Workshop-4 (GETINGE) 13:15-14.00: HALL B Workshop-6 (3M) · HALL C-D Workshop-7 (ASP)		
14.15-15.15	**Session A-3** Moderators: Mehmet Ali Özinel, Turkey Mustafa Özyurt, Turkey Cold atmospheric plasma as a new decontamination method **Rodolphe Hervé, United Kingdom** From a time- or event-related to a data-based shelf-life practice for sterilized items **Hartmut Dunkelberg, Germany**	**Session B-3 (Discussion II)** Moderators: Yeşim Çetinkaya Şardan, Turkey Yeşim Taşova, Turkey New disinfection methods are necessary to prevent hospital infections **Güven Çelebi, Turkey** Routine cleaning and manual disinfection is sufficient for hospitals surfaces **Elif Doyuk Kartal, Turkey**	
15.15-16.00	**Coffee Break**		
16:00-17:15	**Session A-4** Moderators: Dominique Goullet, France Recep Öztürk, Turkey Sustainable development: a new approach in quality management for CSSD **Benedicte Gourieux, France** Biohazardous waste treatments and management **Ronald Russell, Ireland**	**Session B-4** Moderators: Hasan Koçoğlu, Turkey Mustafa Samastı, Turkey Cleaning and disinfection in Intensive Care Units **Meral Şahin Demir, Turkey** Cleaning and disinfection of anesthetic instruments **Dilek Zenciroğlu, Turkey** Cleaning and disinfection in outpatient clinics **Canan Karadeniz, Turkey** DAS management in times of disasters **Mustafa Kasım Karahocagil, Turkey**	
17:15-18:30	**Session A-5** Moderators: Christophe Rousseau, Switzerland Patricia Gomez, The Netherlands Upgrade of the central sterilization service at Mohamed V Military Training Hospital in Morocco: from design to implementation. **Soufiane Derraji, Morocco** Northern transparent education and competence for staff in Central Sterile Services Department **Maria Hansby, Sweden** Sterilization in Peru and Latin America **Maria Elena Yeckle, Peru**	**Session B-5** Moderators: Esra Koçoğlu, Turkey Zerrin Yuluğkural, Turkey Disinfectants and waste disposal **Cüneyt Özakın, Turkey** Disinfectant efficact testing **Oğuz Karabay, Turkey**	
19:00-21:00	**Dinner**		

Friday, November 8th 2013

Time	HALL A	HALL B	HALL C
07:30-08:30			**Session C-2 (Breakfast Session)** Moderator: Bülent Gürler, Turkey Meet the Expert: "Publication Ethics" **Kurtuluş Töreci, Turkey**
08:30-09:45	**Session A-6** Moderators: Christine Denis, France Erdal Akalın, Turkey Design and development of a platform for sterilization **Dominique Goullet, France** To be or not to be ISO 13485, quality systems in the CSSD **Jean-Marc Legentil, Canada**	**Session B-6** Moderators: Güner Dağlı, Turkey Gaye Usluer, Turkey Operating room architecture and reconstruction in terms of hospital infections **Serpil Karataş, Turkey** CSSD Architecture **Murat Günaydın, Turkey** ICU architecture **Fatma Ülger, Turkey**	
09.45-10.30	**Coffee Break**		
10.30-12:00	**Session A-7** Moderator: Ayşegül Karahasan, Turkey Current threats to the attainment of SAL within a CSSD, do we underestimate them and are there technical solutions? A CSSD Managers point of view **Duygu Perçin, Turkey** Systematic comparison of the ability of commercial cleaning indicators to predict process failures **Mark J. Sutton, United Kingdom** Implementation of feed back experience committee in CSSD **Cristophe Lambert, France**	**Session B-7** Moderator: Hakan Leblebicioğlu, Turkey Hospital infections and quality in hospitals **Erdal Akalın, Turkey** What's new in the field of sterilization and disinfection? **Şaban Esen, Turkey**	**Session C-3** Moderators: Güven Külekçi, Turkey Turan Buzgan, Turkey Instruments used in dental health centers **Nevim Acar, Turkey** Sterilization and disinfection in dental health centers **Zeynep Yiğiter, Turkey**
12.00-14.15	**Lunch**		
	12:15-13.00	HALL B Workshop-10 (Miele PROFESSIONAL)	HALL C-D Workshop-11 (Kimberly-Clark) / HALL E-F Workshop-12 (matachana)
	13:15-14.00		HALL C-D Workshop-15 (SterilO) / HALL E-F Workshop-16 (STERİMED)
14.15-15.15	**Session A-8** Moderators: Hiroyoshi Kobayashi, Japan Hürrem Bodur, Turkey Technology, machines, robots:getting the instruments clean requires the human factor **Sharon Green-Golden, USA** Decontamination of medical devices from human prions **Michael Beekes, Germany**	**Session B-8** Moderator: Turan Buzgan, Turkey Legal Responsibilities of health care institutions **Recep Öztürk, Turkey**	**Session C-4** Moderators: Rahime Meral Nohutçu, Turkey İnci Devrim, Turkey Protective clothing in dental health centers **İsmet Yıldırım, Turkey** Water quality in dental units **Rahime Meral Nohutçu, Turkey**
15.15-16.00	**Coffee Break**		
16:00-17:15	**Session A-9** Moderators: Wim Renders, Belgium Serhat Ünal, Turkey The impact of reprocessing single-use devices - An economic study **David Larmuseau, Belgium** Case carts and custom made packs **Koen Vandormael, Belgium**	**Session B-9** Moderators: Kutbeddin Demirdağ, Turkey Nezahat Gürler, Turkey Water management in healthcare services **Yasemin Ersoy, Turkey** Microbiological control of hospital environment: When and how? **Mesut Yılmaz, Turkey**	**Session C-5** Moderators: Ayşegül Karahasan, Turkey Meral Gültekin, Turkey Exemplary CSSD 1 Exemplary CSSD 2 Exemplary CSSD 3 Exemplary CSSD 4 Exemplary CSSD 5 Exemplary CSSD 6
17:15-18:30	**Session A-10** Moderators: Tillo Miorini, Austria Şaban Esen, Turkey Central sterile service in Japan **Hiroyoshi Kobayashi, Japan** Validation of automated endoscope reprocessors **John van Bergen Henegouw, The Netherlands** The National health training package-"The Australian way" **Elinor Radke, Australia**	**Session B-10** Moderators: Murat Dizbay, Turkey Sercan Ulusoy, Turkey Use of antiseptic-soaked items in patient care to prevent hospital infections **Aziz Öğütlü, Turkey** Burns and burn care **Atilla Çoruh, Turkey** Wound care and antiseptics **Maide Cimşit, Turkey**	
21.00-24.00	**GALA EVENING**		

Saturday, November 9th 2013

Time	HALL A	HALL B	HALL C
07:30-08:30			**Session C-6 (Breakfast Session)** Moderator: Recep Öztürk, Turkey Meet the expert "Hospital Infections" **Erdal Akalın, Turkey**
08:30-09:30	**Session A-11** Moderators: Birte Oskarsson, Sweden Türkan Özbayır, Turkey Validation of an endoscope drying cabinet for extended storage of non-channeled endoscopes-a clinical perspective **Caroline Conneely, Ireland** Operating room areas, clothing and traffic **Deborah Spratt, USA**		
09.30-10.30	**Session A-12** Moderator: Hakan Leblebicioğlu, Turkey International and European standardization of sterilization processes and equipment **Ernst Dennhofer, Germany** Surgical site infections linked to contaminated surgical instruments **Stephanie Dancer, United Kingdom**		
10.30-11.15	**Coffee Break**		
11:15-12:15	**Session A-13** Moderators: Murat Günaydın, Turkey Wim Renders, Belgium Best poster presentations: 4 posters		
12.15-13.00	**CLOSING CEREMONY** **Presentation of WFHSS & Central and Eastern European Congress 2014**		

WORKSHOPS

Thursday, 7 November 2013

WORKSHOP-2 • Hall B • 12.15-13.00

Latest on standards and applications regarding Bowie Dick, Chemical Indicators & PCD's as monitoring device
Terry McAuley

WORKSHOP-3 • Hall C-D • 12.15-13.00

Recent Outbreak Investigations with Reusable Devices: Infections and other Complications
Dr. Gerald McDonnell
Dr. Georgia Alevizopoulou

WORKSHOP-4 • Hall E-F • 12.15-13.00

Reasons for implementing and criterias for selecting a traceability system
Vecihe Özek, Managing Director Getinge Turkey, Istanbul, Turkey

Required functionality implementing the T-Doc traceability system
Aliye Parlak, CSSD Head Nurse Amerikan Hospital, Istanbul, Turkey

Instrument management system – beyond the CSSD
Christian Winther, Sales & Support Director Getinge IT Solutions, Copenhagen, Denmark.

WORKSHOP-6 • Hall B • 13.15-14.00

Next Generation Biological Indicators
Craig Wallace

New Approach to Hygiene Management
Michelle Alfa

WORKSHOP-7 • Hall C-D • 13.15-14.00

Low Temperature Sterilization with H_2O_2 Gas Plasma and Steam - From Flexible Scopes to Robots
Moderator: *Philippe Destrez*

Role of H_2O_2 Gas Plasma and Steam – From Flexible Scopes to Robots
Wayne Spencer

Implementation of Low Temperature Sterilization in the CSSD – A Practical Perspective
Dominique Goullet

WORKSHOPS

Friday, 8 November 2013

WORKSHOP-10 • Hall B • 12.15-13.00

Routine testing of cleaning effectiveness
Dr. Winfried Michels

WORKSHOP-11 • Hall C-D • 12.15-13.00

Requirements of bacterial barrier systems
Moderator: *Ian McIvor*

Introduction: EN ISO 11607 requirements
Ian McIvor

Testing of bacterial barrier systems
Hartmut Dunkelberg

Experience with the Smart-Fold Kimguard sterilisation packaging
Fiona Chautant

WORKSHOP-12 • Hall E-F • 12.15-13.00

LTSF-Sterilization: The Alternative for Flexible Endoscopes Sterilization
Elena Lorenzo

WORKSHOP-15 • Hall C-D • 13.15-14.00

5W 1H by the surgical tools tracking system
What? When? Where? Why? Who? How?
Eyüp Öğücü

WORKSHOP-16 • Hall E-F • 13.15-14.00

Virusolve + Family: Evidence-based non toxic, biodegradable hospital and medical grade High Level Disinfectant (HLD), cleaner and sanitizer
Jazz Singh

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The Role of Surface Disinfection in Infection Prevention

Martin Exner[1]

[1] *Institute for Hygiene and Public Health, WHO Collaborating Centre for Health Promoting, University of Bonn, Germany*

Although the relevance of surface disinfection is increasingly being accepted, there are still a number of issues which remain controversial. In particular, in the presentation the following topics will be addressed: Transferral of microbes from surface to patients as a cause of infection, requirements for surface disinfectants, biocidal resistance and toxicity, future challenges.

After discussion and review of current scientific literature there is a broad scientific based consensus that contaminated surfaces contribute to the transmission of pathogens and may thus pose an infection hazard.

Targeted surface disinfection based on a risk profile is seen as an indispensable constituent in a multibarrier approach of universal infection control precautions. Resistance and cross-resistance depend on the disinfectant agent as well as on the microbial species. Prudent implementation of surface disinfection regimens tested to be effective can prevent or minimize adverse effects.

Disinfection must be viewed as a holistic process. There is a need for defining standard principles for cleaning and disinfection, for ensuring compliance with these principles by measures such as written standard operating procedures, adequate training and suitable audit systems. Also, test procedures must be set up in order to demonstrate the efficacy of disinfectants including new application methods such as pre-soaked wipes for surface disinfection.

QA of New Surgical Instruments Don't Accept Our Rejects!

Tom Brophy[1]

[1] *Barts Health NHS Trust: Newham University Hospital, The London Chest Hospital, The Royal London Hospital, St. Bartholomew's Hospital and Whipps Cross University Hospital*

When hospitals purchase surgical instruments, most will assume that they are safe and reliable and that good manufacturing techniques have been used. There is also a reasonable expectation that these devices have been subjected to a rigorous quality control process.

In 1998, the Clinical Physics Department at Barts Health NHS Trust were asked by clinical colleagues to investigate the quality of surgical instruments being supplied to the Trust. We began a quality assurance study of new surgical instruments arriving in the Trust to determine whether they complied with British or International standards. This study found a large number of poor quality instruments entering the Trust's hospitals. These were frequently of such poor quality that they were discarded immediately, before any use. We also discovered that a large number of instrument manufacturers and suppliers had paper management systems but no formal product quality control process.

In 2000, Barts Health NHS Trust set up its own surgical instrument quality assurance section, as we had no confidence that new instruments were undergoing a real quality control process. By 2010 the UK Medical and Healthcare Products Regulatory Agency (MHRA) were warning of possible surgical instrument problems and in 2011 a BBC *Panorama* television programme, "Surgery's Dirty Secrets", investigated the surgical instrument industry and found evidence of lax quality control and poor manufacturing practices and conditions.

Poor quality surgical instruments pose a serious clinical risk to patients. This includes instrument fragments remaining in the patient, resulting in foreign body embolisms which are potentially life threatening. Also, burrs, voids, shredded serrations and rough surface finishes trap potentially infectious tissue which can have serious consequences to the patient.

Additionally many instruments are supplied with no suppliers or manufacturers trade mark. This may seem a minor issue, but it is very important that the supplier is identified. If an instrument fails in service, and causes harm to a patient or theatre staff, there is a question of liability. Without a registered trade or name mark it becomes impossible to identify the supplier.

Other type of defects identified include forceps guide pins protruding on jaw closure which may cause glove puncture, artery forceps with deficient ratchets, scissors not cutting correctly and visible corrosion. A significant minority of newly purchased instruments have actually been used before, with some being contaminated. It is shocking that used instruments have been repackaged and sold on to another hospital as brand new.

Another issue for concern is poorly manufactured sterilization cases, which allow instruments to move out of position in transit and cause unnecessary damage. Cases are required to be supplied with assembly diagrams etched on to the case. If not available we request laminated photographs or diagrams from the supplier. This directs SSD staff to assemble the case correctly and is a visual check that all instruments have been included.

Our presentation demonstrates the advantage of our QA service which protects patients and theatre staff. In addition the service protects the Trust from legal action, ensures surgical instruments are being supplied to British or International Standards and saves money on unnecessary replacements.

Because of our QA service, manufacturers realise they need to provide Barts Health NHS Trust with good quality surgical instruments and the Trust is supplied with the best quality surgical instruments in the NHS, if not the world! It is important to check the quality of your instruments and not accept our rejects!

Sterilization is Required for Endoscopes and Laparoscopes

Gülden Ersöz[1]

[1] *Department of Infectious Diseases, Faculty of Medicine, Mersin University, Mersin, Turkey*

Flexible endoscopy is a widely used diagnostic and therapeutic procedure. Endoscopes may become heavily contaminated with blood, secretions, and microorganisms during procedure. Endoscopes are complicated multi-channeled instruments which are inserted deep into sometimes sterile areas of the body enabling any microorganisms transferred on lumens, external surfaces, biopsy forceps or via contaminated fluids to be deposited in the cavity.

Endoscopy-related infections can be divided into two types: endogenous and exogenous. Endogen infections in sterile areas of the body may be occurred, biopsies are taken which can cause some bleeding and provide an entry point for bacteria or viruses. In the other hand, if the instruments are not properly cleaned, the disinfection and drying procedures can fail and increase the possibility of transmission of infection from patient to patient. These instruments are difficult to clean and disinfect and easy to damage because of their complex design, with narrow lumens and multiple internal channels. Accurate reprocessing of flexible endoscopes involves cleaning and high-level disinfection (HLD) followed by rinsing and drying before storage. Most contemporary flexible endoscopes cannot be heat sterilized.

Contaminated endoscopes can be associated with health care-associated infections. However, the reports in the literature attempt to reassure by stating that the incidence of infection after an endoscopy is "low", the published outbreak reports indicate that endoscopy related outbreaks are occurring, and there are reports of multi-resistant gram-negative organisms including NDM-1 *Klebsiella* spp. and carbapenamase-producing *Klebsiella pneumoniae*, causing outbreaks via endoscopic equipment. Additionally, multidrug resistant microorganisms as *Pseudomonas aeruginosa*, *Burkholderia cepacia* and *Stenotrophomonas* spp. were identified in previous endoscopy related outbreaks.

Endoscope reprocessing can be performed with manual methods or the use of automated endoscope re-processors (AERs). Natural bio-burden levels were detected on flexible GI endoscopes range from 10^5 CFU/mL to 10^{10} CFU/mL after clinical use. Cleaning must precede HLD or sterilization to remove organic debris (e.g., blood, feces, and respiratory secretions) from the external surface, lumens, and channels of flexible endoscopes. Appropriate cleaning reduces the number of microorganisms and organic debris by 4 logs, or 99.99% AERs are strongly recommended for reprocessing of flexible endoscopes to document all steps and to minimize contamination and contact with chemicals and contaminated instruments. However, contaminated and defective AERs can result in inadequate reprocessing and contamination of endoscopes and have been associated with outbreaks of endoscopy-related infections. The ability of bacteria to form biofilms on the inner channel surfaces can contribute to failure of the decontamination process.

After understanding, all outbreaks are related to breaches in reprocessing techniques, it is crucial that endoscope cleaning, disinfection, and drying are performed according to strict protocols. Implementation of microbiological surveillance of endoscope reprocessing is appropriate to detect early colonization in the endoscope and to prevent contamination and infection in patients after endoscopic procedures. But, process control of endoscope reprocessing does not guarantee prevention of settlement of biofilm formation during endoscopy.

Biofilms can be removed from artificial surfaces by physical and chemical methods. Physical methods such as ultrasound and manual cleaning are generally effective but difficult to control in practice. Chemical methods can be unsuccessful because of the resistance of biofilms to antibiotics, disinfectants. The most efficient methods for biofilm removal were autoclaving and treatment with a concentrated bleach solution.

The use of antibiofilm-oxidizing agents with an antimicrobial coating inside washer disinfectors could reduce biofilm build up inside endoscopes and AERs and decrease the risk of transmitting infections. Disinfecting agents used for HLD must have bactericidal, mycobactericidal, fungicidal, virucidal, and sporicidal activity. Glutaraldehyde, hydrogen peroxide, ortho-phthalaldehyde, peracetic acid, and superoxidizedand electrolyzed acid water are effective against bacteria, viruses, fungi, and spores. Two percent aqueous solutions of glutaraldehyde killed vegetative bacteria in 2 min, fungi and viruses in 10 min, and spores of *Bacillus* spp. and *Clostridium* spp. in 3 h.

Johonson et al. reported five arthroscopy related infections (infection rate was 0.04 percent) after completion of all disinfection procedures of the arthroscopic surgery instruments with 2% gluteraldehyde. With the laparoscopic cholecystectomy and other intra-peritonial procedures, HLD is more problematic because the degree of tissue damage and bacterial contamination is greater than with laparoscopic procedures in gynecology. Failure to completely disassemble, clean, and HLD laparoscope parts has led to infections in patients. Disassembling, cleaning, and proper reassembly of laparoscopic equipment were used in surgical procedures before steam sterilization presents no risk for infection.

In the conclusion, outbreaks involving removable endoscope parts and endoscopic accessories designed to be inserted through flexible endoscopes such as biopsy forceps emphasize the importance of cleaning to remove all foreign matter before high-level disinfection or sterilization. Some accessories are now available as single-use, disposable products (e.g., bronchoscope valves, biopsy forceps). AERs need further development and redesign as do endoscopes which durable to sterilization procedure. Strictly adherence to current recommendations and good clinical practice, improvement of decontamination and sterilization procedures for the reprocessing of laparoscopes and equipment's could lower the risk of cross-infection patients to patients.

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High Level Disinfection is Enough for Endoscopes and Laparoscopes

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Endoscopes are considered to be safer medical devices than alternative procedures, like open surgery. However, more outbreaks of healthcare-associated infection and pseudoinfection have been linked to contaminated endoscopes. Infections associated with endoscopic procedures are usually endogenous infections. However, exogenous-related infections can occur due to inadequate decontamination.

Spaulding devised a rational approach to disinfection and sterilization of patient-care items and equipments. On the basis of the degree of risk of infection involved in the use of the items, patient care items were divided into three categories; critical, semicritical and non-critical. Critical items are those associated with a high risk of infection if the item is contaminated with any microorganism, including bacterial spores. Thus, sterilization of objects that enter sterile tissue or the vascular system is critical. Semicritical items are those that come in contact with mucous membranes or non-intact skin. Respiratory-therapy and anesthesia equipment, some endoscopes, laryngoscope blades, esophageal manometry probes, anorectal manometry catheters and diaphragm-fitting rings are in this category. These medical devices should be free of all microorganisms, although small numbers of bacterial spores may be present. I general, intact mucous membranes are resistant to common bacterial spores but are susceptible to other organisims, such as bacteria, mycobacteria and viruses. The minimum requirement for semicritical items is high-level disinfection. The outbreaks due to endoscopes are usually due to inadequate decontamination and not to adhere to guidelines on reprocessing. To prevent the healthcare-associated infections, all endoscopes should be properly cleaned and at a minimum, subjected to high-level disinfection.

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Adsorption of Proteins to Surgical Stainless Steel Surfaces and Assessment of SSD Decontamination Procedures

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Iatrogenic transmission of the infectious prion protein (PrP^{Sc}) is a potential threat due to its resistance to many chemical and enzymatic decontamination protocols and its strong adsorption to stainless steel. The conditions in which surgical instruments are handled duringand after surgery may affect the level of tissue protein, prion attachment and the efficacy of subsequent decontamination regimes. Instruments entering the SSD, either post-surgery or new, are cleaned and disinfected in an automatic washer disinfector (AWD) with the application of an enzymatic or alkaline detergent, after a preliminary manual wash and sometimes sonication. All the cleaning cycles have to be validated in accordance with both British Government (CFPP 01-01) and European Union (ISO EN15883) guidelines and this validation includes the chemical testing for protein residues with approved methods such as theNinhydrin or Biuret tests. Once dry, the instruments tend to be visibly inspected and passed for any residue soiling or mechanical failure before being packaged up and sent for sterilisation. However, doubts have been raised over the sensitivity of such biochemical and visual procedures and whether robust infectious agents such as the prion-causing neurodegenerative diseases, including variant Creutzfeldt-Jakob disease (vCJD), pass undetected, especially considering the relative ease of removing approved test soils compared to tissue proteins.

We have developed rapid, sensitive dual stain fluorescence microscopy techniques to differentiate and quantify tissue protein and prion-like amyloid bound to surgical instruments before and after SSD processing methodology. Instruments post surgery or experimentally contaminated with PrP^{Sc}-infected brain tissue were left to dry between 0 and 120 min at room temperature or 24 h, in dry or moist conditions. Longer drying times increased both protein and prion amyloid adsorption and affected the efficacy of the enzymatic or detergent cleaning chemistries tested. A moist environment post-contamination significantly reduced the attachment of both protein and prion amyloid to the surgical stainless steel surface. Maintaining moist conditions could potentially improve the subsequent decontamination of reusable surgical instruments, also reducing process time and cost. All cleaning chemistries were only partially effective under the recommended conditions. More importantly, PrP^{Sc} constituted the main fraction of the remaining contamination left on these surfaces. This study shows that currently marketed cleaning chemistries and recent decontamination protocols do not completely suppress the threat from iatrogenic CJD. These findings should be taken into account for risk assessment purposes and re-evaluating instrument handling and decontamination practices.

Key Points of Infection Control in Dental Practices

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In dental practice, transmission of pathogens from the patient to the surrounding and to other bodily parts of the patient occurs frequently. The number of transmitted microorganisms is particularly high because of the high number of microorganisms in the patient's oral cavity, but also because their high persistence in dental and bucal biofilms.

Because if this, already in 1989 dedicated recommendations on hygiene measures in the dental setting have been published by the German Working Group for Hygiene in Dentistry (DAHZ). These recommendations are regularly updated. In 1998, the Commission of Hospital Hygiene and Infection Control (KRINKO) at the Robert Koch-Institute published the German Guideline for Infection Control in Dentistry, which was updated in 2006. As a result of three epidemiologic surveys on the hygiene status in 2003/2004, 2005, and 2009, which represented a large sample of German dental offices, an observable improvement in the behaviour towards infection control recommendations was noted in Germany. Details of these observations are discussed later. This positive development was largely boosted trough the publication of the KRINKO recommendations, and supported by the DAHZ, together with related activities of the German Dental Association in all German Federal stats.

Briefly, the key points of infection control-hand hygiene, safe reprocessing of medical devices, ensuring high quality of water in dental units, oral antisepsis, antibiotic prophylaxis, and immunisation of the dental staff-shall be defined in Standard Operating Procedures (SOPs) in detail and tailored into a multi-barrier strategy to avoid infections in patients and dental staff.

Particularly validated reprocessing of dental instruments is a fully controllable risk. Efficient cleansing of instruments contaminated with blood, secretion, or remnants of tissue is a critical pre-requisite for the following process of disinfection or sterilization. The recommended standard is the use of machine-based processes. In order to inactivate prions on root canal instruments own laboratory results with GdSCN will be presenting. The torsional and bending stiffness of the root instruments was not impaired after exposure in 6 mol GdSCN solution for 15 minutes. Another not well-solved issue is the microbial contamination of dental waterlines, which may result in biofilm formation. To prevent initial biofilm formation, or to sanitize heavily contaminated water lines, various chemical compounds and technical solutions are present on the market. Own research results on the efficacy of some electrolytic decontamination methods compared with purge and intensive-purge decontamination will also be discussing. Finally, some current aspects of hand hygiene and mouth cavity antisepsis will be highlighted.

Reprocessing of Dental Instruments in Washer-Disinfectors: Does a Representative Test Soil Exist in Dentistry?

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ABSTRACT

Introduction: Reprocessing of medical devices, being classified as semi-critical B is recommended to be performed in a washer-disinfector. In order to estimate, whether the expecting contaminant of the various medical disciplines can be effectively removed by this washer-disinfector, different so called "test soils" have been proposed to be tested as a marker of cleaning efficacy of the disinfector. Todays described test soils are optimised for the testing of contaminations occurring in surgical procedures, but not for dental procedures.

Materials and Methods: In this study the test soils being proposed in the EN 15883-5 (e.g. KMNE soil, recipe by Koller and coagulated sheep's blood) were compared with 8 reference substances used in the preservative-prosthetic dental practice. The success of the cleaning efficacy in the washer-disinfector was checked visually and by determining the residual protein concentration on the contaminated instruments after the cleaning procedure.

Results: It could be seen, that in contrast to the proposed test soils of the EN 15883-5, the used reference substances of the dental practice could not be removed by the washer-disinfector. Removal of these reference substances was only possible after manual or ultrasonic cleaning.

Conclusion: Since blood plays a subordinate role as a contaminant of instruments during conservative-prosthetic dental treatments, testing of the cleaning efficacy of the washer-disinfector with test soils according to the proposals of the EN 15883-5 is not representative in this discipline of dentistry. Most of the materials used in dental practice can only be removed manually or with the help of the ultrasound bath.

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Potential of Cold Atmospheric Plasma as a New Method for the Decontamination and Sterilization of Reusable Surgical Instruments

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For the past decades the cleaning and disinfection of reusable surgical instruments has focused on traditional washing methods. In addition to the vast amounts of water involved, there is a huge market offering a variety of washing chemistries, with new products appearing virtually every year. This classic biophysical and biochemical approach relies on the displacement of soil through detergents, the breaking of some organic molecules thanks to enzymes, or the modification of molecular structures by relatively strong alkali. Despite the known adverse effect of alkali on metallic hardware, such chemistries have received an increased interest following the discovery of prions. Prions bind strongly to reusable stainless steel instruments and are extremely resistant to most treatments, except strong alkali.

The technology of gas plasma has evolved considerably in the past 10 years. Ionized gases generate free radicals which prove to be extremely potent at degrading organic contamination on various surfaces. This presentation will highlight some of the most recent advances in gas plasma technology and discuss its potential for the reprocessing of reusable surgical instruments.

From a Time- or Event-Related to a Data-Based Shelf Life Practice for Sterilized Items

Hartmut Dunkelberg[1]

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SUMMARY

The step from time- to the event-related concept of shelf life practice for sterilized items is an approach to a more scientific based policy, i.e. the identification of causative factors which compromise sterility. The aim of this presentation is to introduce new aspects and perspectives of sterility assurance policy that includes the barrier efficiency against airborne microbes of the packaging material and environment-related factors which can compromise sterility.

Packaging materials are, as a general rule, gas permeable or have gas permeable components, which allow sterilants such as steam or ethylene oxide to enter the packaging. A relevant air exchange between the inside and the outside of the packaging is an ever present event. Air flow into the package typically results from decreases in temperature (1/273 of the packaging volume per °C), lowering of heights above sea level (about 1% of the volume per 100 m) and number of weather changes from lows to highs (about 1% per 10 hPa).

The capacity of packages to remove airborne microbes, i.e. the filtration efficiency, was determined using the exposure chamber method with the whole package microbial challenge test. Periodic air pressure changes of 75 hPa and an aerosol of *Micrococcus luteus* resulted in a defined microbial challenge. Testing of four different types of pouches on paper-film or non-woven-film basis resulted in a filtration efficiency between about 90 and > 99%. We tested double wrapping of the same pouches and compared them with the single wrapping method. As expected the removal of airborne microbes increases clearly when double wrapping was used. Puncturing with a small needle -diameter 0.5 mm- led to a mean number of 94 colony forming units (CFU) per pouch comparing to undamaged paper/film pouches with a mean of 4 CFU per pouch, even when no air pressure changes were applied. The results clearly show that commercially available packaging materials differ significantly in their capacity to retain airborne microbes.

Using the on-site application of the mobile exposure chamber 41 paper/film pouches, each of them with a volume of about 6900 cm^3 were exposed in a clinical office room to about 450 periodic air pressure changes of 200 hPa. The air of this room with a microbial count of about 200 CFU/m^3 was used to provide an air flow into the packages. Three of 41 pouches were recontaminated which corresponds to 7.3%. A filtration efficiency of 99.9% was obtained as result. That corresponds to a probability of 0.1% that microbes pass the porous packaging material, when usual environmental air is the challenge.

Labels or statements of instruction sheets that reflect the conformance with the Standard ISO 11607 do not necessarily imply that the capacity of the packaging material to remove airborne microbes was measured. The ISO 11607 doesn't determine a specific method for measurement of the barrier properties against airborne microbes. It gives alternative methods which don't use airborne microbes or aerosolized particles for demonstrating compliance with this International Standard. Considering, that the capacity of retention airborne microbes is

an exceptionally relevant evaluation criterion, we believe that there is a gap in examining the barrier with airborne microbes or particles in obligatory testing. This gap in the current regulations is a hindrance for the manufacturers in working towards the best barrier solutions of packaging material, as well as for the hospital staff in selecting products with the most effective barrier against airborne microbes. Only when the general data gap is closed, with reference to the airborne microbial barrier of the packaging material, the packaging material with the highest possible barrier capacity can be selected. Beyond that, an assessment of the maintenance of sterility during the post-sterilization period can be made.

New Assessment Methods are Necessary to Control Efficacy of Cleaning and Disinfection Methods in Hospitals

Güven Çelebi[1]

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Hospital infection is a worldwide problem and environmental surfaces in patient rooms may play an important role in microbial transmission. Numerous studies have showed that implementing effective infection control measures in hospitals can significantly reduce hospital infection rate. Routine cleaning and disinfection of environmental surfaces and medical equipments is a standard procedure of infection control in hospitals. However, monitoring efficacy of cleaning and disinfection methods is not a routine task in many hospitals. New hygiene monitoring methods may assess quality of cleaning and disinfection more accurately. The new methods mainly used in hospitals are;

- Microbial culture based methods: Evaluating presence of bacteria on environmental surfaces by using qualitative or quantitative surface cultures.
- Florence based methods: Before environmental surface cleaning "targeted" surfaces are contaminated by the transparent solution which gives florescence when exposed UV light and "targeted" surfaces are checked by UV after cleaning.
- Adenosine triphosphate (ATP) bioluminescence based methods: ATP is present in all organic material (food, bacteria etc.) and detecting ATP on "cleaned" surfaces shows inadequate cleaning.

Traditional Methods for Cleaning Hospital

Elif Doyuk Kartal[1]

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More evidence is emerging on importance of clinical environment in encouraging hospital infection. Numerous reports detail cleaning as a major control component for outbreaks of norovirus, MRSA, *Clostridium difficile*, VRE and drug-resistant *Acinetobacter*. These pathogens thrive in dust and dirt in a warm hospital environment and easily contaminate surfaces and equipment, particularly during an outbreak. A hospital pathogen will persist in an appropriate environmental niche unless removed through some cleaning process. Many studies state that cleaning is a vital component of the intervention package required to reduce hospital-acquired infection. Enhanced cleaning is nearly always incorporated into an infection control strategy in response to an outbreak.

Sinceless labourius practices for dirt removal are always attractive, there is a danger that traditional cleaning methods are forgotten or ignored. Few studies have examined detergent-based regimens or modelled these against infection risk for different patient categories. Fear of encourages the use of powerful disinfectants for the elimination of real or imagined pathogens in hospitals. Not only do these agents offer false assurance against contamination, their disinfection potential cannot be achived without the prior removal of organic soil. Detergent-based cleaning is cheaper than using disinfectants and muchless toxic. Numerous guidelines emphasise the importance cleaning but offer little practical advice on how to achive this, or how often sites should receive cleaning attention.

Despite future promise, traditional cleaning methods should not be relaxed or abandoned, even if the whole hospital is treated to novel decontamination systems or coated with bioactiveneer. No one single process will remove all relevant microbial soil from the hospital. Strengthening domestic schedules by highlighting high-risk sites beside the patient offers a cost-effective strategy independant of nursing pressures and escalating bed occupancy rates. Restoring hygenic standarts in hospital would be cost- effective metod of controlling hospital-acquired infection.

Cleaning practices should be tailored to clinical risk, given the wide-ranging surfaces, equipment and building design. Few studies have examined detergent-based regimens or modelled these against infection risk. Fear of infection encourages the use of powerful disinfectants for the elimination of real or imaginated pathogens in hospital. Not only do these agents offer false assurance against contamination, their disinfection potential cannot be achieved without the prior removal of organic soil. Detergent-based cleaning is cheper than using disinfectants and much less toxic.

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Sustainable Development: A New Approach in Quality Management for CSSD

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Sustainable development has become a major concern of our society. Preservation of these natural resources, sorting and collection of waste, energy saving, have become ubiquitous in our daily themes. Health facilities are also affected by this problem because he many activities that are taking place (health, production, transportation,...) are both resource-intensive and generate waste. Tools and measurements that have emerged in recent years as the "Barometer of sustainability of health facilities", "Indicator of Sustainable Development in Health (IDD Health)" or sustainable development criteria in the french national guidelines "Certification V2 V2010", are designed to guide, encourage and measure sustainable development actions in our health facilities.

The concept "Sustainable Development" began to appear in various sterilization department or work experiences that have been the subject of recent papers. This concept is quite naturally in the sterilization process. Indeed, as with any process, it is performed in an environmentlocal and specific, which is resource consuming: physical, environmental, human, for which sustainable development actions can be initiated. The tools mentioned above (Barometer, IDD Health) for health facilities in their entirety, are not suitable to help the establishment of a sustainable development policy in hospital sterilization.

The goal of our approach was to build on existing standards and norms in the field of sustainable development, an evaluation guide for the particular activity sterilization and complete on all sides of sustainable development is ie economic, social and ecological watershed. This guide was developed to be comprehensive in terms of the activity of sterilization with representation from all stages of the sterilization process management (quality policy, commitment to sustainable development, relationship with stakeholders) and support processes (purchasing and procurement, hygiene, health and safety, human resources, facilities and equipment). Self-evaluation was conducted in a collegial manner by experts in sterilizationactivity (pharmacists, managers, other staff sterilization,...) as well as local experts in the different themes (eg. physicians, engineers, biomedical technicians,...)

Not knowing our level or performance in terms of sustainable development, this tool has achieved a self-evaluation process of our commitment and actions that can fit into the theme of sustainable development sterilization. To refine the action plan, guide each criterion was weighted according to its performance and the importance of the topic under study (eg. Purchasing, energy). The aim was to highlight critical points on which an action plan could be defined. The weighting was done in a collegial manner with the supervision of sterilization staff and when it was necessary, with local experts.

With this self-evaluation process, an initial assessment has been prepared and work areas weredefinedand prioritized, this for the establishment of a policy of sustainable development in our sterilization department.

Cleaning and Disinfection in Intensive Care Units

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With the help of progresses in medicine, diagnostic and treatment methods have advanced and the survival of patients in intensive care units (ICU) has increased. Along with these developments, the number of used medical equipment, materials and invasive applications have increased as well. During the patient care and invasive applications in ICU, patients may be exposed to hospital acquired infections caused by the environment, employees, other patients and the infection of pathogenic microorganism and devices. *Clostridium difficile*, methicilin resistant *Staphylococcus aureus (MRSA)*, vankomisin resistant enterococci (VRE), *Acinetobacter baumannii* ve *Pseudomonas aeruginosa* are freuqently encountered among ICU pathogens. Epidemics have been reported due to contaminated equipment and environmental contamination. For these reasons,cleaning and disenfection practices in ICU differ from other hospital departments.

Even though ICU covers 5% or 10% of hospital beds, 25% of hospital acquired infectons are detected in these sections. This situation increases morbidity and mortality. The prevention of hospital infections indicate the quality and success of health institutions in terms of patient safety. For the prevention of hospital acquired infections, there are precautions that needs to be taken and practiced strictly except for the patient risk factors. Some of the major precautions are: hand hygiene, cleaning-disinfection-steriliziation of patient care areas, surfaces, environment and the tools/materials.

1. Hand hygiene: Hand hygiene should be made in hand hygiene indications. Hand hygiene is the most inexpensive and effective method for the prevention of infections.

2. Gadgets/materials disinfection: Equipment used in patient care is divided into three groups in terms of Earle H. Spaulding classification.

- **Critical tools/equipment:** Sterile tissue, sterile body cavities and into the vascular system tools/materials should be sterile. This category includes surgical instruments, cardiac and urinary catheters, implants, and ultrasound probes used in sterile body cavities and so on, and most of them are used as a disposable sterile products. The liquid chemical sterilants are used for tools and materials in which these methods are not appropriate.
- **Semi-critical instruments/materials:** That come into contact with broken skin, mucous or completeness of the respiratory therapy and anesthesia equipment, laryngoscope blades, ventilator, connecting hoses, endotracheal tubes, laryngeal tubes, nebulizer cups, nasal cannulas, humidifiers and air filters, suction catheters, flexible endoscopes, feeding pumps, airway, and so on, tool/material. All medical devices must be free from microorganisms contained in this section, but allowed a small number of bacterial spores. Semi-ciritical instruments and materails in contact with steril tissues are used sterilized. Sterile disposable materails are preferred. Non-single use tools and materials should be applied to high-level disinfection process after using them.
- **Non-critical materials:** Face masks, noninvasive ventilation masks, oxygen masks, stethoscope, blood pressure cuff, EKG leads, pulse oximeter, ear speculum, detection equipment, incubators, patient bed sides, crutches, in the

patient's room with dining table, furniture and so on. This section includes the materials in contact with intact skin. Because of its role in transport of pathogenic bacteria, mechanical should be applied to disinfection low or moderate level according to the degree of contamination after cleaning.

- Stethoscope used for the patient, glucometer, otoscope tips, medical supplies, such as blood pressure measuring device must be unique for each patient. If it is not available, they must be disinfected prior to use.
- Cleaning of incubator: Inside and outside should be cleaned every day. Contamination have been identified in surrounding pads, and keeping your arms up valves. These parts should be cleaned with detergent and water every day, at least once a week and disinfected in every baby change. Baby should be transferred to another incubator during the disinfection of incubator. Disinfection of incubator phenolics (due to improper use will cause hyperbilirubinemia in infants) should not be used.

3. Surface disinfection:

- Environmental surfaces in the ICU, the frequency of cleaning and disinfection of environmental surfaces differ from other hospital departments. Surfaces must be smooth and proper disinfection.
- All surfaces must be clean and free of dust. Household type vacuum cleaner should not be used. Wet cleaning should be done every day, two times, and whenever it gets dirty.
- Locker benches, window fronts and horizontal surfaces, such as desks (likely to be exposed to heavy contamination through hands) should be cleaned with a disinfected damp clouth by rubbing once a day or when it gets dirty.
- Sinks should be cleaned twice a day and rub when it gets dirty (detergent/chlorine solution).
- The walls, curtains, windows and non-critical surfaces such as shelves used for storing clean materials are cleaned regularly with detergent water. When visible contamination is repeated.
- The areas in which patient samples are kept temporarily should be cleaned and disinfected once a day and when it gets dirty.
- Dirty laundry, where they are placed in waterproof bags must be removed from the patient care area.
- During construction and renovation work, dust and debris may contain fungal spores in the meantime patients should be transferred to another unit.
- New method of disinfection is used as a disinfectant steaming in environment disinfection. The disinfectant can reach areas where routine disinfection cleaning methods can not reach. However, the major disadvantage is that it can not be applied when there is patient in the room.
- Isolation room: All surfaces in the room during the day at least once wiped with detergent and water should be disinfected. Surface is cleaned once in every shift and when it gets dirty. Any equipment used for the patient should stay in the room until there is no need.
- The most widely used disinfectants, are chlorine 5.25%-6.15% aqueous solutions of sodium hypochlorite and sodium dichloroisocyanurate tablets. Tablets are more appropriate. Solutions must be prepared daily.
- Disinfection of surfaces contaminated with blood; small spills, 1/100, large spills of 1/10 diluted solution of sodium hypochlorite is sufficient.
- Practice of cleaning and disinfection, frequency, concentration of products used should be in written documents.
- There should be control forms for cleaning and disinfection procedure.
- EPA-approved cleaning products and disinfectants should be preferred.
- The cleaning mops, buckets and mats should be cleaned and disinfected immediately after use.
- Use of disinfectants, dilution, storage, shelf life, material compatibility, the manufacturer's instructions for safe handling and disposal must be observed.
- On the materials and surfaces contaminated with blood and other body fluids, cleaning should be made before disinfection.

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Cleaning, Disinfection and Sterilization of Anesthetic Equipments

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Anesthesia equipment is a potential vector to transfer hospital infections. Appropriate cleaning, disinfection and sterilization practices of the anesthesia machine systems, surfaces, patient circuits, bacterial filters, heat and moistures exchangers, single use items and reusable items is necessary for infection control of the facility.

Cleaning: Procedure of removing dirt and organic substances by a mechanical process(1).

Disinfection: Destruction of microorganisms or inhibition of their multiplication on non-viable substances and surfaces (except bacterial spores), classified as high, intermediate and low level disinfectants according to the degree of effect on bacterial spores and mycobacteria(1).

High level disinfection: This is a type of disinfection that inactivates all microorganisms except for some bacterial spores by implementing a shorter period of time (5-20 minutes) compared to sterilization with sporicide chemicals (≥ 3 hours)

Intermediate level disinfection: This is a type of disinfection that destroys all vegetative bacteria including mycobacteria and other microorganisms, but not the bacterial spores (usually ≤ 15 minutes)(1).

Low level disinfection: This is disinfection that destroys some vegetative microorganisms and large enveloped viruses (usually ≤ 10 minutes), but not the bacterialspores, mycobacteria and unenveloped viruses(1).

Sterilization is the process of removing all the microbial life, including the spores. This process can be carried out by physical or chemical methods.

The sterilization and disinfection of every single item may vary. Sterilization and disinfection may depend on the item and the producer.

Spaulding classification is used to identify the disinfection and sterilization methods according to infection risk grading of medical equipment.

Critical items: This category contains the items and equipment that come in contact with the sterile body cavities or vascular lumens. If contaminated, critical items have a high risk of infection and disease transmission.

This category includes regional and vascular needles as well as catheters. These items should be sterile at the time of use(2).

Semicritical items: This category covers the items that come in contact with, but don't pierce, mucous membranes or non-intact skin. Laryngoscopes, endoscopes, laryngoscope blades, oral and nasal airways, resuscitation bags, face masks, endotracheal tubes and connectors, breathing tube components and connectors, esophageal stethoscopes are some of the semicritical items used in anesthesia. Ideally this items should de sterilized whenever possible. If they cannot be sterilized, high-level disinfection is necessary. Semicritical items should be stored dry and in a way to avoiding recontamination(2).

Non-critical items: This category covers objects that come in contact with intact skin, not mucous membranes. Blood pressure cuffs, stethoscopes, arm boards, pulse oximeter sensors, electrocardiogram electrodes, and all associated cables, head straps, blood warmers, CO_2 absorber systems, medication administration pumps, equipment carts and monitors are within this category. For these items, cleaning followed by intermediate level or low level disinfection following is indicated(2).

Environmental surfaces: This category covers the surfaces of medical equipment, knobs, table tops, anesthesia carts, laryngoscope handles, mon-

itoring cables, pumps and other equipment not in direct contact with the patient. Cleaning with an intermediate or low-level disinfectant should provide adequate decontamination. For this category, an EPA registered disinfectant or detergent should be chosen. Facilities should follow manufacturers recommendations regarding use, exposure time, and disposal etc., of the disinfectant or detergent as approved[(2)].

Each facility should establish a protocol for frequency of disinfection as well as monitoring for compliance and efficiacy.

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DAS Applications in Polyclinics

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The most important article of the "National Patient Security Standards" is to take the necessary precautions for preventing Infections.

Taking the standard protection measures for each patient consulting the hospital is compulsory for the security of both the patient and medical staff.

In hospitals many national and international guides in the fields of MSÜ, Operating Rooms, Endoscopy Units etc have been published and their standards have been determined.

In the polyclinic environment mostly the rules and standards aren't defined or some basic rules are disregarded or unnoticed due to intensive patient demand and fast operation.

Today, especially in Urology, Gynaecology, General Surgery, Plastic Surgery, Orthopaedic, Ophthalmology, otorhinolaryngology, Dermatology, Neurology, Gastroenterology, many invasive interventions are done. Also, in some polyclinics like oncology, haematology daily treatment units exist.

In these units, the reuse of the materials used in patient examination shall be controlled, active and secure. Indeed the applied standards aren't different from the hospital overall. The main principle is to provide that the defined standards and rules are applied also in these units.

The cleaning materials, disinfection selection shouldn't be different from the other units. Some disinfection number used in the hospital shall be minimized.

The written procedures and directives shall be applied by trained staff and the applications shall be controlled regularly.

Mostly trained, experienced staff is preferred in this unit. In most of the units, there are dirty, clean (preparation, control packaging) and sterile material areas. Also, many units are sufficient in terms of physical and technical equipment.

Problems are encountered in polyclinics due to physical area, technical equipment and staff inadequacy.

The mostly encountered problems;

- Physical area insufficiency for washing and cleaning operations
- Problem of material and equipment providing to all of the polyclinics where intervention is made and decontamination is necessary
- Not determining a method for reuse.
- Staff training
- Not taking / be able to take protective measure for the staff.

If contact with the patient's blood and body fluid exists, protective equipment shall be used, hand hygiene shall be provided, medical wastes shall be separated and sharp objects shall be removed, used materials and environment cleaning shall be arranged before and material obtaining shall be provided so that it doesn't cause trouble.

Dr. E. H. Spaulding has developed a system which divides the medical devices into classes according to the infection risk. This system is being used in the sterilization-disinfection level selection.

The disinfection or sterilization method used in the polyclinics change according to the features of the device, risk group and body part to which it will contact.

In order to provide that the applications are realized according to these standards;

The polyclinic staff shall be competent in the following subjects and shall be trained periodically;

- The structure, features of the used devices,
- Sterilization /disinfection method which shall be applied according to the risk group,
- Infection risks,

- Correct determination of the aimed disinfection level,
- Toxic effects and security measures of the used materials,
- Product usage

Critical Devices

The devices entering the sterile body cavities, tissues and vascular systems (surgical devices, cardiac and urinary catheters, implants etc) shall be sterile.

Semi Critical Devices

The devices having a contact with the mucosa or tissue of which the integrity has been deteriorated (laryngoscope bladders, ventilator and anaesthetic circuits, flexible endoscopes, anaesthetic equipments, respiration circuits, nasal and vaginal speculums, vaginal and rectal probes, nebulizer cases, some ophthalmic devices, ear hoses, thermometers, hydrotherapy tanks etc.) semi critical devices shall be highly disinfected according to their features with an effective method.

Devices and surfaces which are not critical: Devices having a contact with the tissue of which the integrity isn't deteriorated (pushers, floor, walls, furniture, blood pressure monitor etc).

Operations Applied in the Polyclinics and Mostly Used Materials

GENERAL SURGERY AND PLASTIC SURGERY

Dressing,

Simple operations done with local anaesthesia (nail pulling, lipoma-nevus excision, biopsy etc),

Wound Care

Cosmetic operations

Rectoscopy, anascopy, sclerotherapy, botox treatment

The dressing sets and surgery sets used in these operations shall be sterile, the single use only ones shall be preferred for the other consumables and for rectoscope and anascope.

GYNAECOLOGY

Vaginal and trans vaginal probes used in sonographic screening

Krio device, materials used in cervical erosions.

Carmine injectors and cannula

Vaginal speculum, smear brush

Pesser and appropriate circles for diaphragms

Cervical Cases

Breast Pump accessories

Other surgery sets and dressing sets

All the used surgery set and dressing sets shall be sterile. The consumable materials shall be single use only and shouldn't be reused. (vaginal speculum, carmina cannula etc.)

Vaginal probes are semi critical devices since they directly contact with the mucous membrane. Many guides suggest a new preservative or probe enclosure for each patient in the endocavity probes. Condoms are more secure than probe enclosures in terms of perforation.

Besides, when we think about the tearing of the probe enclosure and preservative, high level disinfection is suggested.

Ultrasound producers suggest 2 gluteraldehyde usages for high level disinfection on transvaginal probes. But 2% gluteraldehyde can shorten the probe lifetime, and can have toxic effects on the fertility cells and embryos.

An alternative procedure for the vaginal probe disinfection;

- Transducer wiping with 70% alcohol,
- Holding in 550 ppm chlorine for 2 minutes and then rinsing, drying
- Cleaning the probe with a foam handkerchief
- High level disinfectant which wouldn't affect the sensitive fertility treatment results in the IVF clinics shall be used with the following features:
- Not toxic for embryo and sperm
- Having all the activity tests completed
- Having a fast biocidal effect,
- User friendly,
- Easy usage and fast application in the polyclinic conditions

OTORHINOLARYNGOLOGY

The ear speculums and tongue depressors used in the otorhinolaryngology polyclinics shall be single use, if not high level disinfection is suggested for the ear and nose speculums. Different speculums shall be used for each patient.

All the surgery and dressing sets used for biopsy and other invasive operations shall be sterile.

Rigid telescope and flexible nasendoscopes used for endoscopic examination are semi critical devices since they are in direct contact with mucous membrane. High level disinfection is suggested for these devices.

In the otorhinolaryngology polyclinics, fast, secure, easy and sporadically effective methods have been preferred in recent years since,

- Secure physical and technical equipment can't be provided
- There is intensive patient demand and increase
- Devices are without lumen.

Especially for physical and technical equipment problems related with disinfection areas single use solutions or foam handkerchiefs are solutions.

TRANSESOPHAGEAL ECHOCARDIOGRAPHY (TEE)

The TEE probes are semi critical devices since they have contact with the mucous membrane. Many guides offer probe enclosures for each patients. But since they have a tearing feature and have are expensive, high level disinfection is compulsory.

It isn't possible to disinfect some TEE probe models with liquid or heat. Since these probes don't have a lumen, foam handkerchiefs are practical and effective way. In the ***"English Echocardiography Association Probe Cleaning and Disinfection Guide"*** foam handkerchief usage is offered in the cardiology polyclinics since secure physical and technical equipments couldn't be provided.

Foam handkerchief usage, shall be arranged so that it aims to remove the organic wastes first and provides the pre cleaning, disinfection and rinsing steps. They can be used for:

- Nasendoscopes
- Transesophageal Echo (TEE)
- Invasive ultrasound probe (tans-vaginal and trans-rectal)
- Manometry catheters
- Laryngoscope

OPHTHALMIC POLYCLINIC

Tonometer

Biometry probes

Pachymetry probes

Goldmann Lenses

Cone Tonometer

Prisma Tonometer

The contact with ocular devices of ophthalmic equipments like ultrasound probes etc. requires sterilization or high level disinfection.

The French Ophthalmology Guide 2011 offers the foam handkerchiefs as an effective, fast and easy method in order to prevent the hospital infections.

For the devices which can't be sterilized, disinfection with a spray having a 70% basis is an alternative method.

The sterile or disinfected materials are kept in the eye polyclinics and they shall be protected so as they are infected again.

After the eye drops are opened, their opening date shall be written on it and shall be kept reserved in appropriate conditions. When the drop is dripped, eye contact shall be removed.

UROLOGY POLYCLINIC

Rigid and flexible cystoscopes and ureteroscopes are critic devices and shall be sterilized with an appropriate method. If sterilization couldn't be provided, high level disinfection is compulsory.

All the surgery and dressing sets used for biopsy and other invasive operations shall be sterile.

Materials used for urodynami, uroflow and sistometry shall be single use, the washing solutions shouldn't be waited on the device, and different solution shall be prepared for each patient.

The device surfaces shall be cleaned with an appropriate disinfectant, and the urinals shall be emptied and disinfected.

PULMONOLOGY

The health story shall be learnt from the patient and patient's relatives and the respiratory infection shall be examined. Necessary isolation measures shall be taken for the patients having respiratory symptoms.

In order to prevent that big particles spread around because of coughing and sneezing, the patient shall wear a mask. Patients having Tbc doubt shall wear a N95 mask. If necessary this patient shall be separated from the other patients.

The mucus samples shouldn't be taken in the examination rooms or waiting rooms. The health personnel shall use protective equipments and shall be careful of hand hygiene.

The used oxygen damping cases shall be sterile. No liquid addition shall be done to these cases.

The nasal oxygen sets and masks shall be for single use, a new set shall be used for each patient.

Nebulizator sets shall be for single use and a new set shall be used for each patient.

The steam machine hoses shall be sterilized or shall be packaged and kept after high level disinfection, rinsing and drying. A different hose shall be used for each patient.

Respiratory Function Test

- Has a high risk in terms of factors of tuberculosis, adenovirus and other social factors.
- The room in which RFT is done shall have a negative pressure.
- A separator shall be between the patient and personnel.
- If the patient has Tbc doubt, s/he has to use a N95 mask.
- A different bacteria filter, single use mouthpiece and nose pin shall be used for each patients in the RFT device.
- Ultraviolet usage in the RFT rooms and examinations room of the pulmonology shall be taken into consideration.

Points to be Taken Into Consideration in the Disinfection Applications

- The working areas shall be planned according to the need.
- A separate room for high level disinfection shall exist. If this is not possible, alternative solutions shall be found.
- High Level Disinfection application areas shall be generalized in the hospital in order to prevent the violation of standards and rules.
- For the portable equipments, the high level disinfection operations shall be done in the Central Sterilization Units and shall be sent to the units by packaging.
- While the contaminated materials are being sent to MSÜ, they shall be transported with closed containers.
- The carriage cases and disinfection cases shall be cleaned and reused after usage.
- While the disinfectant solutions are being prepared the producer firm shall take into account the suggestions.
- The solutions are being inactive very fast after they are diluted. Most of them shall be used in the same day.
- They shall be mixed in a clean and different case with clean water.
- In order to prevent concentration preparation faults, ready solutions shall be prepared.
- The preparation date, expire date, concentration, preparation method of the solutions shall be written and shall be followed.
- Never use low level disinfectant for the disinfection of the critical or semi critical devices.
- The high level disinfectants shouldn't be used for the disinfection of not critical devices or environment cleaning.
- The solutions shall be used with the suggested concentrations and contact periods.
- When a sterile solution is opened, it isn't any more sterile.
- The disinfectant case shall be closed carefully.
- No adding shall be made to the used solutions.
- The staff shall use protective equipment.
- Disinfectant shall be bought for the general hospital not for each unit.
- Areas for hand washing shall exist in polyclinics.
- Eye washing station shall exist in case of a splash.

General Applications

- If contamination with blood and body fluids in all the polyclinic areas are present, the personnel shall wear protective equipments.
- Different gloves shall be worn for the same patients in different interventions.
- The gloves shall be removed without touching somewhere and the hand hygiene shall be provided.
- Irresponsible glove usage shall be prevented.
- During the patient operations, the staff shall go from the clean areas to the dirty ones.
- The infectious wastes shall be removed with appropriate containers.
- When blood or body fluids are spread around first the area has to be cleaned and then disinfected.
- The single use materials shouldn't be used again.
- The used needles shall never be put into their cases and their edges shouldn't be bending. They shall be collected in special containers.
- Wastes shall be classified.
- The staff working in the paediatrics, chest diseases, internal diseases, infection diseases polyclinics shall be taken into the influenza, varicella, rubeola, epidemic roseola vaccine program.
- Periodic "hand hygiene" trainings shall be organized for the staff, the hand hygiene convenience shall be followed.

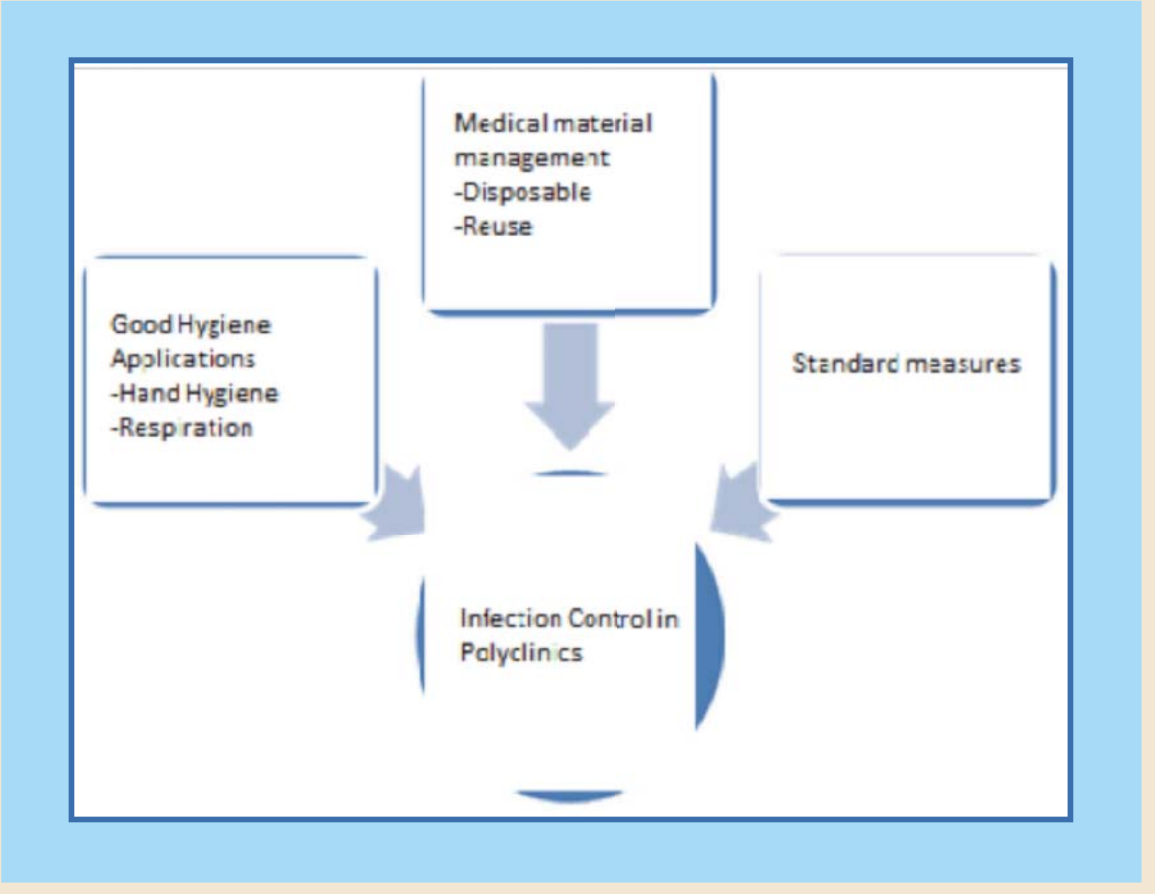
- The patients shall be warned against they have to close their mouth and nose while coughing or sneezing.
- They shall be trained about removing the handkerchiefs they have used and washing their hands.
- Toys shouldn't be kept in paediatric polyclinics, if there are toys their disinfection shall be done periodically.
- The uncritical materials, environment and devices used in the polyclinics shall be disinfected.
- The stethoscopes shall be cleaned with alcohol, the blood pressure monitor muff shall be washed and rinsed with soapy water.
- A disposable muff case shall be used for Blood pressure holter muffs.
- The multi dose medicines used in the polyclinics shall be controlled.
- The pomades, suspensions and syrups shall be labelled after they are opened and their expiry date shall be written, and they shall be kept in appropriate conditions.
- The local anaesthetics shall be removed after usage.
- The EMG needles shall be single used.
- The antiseptic solutions used for dressing shall be labelled after they are opened and their expiry date shall be written, and they shall be kept in appropriate conditions.
- If these solutions will be divided and taken into a different bottle, no adding shall be done. They shall be emptied weekly and cases shall be cleaned and dried and then refilled. The preparation and expire date shall be written on the bottles.
- The ENT units shall be cleaned with disinfectants during the day and the aspiration hoses shall be changed.

As a result the hospital areas shall be classified according to their risk categories.

In order to provide coherence personnel trainings shall be organized. Maintenance shall be provided with frequent controls and inspections.

Hospital principles, standards and rules shall be obeyed.

Patient and personal security shouldn't be conceded for any reason.



DAS Management in Times of Disaster

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Definition

Disaster is defined as a hazard disrupting daily life and public order, interrupting human activities, causing substantial loss of life and property, severe injuries, and significant physical destruction in an extent that is overwhelming the public capacity to cope with and mandating external aid. Disasters can be natural or man-made. We hereby discuss Disinfection-Antisepsis-Sterilization (DAS) management in natural disasters.

The Impact of Natural Disasters on Public Health

Natural disasters represent the most important cause of untimely death, regression in the level of health and deterioration in quality of life. Under disaster conditions, the balance of the relation between humans and the environment is disrupted, creating a new social, physical and biological environment. The difficulty of sheltering in overcrowded environment, migration and massive population movements, ecologic alterations, insufficient general and personal hygiene, problems in infrastructure, inappropriate waste disposal and environmental pollution, limited access to healthy water and food, interruption in delivery of health services, compromised immune system due to malnutrition and psychological stress render individuals vulnerable to infections.

Health Services and DAS Practice in Natural Disasters

Under disaster conditions, the practice of DAS in both emergency and preventive health services is far different than it must be. In such conditions, however, easily accessible DAS methods come to the fore due to disabled usual DAS systems, substantial damage to water supply system and infrastructure, limited facilities and difficulty in achieving minimum hygiene standards. Soap, detergents and bleach are the most easily accessible materials under disaster conditions.

DAS Practice in Emergency Health Services

Overcrowded wards in the field hospitals established after disaster, inadequate water supply and infrastructure, and electric shortages pose significant problem to DAS practice. Thus, chlor solutions appear as an appropriate option to temporarily decontaminate and disinfect medical devices-materials and the environment in health stations until medical aid arrives. Biological agents are neutralized in 5 to 10 minutes when applied with 0.5% hypochlorite solution (1 unit of 5% bleach used in home cleaning diluted with 9 unites of water). Apart from chlorite solution, alcohols, chlorhexidine, iodinated compunds and glutaraldehyde can be used to disinfect medical devices.

A 0.5% chlor solution is prepared in a plastic contained for use in decontamination of medical devices under disaster conditions. Medical devices are mergered in the prepared solution for 10 minutes. Then, the devices are transferred to a basin in front of the sink and mechanical cleaning is performed by water and toothbrush. The devices are irrigated with running water and left for drying. For disinfection in emergency conditions, medical devices are merged in 0.5% chloride solution for 20-30 minutes after mechanical cleaning with detergents and decontamination. The devices are then placed in a disinfected container, irrigated with boiled and cooled water, and left for drying. The devices are placed in a disinfected closed container and kept in a clean and dry environment.

DAS Practice in Preventive Public Health Services

A. Shelter-temporary settlement (tent city and container city buildings): The purpose is to avoid overcrowding in the living area, to provide prevention against disease vectors, and to establish a proper place to ensure environmental and personal hygiene. For this purpose, each family should be provided with a tent-container in a sufficient size, 8-10 mt space should be left between the tents, and the tents should be set up 2 mt away from the roads. The roads should be paved with asphalt or crushed stone. The place of settlement selected should be away from industrial zone, dumping site and natural vectors, and close to roads and water supply sources.

B. Environmental health services: Environmental health services in times of disaster can be often overlooked due to precedence of rescue operations, emergency medical aids and shelter operations. In fact, they are simple, cheap and quite effective measures. From the perspective of environmental health, the first focus is to provide sufficient and clean potable and tap water supply. This is followed by other services such as providing healthy food, toilet-bathroom facilities, waste control, vector control and burial services.

1. Healthy Water Supply

Contamination of piped water in natural disasters is the most serious and top priority public health concern. Therefore, providing clean drinking and utility water appears as the most important DAS activity in areas of disaster. During the acute phase, water requirement per person is 3 liters/day in mild climate conditions but the requirement rises up to 6 liters/day per person in warm climate conditions. The target of 15-40 liters/persons/day drinking and utility water supply should be reached in the shortest time possible.

The existing piped water system supplying the disaster area should be checked for possible contamination. A temporary water supply should be installed if the existing water system is malfunctioning. Central chlorination should be performed if water from the pipe system is to be used. Shock chlorination should be performed by using 100 mg/L for 1 hour or 50 mg/L for 24 hours. But this water should not be used and it is drained off. Afterwards, chlorination with two times higher than normal concentration (high-dose chlorination: 0.7-1 ppm-0.7 mg free chloride per liter) is performed while allowing water use.

During the acute phase of natural disasters, consumption of bottled water offers the healthiest means of providing water supply. If the supply of bottled water is not sufficient, water tank trucks can be used under the supervision of health care authorities. Water delivery through tanker trucks is the most commonly utilized method under disaster conditions. However, consumption of water should be avoided before chloride control is made by the trained personnel upon entrance to the settlement. Open bucket or water reservoirs should not be used due to risk of contamination, and water must be stored only in capped containers with narrow opening for maximum 24 hours. Water tanks in the camp sites should hold at least 200 L of water, should be made of materials allowing easy cleaning, transport and access.

Individual Water Disinfection Methods

Boiling: Boiling water offers a safe method but it is not an economic and practical method. In emergency conditions, boiling small amount of water is appropriate to satisfy individual needs. However, boiling should last at least 1-2 minutes at the sea level and 5-10 minutes in higher altitude.

Filtering: Cotton cloth can be used for filtering of water. Filtering eliminates certain parasites and considerable amount of organic materials. Cotton cloth is placed on the container and water is poured through the cloth to drain into the container. The cloth should be clean; it can be cleaned up using clean water and soap. Furthermore, only one side of the cloth must be used.

Settling: Dirty water can be purified using three containers and settling method to precipitate the debris. Water taken from the source is put into the first container, left for settling for one day, and the water at the top is collected into another container. The next day, top layer of the water is collected into the third container.

Filtration: Filtration should be used if the water appears blurry and dirty, and boiling or disinfection is not possible. Domestic water filtration systems, BioSand filtration systems, ceramic water filters, paraffin filters or mobile filtration devices can be used to gather clean water for individual use. However, efforts should be made to avoid contamination of these systems.

Solar Water Disinfection (SODIS): This method is based on the inactivation of pathogens in the water by solar ultraviolet light. Settling and filtration should be performed first if the water is cloudy and then the water should be placed under the

sunlight. Water bottles are placed at the top of the buildings to which sunlight strikes vertically and left for at least 6 hours.

Individual chemical disinfection of water: This method can be used in emergency conditions to disinfect small amount of water for a small population living in a rural area. However, this method should only be used for limited period until returning normal water. The disinfectants should be disseminated to the public and training should be provided for their use. The water should be settled-filtrated to gather clean water. Hands must be washed frequently during all these procedures. Chloride, iodine and potassium permanganate are the most commonly used disinfectants used for this purpose.

Chlorination for the drinking water is one of the most important advances in the field of public health and it is still the most common and most reliable method for water disinfection. Chlorization at a concentration of 1-2 mg/L (1-2 ppm) strongly inactivates almost all enteric bacteria and viruses within 30 minutes. However, water needs to be boiled in order to kill resistant parasites such as Cryptosporidium. 0.5 ppm-0.5 mg/L residual free chlorination of drinking water for 30 minutes provides adequate disinfection. If the water is cloudy, the amount of chloride should be doubled. Chlorinated water should have a slight chloride odor. If not, the dose should be repeated and left for an additional 15 minutes. Bleach solution used in home cleaning is the readily available chloride solution (sodium hypochlorite). The chlorine content varies between 3 and 10%.

Preparation of 1% stock chlorine solution: Lime paste contains 25-35% chlorine. 40 grams of lime paste (two tablespoons) is dissolved in 1 liter of water and left for 30 minutes. The surface of the solution is collected and precipitating bottom layer is discarded. On the other hand, 1% stock solution can also be prepared by mixing a glass of commercially available 10%-chlorine containing bleach solution with nine glasses of normal tap water. This solution is kept in a closed, dark-colored bottle in a cool environment away from the sunlight. This solution retains its activity for 10-15 days. Dripping 10 drops of this solution into 1 liter of water would be sufficient to gather drinking water and utility water.

2. Healthy Food Supply

Fresh and raw food should be consumed without drying after rinsing with drinking water or should be cooked; food that had a contact with water from an unknown source should not be consumed.

Kitchen tools and utensils and countertop should be cleaned before and after food preparation. Brush and mat-like kitchen tools should only be used in kitchen cleaning, and tools that are used in other places should not be brought into the kitchen. Kitchen swabs should be categorized and the swabs should not be used other than its intended purpose. The swabs should be soaked into boiled or chlorinated water if daily change is not possible. Food containers should be disinfected by soaking them into boiling water for 5 minutes or into chlorine solution for 30 minutes. Kitchen personnel should undergo porter examination. Attention should be paid to the clothing of the employee, and the use of gloves and bonnets should be promoted. Kitchen personnel and waiters must wash their hands with liquid soap for 20 minutes and dry with paper towels before engaging food preparation, after breaks given for any reason, contact with raw meat and before serving.

3. Providing Hygenic Restrooms

In small-sized natural disasters, mobile restrooms can be used until the sewage system is repaired. In acute phase, one toilet should be settleded for every 50-100 people, and the number should later be increased as to cover 10-20 people with one toilet. However, in disasters affecting larger populations, digging straddle trenches is the most practical method. For this purpose, 3 meters wide straddle trenchs are dug one per 50 people away from the water sources. Containers with tap should be placed in each cabin, facilities should be established for hygienic hand washing, and maintenance should be performed to replace water containers and soap. Toilet hygiene should be closely monitored; odor or access of vectors to the toilet should be avoided. For this purpose, pits and cabins should be daily disinfected using lime paste.

4. Waste Disposal

In temporary settlements, domestic garbages should be collected in plastic bags and the bags must be tied firmly, and removed daily. Garbage dumps should be created in appropriate fields within the site and disinfection should be performed daily using lime paste or bleach solution. Leakage of stum from the trash pile should be avoided, and if occurs, disinfection should be performed using bleach solution or similar disinfectants. Children and animals should be kept away from garbage dumps. Breeding of insects and ro-

dents in garbage dumps and solid waste collection sites should be avoided, and pesticides and insecticides should be used for control. If garbage dumps are not used before the disaster, garbages should be burned or buried until the establishment of new garbage dumps.

5. Vector Control

Controlling vector breeding habitats represents the most economic means of vector control. Exposed garbages, animal carcass, collections of waste water, marsh area, burst sewage system and dispersed food peoducts provide suitable environment for vector breeding (Jit). It is essential to avoid the formation of new JIT areas, to eradicate existing JIT areas and to implement chemical control. Application of insecticides, pulverizing larvacides into water collections and outdoor fogging can be used. The staff responsible for applying these agents should be trained and should wear appropriate protective clothing.

6. Burial Services

In natural disasters, human and animal bodies may cause outbreaks of gastroenteritis if they come in contact with drinking water. Unlike earthquakes, flooding brings the highest risk. Nevertheless, dead bodies must be placed in body bags and transported to temporary morgue settlements, and then, should be buried deed enough. It should be kept in mind that bodies can become contaminated, and in cases of unexpected death, burial places should be treated with unhydrated lime or disinfectants. The people taking part in the collection and transport of dead bodies must take self-protective measures and use protective barriers (gloves, impermeable boots, aprons and mask). Contact with blood and bodily fluids should be avoided as much as possible, and these personnel should be administered with hepatitis B vaccine.

C. Personal Health Services

Washing the hands with soap and water is a universal protective measure against fecal-oral transmission of infectious diseases in all conditions. The major problem occurring in disaster conditions is the inadequate supply of water and soap, and inability to install hand washing facilities. This is why hand washing facilities should be prioritized and this must be followed by hygiene training. Compact or liquid soaps, detergents or antimicrobial soaps can be used for hand washing. The use of liquid soap is more appropriate. If bar soaps are to be used, it is recommended that they are hung with a rope in small molds or placed on a dispenser with a hole underneath. Hard water reduces the effect of soap. Detergents can be used in cases where the soap can not be adequetly foamed. The hands must certainly be dried after washing. If possible, personal towels or paper towels should be used. Especially children should be educated about hand washing, playing with contaminated water supplies or toys that came in contact with this water should be avoided.

Northern Transparent Education and Competence for Staff in Central Sterile Services Department

Maria Hansby[1]

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With this letter we would like to introduce you to the VEDAS project, which by the time of the Congress in November, has been finalized and will be in the process of dissemination.

To present our work and the outcome to the WFHSS World Congress audience, would be a great honor and would also, hopefully inspire colleagues in other countries to pick up from us and continue or develop this.

Introduction

Educational EU Commission statement for creating highly skilled workforce:

"To provide job opportunities for all and create a more competitive and sustainable economy, Europe needs a highly skilled workforce able to meet current and future challenges. To ensure this, it is urgent to invest in the right skills and improve matching of jobs with these skills in the EU.

A joint policy initiative carried out in cooperation between the European Commission and the EU Member States, aims to address some of these issues by supporting EU countries and regions in developing more effective ways to analyze skills, required in labour markets.

This initiative gives the opportunity for EU Member States to learn from each other and share solutions by pooling their efforts at the European level, as well as with other international organizations on the themes related to skills upgrading, matching and anticipation."

The development of the health care system, globally and nationally has drastically changed over the last decades. The technical part of the work are much more advanced and complicated today and at the same time, the number of Healthcare Acquired Infections (HAI) are increasing in large numbers each day. General infections, pandemics and HAI engage a large number of people and departments of the society today.

Prevention Strategies

WHO states, that HAI occur worldwide and affect both developed and resource-poor countries. Prevention of HAI is the responsibility of all individuals and services providing health care. Everyone must work cooperatively to reduce the risk of infection for patients and staff. This includes personnel providing direct patient care, management, physical plant, provision of materials and products and training (Prevention strategies for infection control, 2002).

With this in mind The National Board of Health and Welfare (Socialstyrelsen), governmental agency in Sweden under the Ministry of Health and Social Affairs, have, together with the Swedish Institute for Infectious Disease Control (SMI) and Swedish Association of Local Authorities and Regions (SALAR) made a statement regarding the necessity for a formal education for CSSD staff in Sweden. The Swedish education for CSSD staff started 9 years ago and is still developing.

We found the same engagement in neighbour countries and the interest of creating and establishing a mutual standardized education in our countries grew. We had a variety of shorter training opportunities and we found the similar situations and the similar problems.

The group was convinced that we had a lot to learn from each other in this field and were prepared to bring this subject forward, towards a transparent Northern European vocational education for CSSD staff.

Our first meeting was held in Stockholm, April 2009 and in 2010 we applied for EU funding in a Leonardo Da Vinci project to finance our work.

This project and the outcomes was supported by EU Commission for Health and Consumers Directorate, Commissioner John Dalli and Mr. John F. Ryan, on 21st July 2010, themselves, stating the importance in this work and the priority for the Commission to prevent HAI and foster education and training of staff (D:427690).

The project was opened in Helsinki, Finland 2011 and will be finalized and disseminated from September, 2013.

Objective

To produce and establish a Northern European transparent Vocational Educational Training (VET) for CSSD staff, in order to increase patient and staff safety, also including a more environmentally friendly and equalized CSSD.

The educational platform will improve comparability between different modules and outcomes and also increase the mobility and employability of those trained.

We can appreciate an advantage to diffuse the result to fellow colleagues in Europe and the rest of the world, in order to highlight and bring the issue further.

Project Team

We are 10 partners and 7 countries participating, in this Leonardo Da Vinci, Transport of Innovation project.

Sweden

Partner 1: Karolinska University Hospital, Department of BME.

Mr. Lars Carlsson, Director BME and contact person Ms. Anne Clöve, Section manager and also president of the Swedish Sterile Technique Association of SFVH.

Partner 2: University Hospital, SUS Mr. Henrik Dhyre MD PhD.

Contact person Ms. Birte Oskarsson, Manager of CSSD, SUS and also vice president of WFHSS

Partner 3: Reveljen, College for Adult education. Ms. Maria Modin, Financial and administrative

Manager, Project sponsor

Contact person: Ms. Maria Hansby, Project leader

Finland

Partner 1: Hospital district of Helsinki and Uusimaa and HUS/Desiko, Mr. Aki Linden and Mr. Kimmo Mattila.

Contact person: Ms. Tuula Karumäki, CEO

Partner 2: Amiedu College Helsinki, Mr. Seppo Tammisto

Contact person: Ms. Heidi Yisrael- Training supervisor

Estonia

Partner 1: East Tallinn Central Hospital, Mr. Ralf Allikvee

Contact persons: Ms. Anne Sirge-Head of department of Education and Training and Anu Tammemäe - Head of Central Sterile Supply

Latvia

Partner 1: Eastern Clinical University Hospital, Ms. Danuta Lace Chief Manager CSSD

Contact person: Mr. Gundars Lacis, Latvian Infection control and sterilization Association

Lithuania

Partner 1: Vilnius University Hospital, Mr. Alexandras Laucevicius, General Director

Contact person: Paulius Petreikis, Infection control Doctor and Microbiologist

Norway

Partner 1: Kirurgisk Klinikk, Ålesunds Hospital, Mr. Ståle Hoff, Director of Kirurgklinikk

Contact Person: Kari Sletten Helgesen, Manager of Ålesund Hospital Department of Sterile Supply and Theatre ward and President of Norwegian Association of Sterile Supply

Iceland

Partner 1: Landspitali, Reykjavik. Mrs. Lilja Stefansdottir, Chief Executive

Contact persons: Erlín Oskarsdóttir, Manager of Surgical Ward and Helga Kristin Einarsdottir, Manager of Surgical Wards and Director of hospital design.

Workpackages

During the project a number of work-packages have been conducted:

- Terms and definition
- Educational Methods and Materials
- Tutor Criteria
- Examination Criteria
- Validation Criteria
- Dissemination

The work package teams have been identifying and mapping current national educations and guidelines, also investigating the levels of qualification. From this, our own national situations and EU requirements for education, a complete Syllabus and Curriculum including examination, tutor and validation criteria has been produced.

Result

Dissemination for colleagues

We will by October 2013 have finalized our project and will disseminate our work including the complete Curriculum for our standardized VET for staff, working in Sterile Services.

It will be presented before the national authorities during the autumn of 2013 and also for the EU Health Commission in Brussels in September/October.

The project has already helped starting a new education in Iceland and also in Latvia. The Swedish educational provider will also in the future adjust their education in favour of this standardized VET which will help increasing the mobility, work-practice and employability between our countries.

To disseminate the work to colleagues in different countries during the World Congress in Turkey would give us the opportunity to spread our thoughts regarding education for sterile technicians and how our 10 partners see this, as well as providing ideas to anyone who is in beginning of the education progress and needs different inputs along the way.

We would appreciate to hold a presentation from stage and if possible hand out the document to anyone who would be interested.

The work will be presented in digital and paper formats as educational documents.

Internet web-sites publications

The result will be published at our VEDAS web site, to reach a wider, even more global, audience.

Publications and medical journals

The aim is to publish the result in scientific journals focusing on Infection Control and Sterilization, which have a global spread among the groups which are affected by the outcome.

With great hopes that our application will be dealt with and approved.

See you in Turkey in November, 2013.

Best regards,

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Disinfectants and Waste Disposal

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Disinfectants are applied to non-living objects to destroy microorganisms that are living on the objects. Disinfection is less effective than sterilisation. Disinfectants are different from antibiotics and antiseptics, which destroy microorganisms within the body or on living tissue. Disinfectants work by destroying the cell wall of microbes or interfering with the metabolism. Bacterial spores are most resistant to disinfectants, but some viruses and bacteria also possess some tolerance.

Disinfectants are classified simply; we say glycols (for air disinfections), alcohols, aldehydes, oxidizing agents, phenolics, quaternary ammonium compounds, silver, copper etc..

Disinfectants contents a single substance or multiple substans. Accordance with the provisions contained in disinfectants can cause various toxic and dangerous effects. Information about the dangers of disinfectants when are using, handling, storage and waste is material safety data sheets.

Material safety data sheets for any disinfectant contains preventing information for during their use possible adverse reactions, during storage and transportation to consider when, hazard characteristics and procedures disposal.

National and international the rules should be applied to disinfectant waste disposal. These rules are more stringent for disinfectants with ecological danger.

Disinfectant Efficacy Testing

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Disinfectants are chemical agents that exterminate pathogenic organisms and prevent their proliferation. The choice of disinfectants may change depending on the infection risk of the medical devices to be used in medical procedures and patient care and surfaces to be cleaned, the pollution level of the work area, nature of the surfaces to be disinfected, type of the equipment to be used and nature of the disinfectant. Furthermore, the cost of the disinfectant should also be considered during the selection.

Standardized methods are used to determine the efficacy of disinfectants. For this purpose, different standards were developed in different countries. For example, AOAC standards are used in the USA, DHGM in Germany, AFNOR in France, BRI in the UK, CEN in the European Union and the Turkish Standards Institute in Turkey.

In this presentation, it aimed to summarize shortly dilution and neutralization methods that used in the disinfectant efficacy tests.

Classification of Tests

A. TESTS ACCORDING TO THE ORGANISM TO BE TESTED

These tests can be classified as

1. Bactericidal tests for bacteria
2. Tuberculocidal tests
3. Sporicidal tests for bacterial spores
4. Antiviral tests
5. Antifungal tests.

B. CLASSIFICATION ACCORDING TO THE PURPOSE OF THE TEST

1. First-phase tests: It is assessed via this tests whether a developed chemical has antibacterial-antiviral properties or not. Then, the exposure time is assessed. The effect of the presence of an organic material on the tests is investigated.

2. Test of efficacy in private use: In this phase, the dilution values for the disinfectant to be used are identified.

3. Field tests: Its practical usability and efficacy in clinical tests under real-life conditions are measured.

WHICH BACTERIA SHOULD BE USED DURING TESTS

Bactericidal tests are the ones, which are most frequently used. For the measurement of the efficacy of disinfectant testing, the bacteria *Pseudomonas aeruginosa* ATCC 1542, *Escherichia coli* ATCC 10536, *Staphylococcus aureus* ATCC 6538, *Enterococcus hirae* ATCC 10541, *Salmonella typhimurium* ATCC1351 strains are recommended[(1)].

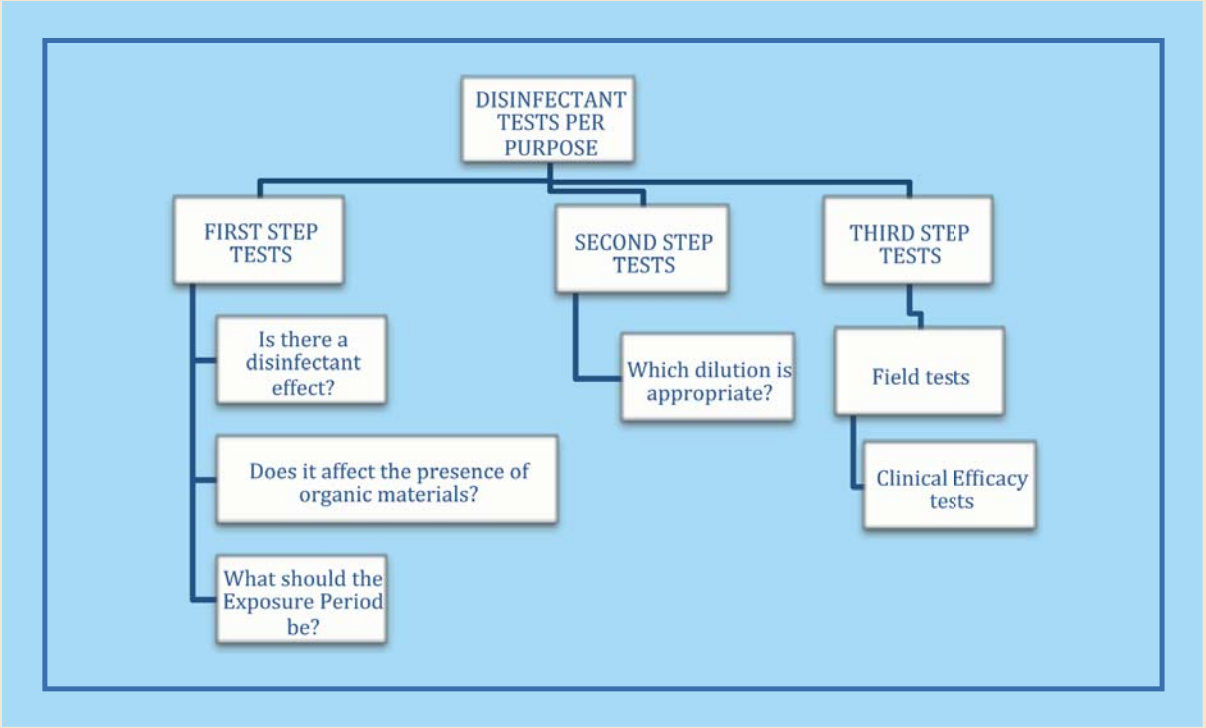
MEASUREMENT OF FUNGICIDAL ACTIVITY

For the fungicidal activity test, the *Candida albicans* ATCC 10231, *Aspergillus niger* ATCC 16404 media are used. In the experiment, the vegetative cells of *C. albicans* and the *A. niger* spores with a density of approximately 7 log. cfu/mL are used.

If a decrease of > 4 log has been achieved in the fungi tested at the end of an incubation period of 24-48 hours, this result is interpreted as the presence of "fungicidal activity".

TUBERCULOCIDAL ACTIVITY TEST

For the performance of this test, *Mycobacterium smegmatis*, rapidly proliferating micro-bacteria is used. During the first tests, it is initially checked whether the disinfectant is effective during the 10-minute-long contact duration. Then, the disinfectant is reconstituted and serum is added to the medium. The highest disinfectant dilute that kills the test is titled the **"disinfectant with tuberculocidal effect"**.



VIRUCIDAL ACTIVITY TEST

Tissue cultures, eggs with embryos and experimental animals are used in searching for an antiviral activity. The method may vary depending on whether the viruses used in the tests are enveloped or not and whether they have cyto-pathic effects or not. First and foremost, the capacity of the virus to be tested to create 50% infection should be identified. This reduction in the titration following the contact with the disinfectant demonstrates the efficacy of the disinfectant. For this purpose, tissue cultures are used at the greatest extent.

IDENTIFICATION OF SPORICIDAL ACTIVITY

The disinfectant-neutralizing agent and spore suspension are mixed. Suspensions containing 2000-6000 spores per milliliter are used for the test. After the mixture is kept waiting at a specific temperature and for a specific duration, the colonies in the mixture are counted. *Bacillus cereus* CIP 7803 and *Bacillus subtilis* var. *niger* ATCC 9372, CIP 7718 are incubated at 30°C for 48 hours and *Clostridium sporogenes* CIP 7939 are incubated at 36°C for 48 hours for preparation. For every strain, suspensions containing 2-6 x 103 live spores per mL are prepared. The experiments are conducted separately for every microorganism. Trials are made for periods of 1, 5, 15, 30, 45 or 60 minutes.

DISINFECTANT TEST ON THE HAND

This test enables the measurement of the capacity of the disinfectant used for removing temporary flora bacteria on the hand. In this test, hand hygiene is assured using a disinfectant for a period of no more than 30 seconds and the level of cleanliness achieved in the hand is compared against the level obtained via standards such as 70% ethanol or 60% isopropanol. The tested material is expected to produce a result that is at least as good as these substances[2].

In conclusion, several in vivo and in vitro tests are available for use in order to test the efficacy of disinfectants. More realistic results can be achieved by mans of the application of these tests in life-like conditions.

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Conception and Development of a Center of Sterilization

Dominique Goullet[1], et al.

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The public hospitals of Lyon represent 14 hospitals in 6 groupings, 5151 beds, 41 operating theatres (o.t.), 123 rooms of intervention. The medical staff consists of 4308 full time agents and the non-medical staff of 17.472 full time agents.

Anticipating the publication of the legislative and statutory texts on the sterilization in France in the 2002s, the general manager wished to reorganize completely the function and the means of sterilization, which, until 2001, concerned 11 establishments, 54 sites (except units of care) for the cleaning and/or the sterilization. The centralization of the activities was, on that time, effective or partial on 7 sites. The equipment represented 50 steam sterilizers, 51 washing machines and 3 sterilizers steam/formaldehyde (Chemiclave), 7 ethylene oxide sterilizers and 1 hydrogen peroxide and plasma sterilizer (Sterrad 100®).

A first project was led from 2002 for a construction on the site of the East Hospitals grouping, but the refusal of the building permit by the Mayor of the city made fail in the very last moment this project in 2006. It was necessary to find intermediate solutions (temporary rehabilitation of 3 sites of central services) in expectation of the realization of a second project.

Main lines retained for this second project were the following ones:

- It is a public hospital service,
- Development of the process without step backward in snail shape and not in shelf space,
- Delivery of the instruments within 24 hours,
- Functioning from 6:30 am till 9:30 pm, reduced on Saturdays (6:30 am-4:00 pm), closure on Sundays and holidays (except when the holiday is Saturday or Monday): this engagement required the upgrade of instruments in o.t. (purchases of instruments for a rough value of 3 M €),
- Versatility of the staff,
- Social support of the staff in three sites in the course of functioning,
- Search for ergonomics and natural light,
- Work in tense thread from the collections to the deliveries of the instruments.

Chronology

The writing of a detailed technical project ended at the end of 2007. A call for tenders for the conception-realization was launched in 2008, and on three candidates, the GCC company gained it for a projected budget of 10.6 M € not including the process equipments of sterilization.

The building permit was obtained in 2009 for a construction in suburbs of Lyon, close to the motorway network (Saint Priest). The construction site began in January, 2010, and ended in February, 2011. All the validation could be performed in March, 2011, just before the opening on April 19th, 2011.

Activity

The activity is the washing, the inspection, assembly packaging and sterilization of 700 containers/day and 2200 bags/day.

The number of customers is 38 operating theaters and 154 units of care, medical technical department or consultations. The total amount of containers for instruments in our hospitals is 6200 distributed in 2700 different varieties.

Surfaces

2200 m² floor space, except technical surfaces

Equipment

- Five washing cabins GETINGE (2 validated for instruments, 3 for transport trolleys and boxes),
- Eleven washers disinfectors 15 trays (8 BELIMED recovered from a central service, 2 MIELE from another central service, intended for the dentistry), able to produce 255 trays per hour,
- Nine steam sterilizers BELIMED 12 STU (5 recovered from a central service), able to produce 108 STU/1, 5 hours= 6 m^3/1.5/hour,
- Two plasma sterilizer Sterrad® (one 100S and one 200),
- Twelve sealing machines,
- One conveyor for containers,
- Seventeen workstation for inspection and assembly,
- Seven workstations for reception and 3 wash station for manual washing,
- Three ultrasound bathes,
- Three steam disinfectors.

Ergonomics

A research for ergonomics was a constant concern, and brought to take the following orientations:

- A conveyor to bring containers from the work stations to the loading zone of autoclaves,
- Tables at adjustable height, comfortable seats and footrest,
- Maximum of surfaces glazed for natural light,
- Automatic loading and unloading of the washers and the autoclaves.

IT Traceability

The Advance® software was selected and is still now the object of evolutions and very important adaptations in partnership with the designer.

For the moment, only the traceability of the process is performed, and only some specific instruments.

Categories and Number of Staff

Except pharmacists hospital practitioners (3), internal hospital students (2) and executives of health (4 including 1 o.t. nurse), the agents are distributed in 3 categories:

- Operating theatre nurses or assistant pharmacist (10),
- Versatile agents of sterilization: help nurses and agents graduated in the field of the health (67),
- Agents for handling, resupplying and maintenance of surfaces (17),
- Engineer of production and team leaders (1 + 4),
- Logistician (1),
- Secretary (1/2),
- Technicians of maintenance shared with the nearby food production site (8).

The total number of staff is 102.5.

Training

- The theoretical training contains 8 modules of 3.5 hours each, for a total duration of 28 hours:

  - E1: generalities on the sterilization and the organisation of hospitals,
  - E2: surgical instrumentation,
  - E3: inspection and assembly in operating trays and containers,
  - E4: washing-packaging,
  - E5: "driving licence" for autoclaves,
  - E6: controls of sterilization,
  - E7: hygiene, dresses and biocleaning
  - E8: role of the operating theater in the process of sterilization

- A training on the knowledge of the operating theatres and the use of instruments, of duration about 4 half-days is performed in different o.t.
- The practical training is realized by compagnonage during approximately 46 days with a training personnel.

Functioning

The Central Sterilization is opened from Monday to Saturday, from 6:30 am till 9:30 pm, by working in 2 teams (6h30/14h20 and 14h/21h30). A team of 3 agents begins at 5:30 am for the cleaning of premises and the starting of sterilizers and washers.

For Saturdays, a restricted team (16 agents) takes in charge the functioning from 6:30 am till 4:30 pm.

There is no on call team.

Logistics

- The external logistics is taken in charge by a private company; 4 circuits and 3 tours by circuit are organised every worked day.
- Internal teams in establishments collect the instruments and the deliver them at their return.

Load Increase

It has been progressive, and was extended from the middle of April, 2011 (approximately 200 containers/day), at the end of 2013 (700 boxes/day), by way of intermediate stages: at the end of 2011: 280 boxes/day, at the beginning of 2012: 450 boxes/day.

During this load increase, at the end of 2011, the staff was about 56 agents for production.

Taking Into Consideration of the Industrial Dimension of the Production:

- By recruitment of an engineer of production and 4 team leaders (optimization of the flow and check of the correct addressing of the trolleys, containers and individual instruments).
- Quality control of the inspection and assembly of instruments in trays, by qualitative daily controls in the hazard (minimum 5 a day) and quantitative by comparison of the number of instruments incomers and number of the outgoing instruments. The situation was so considerably improved on all the plans.

Challenges

- Logistics: it is double, extra-hospitals and intra-hospitals. The latter is a very delicate point.
- Complete IT traceability of the process and of some varieties of instruments: it is a very time-consuming operation for its implementation. At the end of 2013, 65% of the park of containers is traced.
- Contact with operating blocks: difficult to maintain at a high level because of the distances between the Central Sterilization and the "customers".

Key Points

- It is a brand new premise "planned for" and not and old premise adapted "to make with".
- Extended natural light.
- Ergonomics adapted whenever possible.
- Very motivated team.
- Global economy in staff and equipment because of the total centralization (6 agents).

Weak Points

- Distances from the customers,
- Too big, too small.

To be or not to be ISO 13485, Quality Systems in the CSSD

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Quality assurance is part of every CSSD we know, and making a professional work concerns all management and employees teams, so why an additional standard and incremental expenses? Through recent interviews with different sterilization experts in Canada, Belgium and France, interesting thoughts were developed around the necessity to guarantee process control in sterilization, just like industry does.

The presentation will introduce incidents in the sterilizationprocess that we see and those incidents we do not see. Asking five times WHY, unusual root causes were revealed that are not conventional, among them the type of individuals and their recruitment, lack of process control and absence of risk management from the administrators. After a brief explanation of ISO 13485, we will see an unconventional answer to the question "where to start" and who should be made responsible for the broken chain in the sterile process.

Operating Unit Design

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A. PLANNING

1. Planning Models

The operating unit shall be located and arranged to prevent non-related traffic through the suite. The number of operating rooms and recovery beds and the sizes of the service areas shall be based on the service plan and expected surgical workload. The size, location and configuration of the surgical suite and support service departments shall reflect the projected case load and service plan of the Unit. A number of planning models may be adopted including:

Single corridor: The single corridor model involves travel of all supplies (clean and used) as well as patients (pre and post operative) in one main corridor. There is ongoing debate as to the suitability of this approach. However, this option is considered suitable provided:

- The main corridor is sufficiently wide in order to permit separation of passage of goods and services.
- Handling of clean supplies and waste is carefully managed to avoid cross contamination A major disadvantage of this planning model is that a patient awaiting surgery may be exposed to post operative patients.

Dual corridor: The dual corridor model allows for all the operating rooms to be accessed from an external corridor for patients and directly from a central set up/sterile stock room for sterile goods. This model aims to separate "dirty" from "clean" traffic by controlling the uses of each corridor. In this design, there must not be cross traffic of staff and supplies from the decontaminated/soiled areas to the sterile/clean areas.

Clusters of operating rooms: In this model operating rooms may be clustered according to specialty, with a shared sterile stock and set-up room for each group or cluster.

Disadvantages of this model include:

- Additional corridor and circulation space required for corridors around clusters of rooms, which reduces the available space for stock.
- Potential duplication of stock and additional staff requirements may result in increased operating costs.

Dedicated theatres with fixed or mobile equipment: In this model operating rooms are dedicated to specific types of surgery such as hybrid operating/imaging rooms, urology, vascular, neurology or other specialties requiring specific equipment. This may be beneficial in larger suites where the case volume justifies specialization, however, smaller suites may favor flexibility of operating room use. Fixed equipment can preclude the multifunctional use of the room.

TSSU/CSSU: The operating unit is a major user of sterile stock and the location of the instrument processing area and sterile stock is of high importance. There are two main options available for supply of sterile stock to the operating unit:

- A dedicated TSSU (Theatre Sterile Supply Unit) serving only the operating unit.
- A CSSU (Central Sterile Supply Unit) that also serves other areas of the hospital. The TSSU may be located within the operating suite or externally. It is preferable to locate the TSSU adjacent with direct access to the operating suite. The TSSU may also be located on another floor of the building connected by dedicated clean and used goods lifts. The CSSU may be located in a service zone of the hospital. There is a strong functional link between the CSSU and the operating unit; efficient transport of stock to and from each unit will require careful planning.

2. Functional Areas

The operating unit consists of the following functional areas:

- Admissions and reception area for admission of patients to the Unit, with general overseeing of day to day operations, control of entry and exit from the unit and completion of general administrative tasks.
- Holding areas for holding and management of patients prior to their operation or procedure.
- Operating rooms area where procedures are carried out.
- Support areas including storage and management of stock and sterile supplies, disposal of waste and sterilization of smaller items.
- Recovery areas where patients are assisted through the process of recovering from the effects of anesthetics.
- Administrative and staff areas including change rooms, staff room, offices and administrative space for clinical staff.

Dental surgery: In addition to the standard operating room equipment and services, items considered essential for dental procedures are as follows:

- One compressed dental air outlet situated close to the service panels for medical gases, suction and electrical outlets, with the provision of a regulated bottle of appropriate compressed air as emergency backup or secondary use.
- Facilities for dental X-ray.

Laboratory areas: Depending on the service plan and unit policy, an area for preparation and examination of frozen sections may be provided. This may be part of the general pathology laboratory if immediate results are obtainable without unnecessary delay in the completion of surgery.

Staff amenities: Appropriate change rooms, toilet and showers shall be provided for male and female personnel (nurse, doctors and technicians) working within the operating unit. The change rooms shall contain adequate lockers, showers, toilets, hand basins and space for donning surgical attire and booting. Staff change rooms shall be arranged to encourage a one-way traffic pattern so that personnel entering from outside the surgical suite can change and move directly into the operating unit.

Alternatively, the entrance to the change rooms may be planned in direct view of a staff station at the entrance to the operating unit. The change room entrance door shall be provided with locks or electronic access devices to prevent the entry of unauthorized persons into the operating unit.

Flash sterilizing facilities: A flash sterilizer should be located in the unit, however, the use of this method of sterilizing should be restricted to situations where a single instrument has been dropped and there is no sterile duplicate available. Flash sterilizing is not suitable for processing of cannulated, complex instruments, suction and other tubing, textiles, paper or liquids.

Storage: Adequate equipment store room/s for equipment and supplies used in the operating unit shall be provided. Equipment stores shall be provided at the minimum rate of 10 m^2 per operating room.

Note:

- Store rooms do not necessarily require doors.
- Store rooms are best designed in an elongated rectangular shape to allow easy access to all items.

The design of the operating unit should allow for ease of access to the storage areas for delivery of operating unit consumables. Controlled access from an external corridor is highly desirable. Mobile equipment bays shall be provided for equipment such as portable X-ray equipment, stretchers, trolleys, warming devices and mobile equipment. Mobile equipment bays shall comply with standard components and provided at the minimum quantity of one per operating room. Equipment bays are best designed as elongated rectangular shapes and may be combined for space efficiency.

Biomedical store/workshop: An area for testing operating equipment may be included in the operating unit. This room may be collocated with a general store, or a dedicated room for this purpose may be necessary. A direct corridor access to this room is recommended, with controlled access to the remainder of the operating unit.

3. Functional Relationships

The operating unit requires close relationships with the following areas, particularly for urgent cases:

- Emergency unit
- Intensive care units
- Obstetric unit
- Helipad

Links between these units and the operating unit should be rapid, direct and discreet; transit of severely ill patients to and from the unit through public corridors should be avoided.

The operating unit has a direct operation link with the following units:

- Peri-operative unit/day surgery
- TSSU/CSSU

Other units that have a close relationship include:

- Pathology
- Imaging
- Obstetric/birthing unit for caesarean section procedures

B. DESIGN

Natural Light

The need for an external view from the operating room is an important consideration. Provision of windows need to consider the following:

- Vision from the operating room could be through a corridor, set up area or directly to the external environment.
- Many procedures require black-out.
- There are heating, cooling and shading implications for windows in the unit located on the outside of the building that may have an impact on the recurrent costs for maintenance and cleaning.
- Viewing windows from a corridor to the operating room can be useful for supervision and training purposes.
- Windows to recovery, staff lounge and TSSU areas where staff spend a majority of their time, should be given a high priority.

Finishes

Operating units shall have the following finishes:

- Floors that are smooth, non-slip impervious material laid in a continuous washable material and graded where necessary to fall to floor waste; floor material that resists staining is recommended.
- Wall finishes which are seamless, impervious and washable.
- Ceilings which are smooth and impervious.
- Intersections of walls and architraves to be rendered watertight junctions. In all areas where patient observation is critical such as operating room/s, anesthetics room/s, recovery area/room, holding area/room, colors shall be chosen that do not alter the observers perception of skin color.

Infection Control

- Infection control issues are paramount in the operating unit and require careful attention to planning models and separation of clean and dirty workflows.

Infection Control During Construction & Renovation

Planning: Infection control precautions during construction should be integrated into the design and documented from the beginning of the design stage. It is important that the dust and infection control principals developed during the pre-design stage are integrated at the initial stages of the design development. It is important that the pre-design team comprehensively brief the design team and submit the findings of the survey and risk profile.

Risk management: A formal approach to risk management must be part of all building and renovation activities. Risk management should include specific assessment of infection control risks. The design stages of a project shall include an infection control risk assessment.

Airborne sampling may be part of a risk management program. Cumulative data is used to establish indoor and outdoor background levels of filamentous fungi for a particular site. This will enable establishment of risk profiles for particular locations in and around the hospital.

The risk profile should as a minimum:

- Identify the location of high-risk patients in relation to the site.
- Identify ventilation system types and potential impact.
- Determine air monitoring requirements, methodology and frequency.
- Take air quality samples to establish a baseline.
- Identify possible contaminants and their locations (contaminants may be present in ceiling dust, service shafts, sprayed on fire retardants and bird droppings).

Construction: Current construction practices can impact on patient well being by the dissemination of bacteria and fungi that can cause health care associated infections. Building, renovation and maintenance activities within a health care facility impose risks upon the incumbent population unlike any other building site. Building practices therefore require a range of precautions appropriate to the risk. Identification of the at risk population, a knowledge of the transmission route of a likely pathogen and location of the at risk population in relation to the construction, all need to be taken into account in the planning stages.

Infection control measures to consider during construction are:

- Infection control site induction of building workers should be carried out as a major component of the OH & S induction. This induction process should be documented and signed off by each person inducted.
- Worker compliance with procedures should be monitored and the results of this monitoring should be fed back to the workers routinely through the Builder. A system must be in place to manage major breaches.
- Ensure that adequate inspections by the nominated representatives take place during the construction of the barriers. These inspections should be monitored and reported on.

Construction site: Negative pressurization of the construction zone is recommended to maintain correct airflow direction. The exhaust/extraction systems specified in the contract documentation must be constantly monitored and maintained to ensure no failures occur.

If HEPA filtration is required a person must be nominated as the responsible person for that duty. The filters should have differential pressure monitoring with alarms. Spare filter elements must be kept on hand. These inspections should be documented and reported on.

Routine inspections of barriers should be conducted by the hospitals nominated representative from the contractor. These inspections should be documented and reported on. Routine air sampling should be employed by the hospital to monitor the effectiveness of the barriers, pressurization and housekeeping procedures. The routine air sampling should be documented and reported on.

A high level of site cleanliness is essential. It is recommended that tools with efficient dust extraction systems connected to HEPA filters are to be used. Tasks such as sanding plasterboard present a high level of potential risk. Therefore it is recommended that mechanical sanding should be used. Demolition and jack hammering of concrete should be undertaken with a filter unit in close proximity.

HEPA vacuuming, not sweeping, should be used to clean up. Conventional vacuum cleaners disseminate huge quantities of dust and fungal spores and should not be used. Movement in and out of the site shall be controlled by restricting access to only those who have undergone site induction. This will assist greatly in reducing the spread of contaminants. All inspections should be documented including a non-conformance system for defaults complete with a corrective and preventative action loop.

Air sampling methodology: There are two distinct sampling methodologies for the detection of viable airborne fungal spores. These are **high air volume sampling** and **low air volume sampling.** Sampling for viable fungal spores almost universally is via low air volume sampling. Low volume sampling is used to measure high spore concentrations. High volume sampling is used to measure low spore concentrations.

Along with airborne sampling, routine surface sampling should be used. A combination of settle plates and surface swabbing can be employed to augment airborne sampling. Airborne sampling has limitations due to the burst nature of fungi and the transience of bacilli.

It is important to have a clear idea of what outcomes are required of the sampling. Equally important it is necessary to have an approximate idea of the expected number of fungi that will be obtained. This will determine the appropriate sampling system. Refer to ISO 14001 for additional information related to air sampling.

Safety and Security

Access control is required to the patient and staff entry areas of the operating unit. Limiting the number of entries and locating the reception area with direct overview of entry areas is highly desirable.

C. FUNCTIONAL RELATIONSHIP DIAGRAM

Operating Unit Functional Relationship Diagrams

The relationships between the various components within an operating unit are best described by functional relationships diagrams. The requirements for infection control and patient management result in a number of planning "models" that have proved successful through numerous built examples and many years of practice. Most operating unit plans are a variation of one of these "models".

In reviewing and using the enclosed operating unit flow diagrams, designers should carefully consider a number of issues:

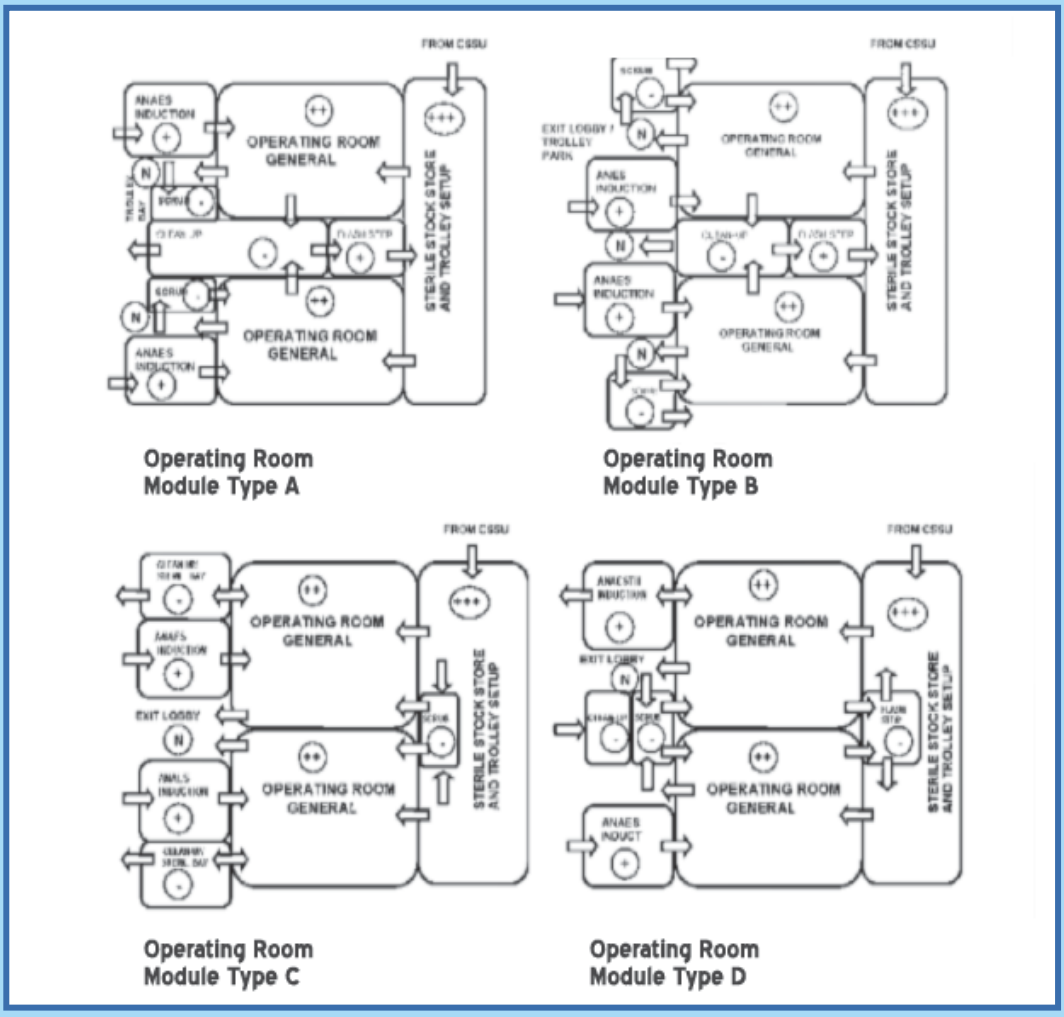
- Each flow diagram represents a method of managing the patient access, clean/dirty flow, air pressurization, sterilization of dropped instruments etc.
- The diagrams are different but each addresses the issues involved in a satisfactory manner. Each option may suit a different management mode or building configuration.

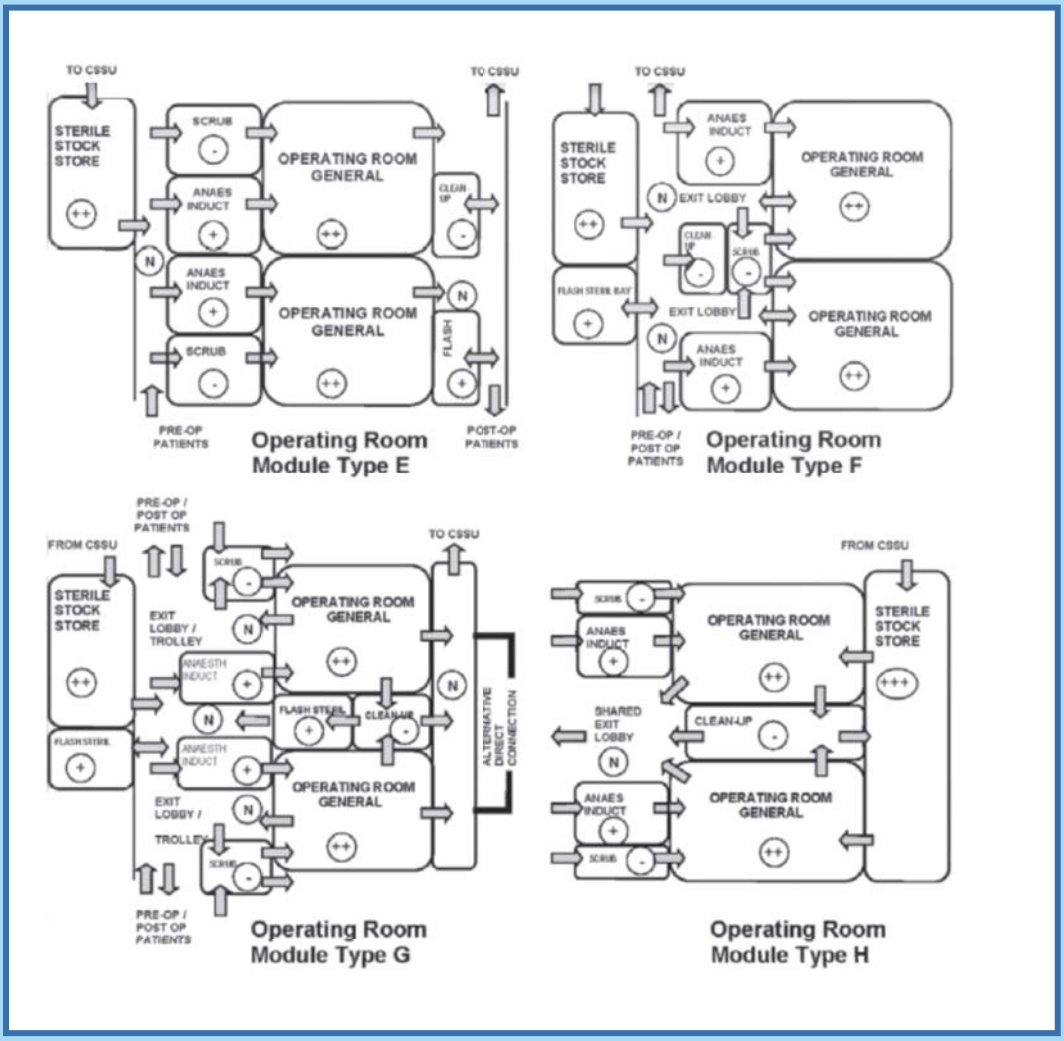
• Designers are strongly cautioned against creating hybrid options by combining features of various diagrams. This may result in wrong clean/dirty flows or other unacceptable features. If in doubt, designers should seek advice from specialist operating room consultants and infection control nurses.

The functional relationship diagrams in Enclosures 1 and 2 show base linear models. The models can be stretched to create the number of operating rooms desired. The support facilities required also grow with the number of operating rooms.

Each module includes the configuration of:

- Operating rooms
- Anesthetics induction rooms
- Scrub bays or rooms
- Sterile stock store/set-up room
- Clean-up room
- Flash sterilizing bay





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Architecture of Central Sterilization Units and Their Restructuring

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The central sterile services department (CSSD)s collects the contaminated materials from the different places in the hospital, processes and delivers them to the user again. These centres provide service for 24 hours and 365 days; they are connected to the operating theatre, but they are independent centres.

In ideal CSSD restructuring processes; hospital administrators, doctors and nurses experienced on the subjectmust take part, in addition to experienced architects and engineers in this area that can give scientific and technological support.

Central Sterilization Unit team should consist of administrative personnel, nurse, technician and assistant personnel. It is also suggested that there should be biomedical technicians responsible of solving the tool and complicated device problems, in the team.

CSSD personnel number is determined according to the bed number, outpatient number, operating theatre room number, daily operation number, workload of the units, which CSSD serves, and duration of the service periods of the CSSD.

Material current direction in CSSD must be a one-way direction from the contaminated area to the clean area, and from the clean area to the sterile area. CSSD must contain Contaminated Area, Clean Area, Sterile Storage Area and Support Areas. The workload of CSSD may vary according to many factors, such as bed number, operation number, intensity of the use of disposable materials. That's why, the ideal space required for aCSSD may differ from one hospital to another. However, as a general scale, a CSSD should be planned as 0.5 m^2 per bed. If there are fewer beds than 200, it must be 1 m^2 per bed. (e.g.; for 100 beds, 100 x 1= 100 m^2, for 300 beds, 300 x 0.5= 150 m^2). The area of the CSSD generally should be planned as 35% contaminated area, 35% clean area, 20% sterile storage area, and 10% support area. There should be directional signs and emergency exit signs in CSSD.

CSSD Decontamination Area

It is the area; the unsterile materials are accepted to the unit. The tools and materials are classified, cleaned and decontaminated. As the microbe- and particle- originated contamination is probably at high-level in the decontamination area, environmental contaminants should be controlled and cleaned/disinfected periodically.

In addition, the decontamination area should be physically separated from all the other areas of procedure, and its entrance should be from a different service hallway. This area should contain the followings:

- Hand washing sink,
- Table to receive, control and record the items.
- Bath and tablefor manual cleaning
- Automatic washing machinewith Two-doors.
- Ultrasonic cleaning machine
- Air and water gun system
- Chemical disinfection area
- A special areafor cleaning-disinfection of transport cars and containers
- A storage area for solutions and materials used in this area.

CSSD Clean Area

Clean area contains the following areas: Area for checking and caring the cleaned items, packaging area for sterilization, storage area for the packaged items waiting for sterilization, area for loading the sterilizators.

Steam sterilizers and other (ethylene oxide, hydrogen peroxide) sterilizers are also in this area. Ethylene oxide sterilizers should be placed in a separate compartmental space (glass partition is recommended); it must containspecial ventilation and gas control detectors. It must be suitable for emergencies such as gas leakage. Section chief's office, rest and seminar rooms of the personnel should be in the clean area or support area (ISO Class 8 of standards EN ISO 14644-1).

CSSD Sterile Material Storage Area

In thisarea, the sterile and clean materials are stored before delivering to the user. Area size may differ according to the facility workload and circulation.

It is very important to maintain the sterility of a sterile materials until the point of use. The contamination of these items must be avoided in the storage areas.

- The only function of a sterile storage area is to store the clean and sterile items. It must be a separate and closed section with limited access.The ventilation system should be designed to provide the flow of the air from the sterile area to the outside with positive pressure.
- Material shelves should be at least 25 cm high from the ground. The distance between the top point of the materials at the top shelf and the ceiling must be at least15 cm. Shelves must at least 5 cm away from the walls in order to maintain air circulation.Shelves must be secured.
- Fire valves should be in reachable range for the fire safety.
- Items should be grouped during storage, e.g. according to the package type, surgical branch or using purpose.

CSSD Support Areas

In order to maintain the uninterrupted function of the above-mentioned main structure, support areas are needed. This part must contain storage area, air compressor, electric generator, uninterrupted power supply, uninterrupted water softener-deioniser systems, waste space or room, education& resting& changing rooms, toilets, showers.

Laundry and Textile Preparation Area

If there is textile in CSSD, they should be examined, folded and packed in a separate section in the clean areain order to prevent the laundry lint passing to the other sections of the clean area.

Air flow should be of downdraught type and the number of the air changes must be 10 air changes/hour. This system should minimize the fibre particles in the air. There should be adequate space and shelves to store clean laundry and wellilluminated control table.

Hand Washing Sinks and Places

- Hand washing sinks should be placed between the crossings of dirty, clean and sterile areas.
- Liquid soap and paper towels must be present beside to sinks.
- There should be hand sanitizer beside the sinks.
- Hand washing sinks should also be in the all personnel support areas such as resting areas.
- Surgical-type taps or taps with photocell arerecommended in order to reduce the cross contamination risk.

CSSD TECHNICAL and ARCHITECTURAL HARDWARE

Floors and Walls

If ceramic is used, the ceramics used should be resistant against cracking and must be in big sizes (> 30 x 30 cm). High quality and durable joint filling should be used for the ceramic breaks. Since the cleaning and disinfection of the joint cracks are difficult, these breaks should cause growing of microorganisms. For this reason, ceramics should not be preferred for the ground; instead monolithic floor coverings such as PVC must be preferred.

In the new structures or in big renovation processes, surfaces, and wall - base junction points should be monolithic, inarticulate. The corners should be rounded.

To clean all the process areas periodically, surfaces and walls should be made of the materials strong enough to endure vacuuming and washing.

Wall paint should be smooth, antistatic and epoxy paint to prevent the microorganism to colonise.

Materials shouldn't be affectednegatively from the chemicals used for cleaning.

Floor material should be easy to clean and resistant to tear.

Floor colour should be chosen in a way that, when an item falls onto the floor it can be seen easily.

Ceilings

The ceilings should be a flat surface to minimise the condensation, dust accumulation and probable contamination sources. The pipes and other fittings on the workspaces should be covered. However, the pipes and other fittings should be designed easily accessible when required. Ceiling height is suggested to be minimum 280 cm in the new units (Ventilation in low-ceilinged units may be insufficient).

If the suspended ceiling is preferred, big sized (e.g. 60 x 120 cm) and washable plates should be preferred.

Materials, which shed particles or fibres, shouldn't be used in the construction of the ceiling.

Ventilation

Central Sterilization Unit ventilation should provide at least 10 air changes in every hour. No tool that causes air turbulenceshould be used.

Air circulation system should be downdraught and the air should flow from clean areas to dirty areas.

Ventilation should work non-stop 24 hours.

In clean areas, minimum 15 air changes (preferably 20) per hour should be provided. The positive pressure difference between clean area and dirty area should be 30 Pascals.

Particle count in the air should be under the level specified in EN ISO 14644-1 ISO Class 8 standards.

Temperature and Humidity

Workplaces should be at the temperature that provides personnel work comfortably. It is suggested that the temperature must be 20-25°C and humidity must be 40- 75%. While determining the temperature and humidity rate of these areas, the temperature and humidity caused by the devices should be taken into account.

Illumination

Choosing the lights for all areas of the CSSD including decontamination, preparation and packing, sterilization, processing, sterile storage and distribution is important.

General examination	50-100 watt
Detailed examination	100-200 watt
Sinks	50-100 watt
General working areas	20-50 watt
Sterile depots	20 - 50 watt

Properties of the Water Used in the Processes of Sterilization and Disinfection

There should be uninterrupted water for 24 hours in Central Sterilization Units. The water which comes from washing and pressurized water guns/ last rinse water should be softened. To acquire soft water, there are usually ion exchangers called water softening devices in the hospitals. Caand Mg ions are removed from the water and soft water is acquired with these devices.

Silica (SiO_2) content	under 1 mg/L
Chloride content	under 2 mg/L
pH	between 5-7

The water hardness which the steam is produced for the sterilization process should be under 4 dH German hardness. According to EN 285, the highest values which can be found in the water to acquire steam are as follows.

SiO_2	0.01 mg/kg
Iron	0.1 mg/kg
Cadmium	0.005 mg/kg
Lead	0.05 mg/kg
Other Heavy Metals	0.1 mg/kg
Chloride	0.1 mg/kg
Phosphate	0.1 mg/kg

For a good CSSD service, a unit which is produced for the right place and in correct architectural qualities is needed. Devices can change, personnel can change, when required, however it is very difficult to change a unit. For this reason, it is the fundamental of a work to work with the professionals at the beginning and make an accurate start.

Current Threats to the Attainment of SAL within a CSSD, do we Underestimate Them and are There Technical Solutions? A CSSD Managers Point of View

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For a terminally-sterilized medical device to be designated "STERILE", the theoretical probability of there being a viable microorganism present on/in the device must be equal to or less than 1×10^{-6}. This probability is called sterility assurance level (SAL). This concept is based on the assumption that the inactivation of microorganisms by physical or chemical means follows first-order kinetics. The SAL $\leq 10^{-6}$ as the quantitative end-point which has to be guaranteed by a sterilization process is not based on scientifically proven data, but is only a rule of approximate values.

The elimination of microorganisms from a product during sterilization is a time-dependent process, influenced by the intensity of treatment and the initial microbial contamination level. During routine work in Central Sterile Supply Department (CSSD) we have been coming accross some risks associated with non-condensable gases, improper cleaning and excessive condensate. But the effects of these risks on sterilization cycle cannot be seen easily.

In this session the results of a study, questioning basic theory of sterilization and SAL will be discussed. These results have been proved that SAL theory following first-order kinetics cannot work in case of excessive condensate and confirmed the insufficiency of chemical and biological controls in routine use. Consequentially, need for alternative methods, for evaluating efficiency of sterilization procedures and determination of SAL will be discussed.

Excessive condensation on the instruments is one of the most important and frequent problems in CSSD. Traditional variables which are in use at present for describing efficacy of sterilization cycles may not be enough in case of excessive condensate. In these circumstances, implementation of new variables to show efficacy of complete sterilization process consisting of sterilization cycle, environment and subject of sterilization are necessary.

These new variables can be used by producers of reusable medical devices to determine capability of their reprocessable products to be sterilized with values which are correlating to physical properties of standardized sterilization cycles.

Systematic Comparison of the Ability of Commercial Cleaning Indicators to Predict Process Failures

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Introduction: A variety of commercial indicators are used to monitor surgical instrument and endoscope cleaning processes in hospitals. There is little data to explain what these indicators respond to during the cleaning process and, as such, what any failed tests mean. Test rigs for both instrument and endoscope cleaning were established to allow critical cleaning factors to be analysed singly and in combination. To compare the ability of cleaning indicators used in automated washer-disinfectors (AWDs) and automated endoscope reprocessors (AERs) to report process failures.

Materials and Methods: Test rigs were set up to mimic washing of either surgical instruments or endoscopes and benchmarked against the performance of AWDs and AERs in UK hospitals. Commercial cleaning indicators were used in repeated cycles to evaluate the effects of cleaning time, detergent type and dose and process temperature. Results were recorded both visually and using image analysis. Quantifiable enzyme-based cleaning indicator devices (to be marketed under the name WASHtAK and LUMENtAK) were used as comparators.

Results: The commercial indicators showed variable responses to different wash parameters. Six out of 7 indicators were deemed as passes (according to manufacturers' instructions) after 10 minutes of a 15 minute cycle, and at 25% of the recommended detergent dose. Five out of 7 indicators were also passes when the process was run at 22°C compared to the recommended 50°C. The enzymatic indicators provided quantifiable measurement of cleaning efficacy across a broad range of process parameters.

Conclusion: Results from commercial cleaning indicators must be treated with caution when assessing whether a process has performed as required. A quantifiable process indicator potentially has significant value in monitoring and managing these processes.

Implementation of Feedback Experience Committee in CSDD

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Introduction: Risk management using feedback experience is now recommended by the French Health Autority (HAS) in all hospital settings. This method is based on aeronautical experience requirements to prevent accidents.

Materials and Methods: Implementation of feedback experience committee has been settled at CSSD of Chambery since January 2012. Each month, the committee analyses precursors events or incidents observed and declared by our coworkers. The analysis method used is called ORION®. This is a systematic method, easy to learn for each members of the committee. This method proceeds in different steps: rebuilding the chronology of facts resulting in the considered event, identifying causes and contributing factors, proposing correctives actions and following their implementation.

Results: In 2012, 216 events were declared and collected at CSSD. Seven events chosen by the committee were investigated and 70% of corrective actions were realized. The purpose of this conference is to present how to implement a feedback experience committee at CSSD and to prove, by using examples, how this method can be an effective tool to improve quality and security in CSSD.

What's New in the Field of Sterilization and Disinfection?

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Sterilization

Developments in sterilization technologies that are applicable to health care facilities have followed the trend of the decades, a focus on low temperature sterilization systems. The aims of the developments are shorter cycles, improved materials compatibility, environmental friendliness, and reduced costs. Low temperature sterilization systems are main target of industry. Commercially available low-temperature sterilization systems have been enhanced, and newer technologies are moving toward commercialization.

Hydrogen peroxide gas plasma: The STERRAD® 100NX Sterilizer uses low-temperature H_2O_2 gas plasma technology for sterilization of heat and moisture sensitive medical instruments and devices was cleared by FDA in September 2012. New technology has expanded the number of cycleoptions currently available for the system.

Vaporized hydrogen peroxide: Vaporized H_2O_2 using commercial system V-PRO was devolopped by Amsco and cleared in August 2011. This system removes moist during conditioning phase to optimize sterilization with the vaporized H_2O_2.

Ozone + hydrogen peroxide: A new technology came from Canada as a low temperature sterilizer. The STERIZONE® combines vapor H_2O_2 and ozone (O_3) in one process to createa synergistic effect for enhanced microbial inactivation. The sterilizer isdesigned for sterilization of heat and moisture sensitive instruments including flexible endoscopes.

Sterilization Monitoring

New rapid readout BI: Super Rapid Readout Biological Indicator System (3M) provides faster read out times for steam sterilization processes than currently available BIs. The BI for gravity displacement cycles was cleared by FDA in April 2011. It has a 30 minute incubation time until a negative result. The BI for vacuum-assisted steam sterilization cycles was FDA cleared in October 2012. This BI has a 1 hour incubation time for acceptance of a negative result.

Disinfection and Surface Disinfection

Chemical disinfectants: Glutaraldehyde formulations is being continued to be developed.Glutaraldehyde + isopropyl alcohol was cleared in 2012. More oxidizing chemical formulations such as new formulations of H_2O_2 and peracetic are in market. A newer intermediate-level disinfectant formulation (STERIPLEX SD) is active to *C. difficile* spores within five minutes and no toxicity was reported. It was registered by EPA in December 2011. The active component of this new formulation is 22% H_2O_2, 15% PAA, and 0.015% silver.

Environmental disinfection: Frequently touched environmental surfaces can be contaminated with epidemiologically important microbes. Present methods for surface disinfection have been improved to address respective limitations and create viable alternatives for decontamination/disinfection of surfaces in room size areas. These "area decontamination systems" are intended to supplement health care facility cleaning and disinfection procedures, which studies have shown to be lacking in effectiveness. Hdrogene peroxide vapor (HPV) and UVC are most popular new decontamination methods of the last years. It has beenfound that both HPV and UVC decontamination reduce bacterial contamination in patient rooms. Of the two technologies, UVC decontamination is easier

to use and has significantly shorter cycle times, can be administered by personnel with only limited training, and does not require monitoring by personnel during the process.

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Instruments and Their Features Used in Dentistry

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Right diagnosis is the basis of modern treatment. Attempt to reach a correct diagnosis in dentistry, the hand tools and instruments keeps an important place. In oral examinations, mirrors, sondas and pressels are indispensable hand tools. Especially, they ease the diagnosis by showing the inside of the mouth macroscobically.

ORAL SURGERY WORK AREAS: All the surgeries that include jaw and nearby zones and davies, elevators, hemostats etc. are some of the most common instruments used in surgery.

Their features are to be used in the surgeries of the teeth, properly made for the anatomy of oral zone. For tooth extraction, davies are most common used objects. This instrument helps to remove the tooth from alveol bone.

Elevators: Secondly most common used in normal tooth extractions and most common in complicated teeth. It is used to seperate the mucoperiostal layer, to extract the root, to extract dental caries that are not proper for Davy applications and to raise the tooth in the cavity before using Davy. Another way to raise the bone is putting dynamic hand tools on Fizyodispenser device by using different kinds of tips (burs). The benefit of this way according to other methods is that, the distress of osteotome and hammer is absent and the patients are less affected due to mechanic traumas.

Dental burs: Stain burs were firstly used proper to today's formation but because it did not cut the tooth easily, to product using other substances was tried; so silicone, carbide and diamond burs were used. Studies with the speeds of tips were made and it was seen that diamond and tungsten carbide burs were successful at high rotations.

Surgery burs are made longer and wider according to normal burs to work comfortly. The ones with "fissura" are wider to impede bone powder plugs.

PIEZO surgery device (CUTTING BONE): Is a system that's developed to cut bones with microvibration. Microvibration is got by changing electric flow to ultrasonic waves. It's spesific and sharp.

PERIODONTOLOGY; Periodontal instruments are prepared for scaling, root surface smoothing, curettage of gums or to clean the enflamed tissue. Root planning and curettage: Universal and spesific curettes; Gingivectomy-gingivoplasty: Gingivectomy surgery sets; Flep surgeries-Flep sets.

IMPLANT SURGERY; Implants are artificial tooth roots that are made of titanium and placed instead of lost or congenitally absent teeth. The implant sets are usually supplied by the firm of the implant product. The Sinus Liftings Set is used during the operation. The implant set has much details and includes implant burs.

ENDODONTICS AND RESTORATIVE DENTISTRY; The instruments used in endodontics and restorative dentistry are; examing set, Tirnerf, canal files, Gates Glidden burs and other burs. They are mini made and useful for narror working areas. The aerator burs must be steel or diamond, easy to use, sharp and stainless.

ORTHODONTICS; The basement of ortodontic treatment is moving the teeth in bone, by using suitable forces. Wire bender and cutting nippers, band uprooting nippers are some of those instruments. They are sharp sided. They have semi critic area function as well as critic area function.

Sterilization and Disinfection at Mouth and Dental Health Centers

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In orthodontics, disinfectants are used in general before sterilization for those to be sent to the prosthesis laboratory and for the disinfection of the unit water at the stage of cleaning the dental instruments. The sources of infection in orthodontics are hands, saliva, breathing, secretions, blood, aerosols, nose secretion, splitting drops, and orthodontic tools, materials and instruments. In dentistry, the microorganisms may enter the body through breathing, digestion, contact with the mucosa, and inoculation. In dentistry, infection through water takes place during the utilization of air and water guns, hand instruments with high revolution speeds, or ultrasonic curettage instruments. Various studies and researches showed to us the existence of bacteria from such families as legionella and pseudomonas in the dental unit waters. The dental unit water must have the qualities of drinkable water (potable water). The water used in such application as implant applications must be sterilized.

Disinfection and Sterilization in Prosthetic Dentistry

Sodium hypochlorite or iodophor may be utilized in the disinfection of hydrocolloid measurement substances (alginate). It is proposed that polyether measurement substance should be kept in hypochlorite solution for 2 to 3 minutes for the purposes of keeping and guarding the dimensional stability because polyether measurement substance is hydrophilic. For zinc-oxide eugenol measurement substance, any disinfectant solution may be used other than chlorine compounds. For the disinfection of acrylic prosthesis, iodophor or chlorine compounds are preferred. Despite the fact that iodophor or sodium hypochlorite is corrosive on the chromium cobalt alloys, their short timed disinfection is sufficient. After the disinfection process the acrylic prosthesis may be kept in the diluted mouthwash.

Sterilization and Disinfection in Orthodontics

Even though the sterilization of orthodontic instruments in autoclave is preferred, this may cause bluntness of the cutting edges and corrosion. And the biggest disadvantage of sterilization with dry air is that the time that it takes is very long and another negative factor is that the high temperature may cause harm to the instruments.

Sterilization and Disinfection in Treatment and Endodontia Clinics

The caps must absolutely be sterilized or disposable ones must be preferred. The guttapercas used in endodontic treatment must be sterilized because they touch periapical tissues. In order to protect the root canals from infection during endodontic treatment, rubber dams may be utilized.

Oral Diagnosis, and Sterilization and Disinfection in Radiology

After using X-ray instruments, each and every part that has been touched with hands must be wiped with a disinfectant solution. Films that are taken out of the mouth of the patient must be kept in sodium hypochlorite for 10 minutes.

Sterilization and Disinfection in Oral Surgery and Periodontology

All of the instruments and materials used in such clinics are included in a group which we classify as critical, and therefore their sterilization is

a requirement. In addition, the water coming to the units may cause microbial contamination. For this reason, in oral surgery, the physio-dispenser instrument and physiological solutions must be used.

We can summarize the measurements that can be taken at mouth and dental health centers with respect to the control of infections shortly as follows; Surfaces must be covered with disposable covers in order to be safe from contamination. If they cannot be covered they must be disinfected. The patients must wear disposable paper aprons and protective eye-glasses and rubber dam acording to the sort of the operation to be carried out. In order to decrease the number of microorganisms in the aerosol the patients must wash their mouths water that contains chlorhexidin. Strong saliva absorbers must be used. Operations and work must be carried out with sharp instruments and needles without causing injuries. After the treatment, all the instruments must be sterilized or disposable instruments must be preferred and used. Autoclave sterilization should be preferred. The measurements, waxed moulds, and apparatuses to be sent to the dental laboratory must be disinfected and swilled. They must be cleaned and sterilized according to the features of dental hand piece and angldruva. The formation of bio-film layer inside the water canals of the dental unit must be prevented regularly with disinfection or filtration. Convenient sterilization, disinfection, and decontamination procedures should be determined, adopted, and implemented under the guidance of sterilization guides in line with the organizational policies.

Technology, Machines, Robots: Getting the Instruments Clean Requires the Human Factor

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This paper brings to the forefront the importance of having human beings working in the CSSD that are capable of critical thinking. It is the job of the sterilization technician to aid in the eradication of bacteria. Statistics from the CDC show that an estimated 1.7 million HAIs occurred in 2002 were associated with approximately 99.000 deaths. The human factor plays an important part on the infection control team to assure that the instruments are clean and free of bacteria. Surgical site infection should not be an issue in CSSD.

The day in and day out activities of the CSSD team requires the eyes and knowledge base of a human being. The human factor allows an instrument that is not quite clean to be re-washed. All of the new and modern technology aids the human in working smarter rather than harder. Rapidly changing technology and machines can't replace the human factor needed in this process.

This presentation outlines the importance of the human in the cleaning of instruments in a CSSD. The human factor in a CSSD reduces the possibility of a surgical team receiving contaminated instruments for a case. It is our fiduciary responsibility to process instruments according to best practice, and regulatory requirements. Machines and robots can aid that process but they will not replace the human factor needed to succeed.

Decontamination of Medical Devices from Human Prions

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Prions, proteinaceous infectious particles causing fatal transmissible spongiform encephalopathies (TSEs) such as Creutzfeldt-Jakob diseases (CJD) or its variant (vCJD), rank among the most tolerant pathogens to disinfection and sterilization. Accordingly, prions constitute both challenging agents as well as informative test pathogens for the reprocessing of medical devices. The efficacy of cleaners, disinfectants and sterilization processes against prions is commonly being assessed with the help of model TSE agents from animals. However, recent studies have shown that human prions may be more resistant to specific chemical formulations or steam sterilization procedures than animal model prions. Therefore, reprocessing procedures found to be effective against such test prions from animals need to be validated for authentic human TSE agents. For this purpose, we have devised Western blot and protein misfolding cyclic amplification (PMCA) assays that allow the sensitive quantification of pathological prion protein (PrP^{TSE}) and prion-associated seeding activity, respectively, from patients with sporadic CJD (sCJD) or vCJD.Findings from cleaning-, disinfection- and sterilization studies using these assays for probing the decontamination of medical devices from human sCJD- and vCJD prions will be presented.

Legal Responsibility of Health Care Providers in Respect to Health Care-Associated Infections

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Health care-associated infections are the most frequent adverse event in health care delivery worldwide. Health care-associated infections, or "nosocomial" and "hospital" infections, affect patients in a hospital or other health care facility, and are not present or incubating at the time of admission. They also include infections acquired by patients in the hospital or facility but appearing after discharge, and occupational infections among staff. Of every 100 hospitalized patients at any given time, 7 in developed and 10 in developing countries will acquire at least one health care-associated infection. In high-income countries, approximately 30% of patients in intensive care units (ICU) are affected by at least one health care-associated infection. In low- and middle-income countries the frequency of ICU-acquired infection is at least 2-3 fold higher than in high-income countries.

In recent years, after using bundle cares strictly, some hospitals achieved zero or near to zero nosocomial infection in some areas (catheter-related bacteremia, ventilator-associated pneumonia, catheter-related urinary tract infection).

Nosocomial infections are related with almost every discipline of the medicine especially with surgical specialty areas. Nosocomial infections increase morbidity and mortality; increase hospital stay and increase the costs. Also nosocomial infections produce some legal issues for the institutions and the health care providers. In recent years, there appears increase numbers of patient complaints about nosocomial infections in our country and in the world.

Health care providers may be opened judicial, legal, administrative, and occupational investigations. Medical and surgical interventions of the physicians may pose some risks to the patients. Being an inpatient itself, the interventions and surgery in the hospital are the risk factors for the nosocomial infections.

In developed countries, there has been a long and active fight against hospital infections. Although this issue is under discussion for 20-25 years, the legal support was only possible after the legislation of "the regulation of inpatient institutions" released in Official Gazette dated 11 August 2005, number 25903.

After this regulation, it is an obligation for both state hospitals and private hospitals to establish a control committee and make this committee working effectively. According to the regulation, the committees are responsible for such essential duties as establishing an infection control program, writing down the standards of infection control, educating the staff, making surveillance and determining the control programs after the data of surveillance, and contributing to the standards of using antibiotics and disinfectants. The regulation clearly describes the roles and the responsibilities of infection control physician, infection control nurse, and infection control staff and states that the sub-committees can be established when needed.

After the regulation, there should not be any hospital without an infection control committee. The regulation not only established a committee but also clearly defined the roles and responsibilities

of the committee and necessitated the interventions. Hospital management has been obliged to establish an infection control committee and to support it for its studies. The committee has been obliged to perform the defined duties. The managers of the hospitals can be investigated if they do not establish an infection control committee. If the committee does not exist or inactive, the managers and health care providers may be opened judicial, legal, administrative, and occupational investigations especially when an infection or outbreak is seen. In that case, depending on the characteristics of the event, the unit in which the event took place and the committee may be responsible alone or together.

In our country, the main problem in nosocomial infections appears to be the diagnosis, treatment, and follow-up of the infections developed after the surgery. Among surgical units, obstetrics and gynecology, general surgery, urology, and neurosurgery are the main problematic units.

Furthermore the applications and interventions in neonatal and adult intensive care units may be complained. Recently, the complications of repeated use or sterilization of disposable instruments (i.e. endophthalmitis following cataract surgery) have been noted. Common errors in surgery are failures to consider the postoperative infection possibility in the early period, to obtain the appropriate culture, to initiate the appropriate antibiotic treatment, to request infectious diseases consultation, and to record the events. It is also noted that control of hospital infections is not maintained appropriately, and records of the events (especially sterilization control records) are not adequate.

Incorrect medical application, "malpractice", is an unfair treatment or application of a professional in his/her profession. In order to say neglect in the area of nosocomial infection, there must be the following main elements: a task that should be done, negligence in that task, damage caused and affordable.

The plaintiff claims that an infection is a nosocomial one and emerged due to the negligence of health workers such as physician or nurse, these related elements should be evaluated in this case. In the inquiry of a nosocomial infection, the following questions should be sought: "Are physicians or other health professionals responsible for the infection, and did they do the right things in the diagnosis, treatment, control and report of this infection?"

Hospital infections are frequent, unpredictable and difficult to protect. The court estimates with the help of experts that nosocomial infection can develop despite the care has been taken in all standards. To identify whether an infection develops as a result of negligence or insufficiency is very difficult. However, hospital-acquired infections cannot be regarded as a natural consequence of hospitalization.

The patient is hospitalized in order to be well. If nosocomial infection develops in a patient hoping the recovery of any reason, searching his/her rights is understandable. However, to decide whether it is a complication or a nosocomial infection is possible only after evaluating every single patient thoroughly, and searching the medical records. The decision may be applicable at all times and in every case. Each event should be illuminated with a detailed examination of experts.

Nosocomial infections add to the cost of the patient by extending the length of stay in hospital, by causing additional diagnostic tests and treatment. This problem of additional cost is not able to solve since it is not regulated by whom it is paid and the dispute among the patient-hospital-paying agency/insurance company cannot be resolved easily. In recent years, interestingly, some countries do not pay particular institutions for nosocomial infections or pay compensation for (exogenous) nosocomial infections.

However, since various infections were decreased to be zero or close to zero in recent years, the old paradigm has changed: nosocomial infections were often considered as medical errors. In fact, the "Institute of Medicine" stated that all hospital-acquired infection unless proven otherwise are potentially preventable when the basic measures of infection control are followed.

This paper mainly discussed the issue from the point of the patient. Infections of health professionals caught especially during the professional practice will be considered more often in the future in terms of corporate social responsibility. These infections of the employees in the clinics and laboratories facilitated by unsuitable working conditions and inappropriate protection measures are the causes of the investigations against institutions. Hospitals and physicians should consider protecting the health of patients and also that of health care professionals. Health care workers faced with all kinds of harmful pathogens. Ethically, employers have a duty to create an appropriate work environment for employees and also a duty to warn them against the dangers they cannot understand.

The followings should be considered in order that hospital infections do not bear any liability for institutions and health care professionals.

1. Hospital infection control committees should work effectively in every hospital, necessary instructions or guides prevention and control [gloves for hand hygiene and isolation practices, disinfection/sterilization, hospital cleaning and waste management, hospital kitchen, water and air systems, control, repair, and hospital repair procedures, control of multi-drug resistant bacterial infections, prevention from and control of common nosocomial infections (catheter-associated urinary tract infections, surgical site infections, ventilator-associated pneumonia, catheter-related bacteremia), endoscopic devices, disinfection/sterilization, the protection of healthcare workers from infections, rational use of antibiotics, etc.] should be prepared in a detailed and understandable manner, and should maintain training and supervision necessary to ensure their implementation. The protocols must be followed strictly. Hospital management should provide the necessary support to implement recommendations of the committees.

2. Early diagnosis of nosocomial infections should be established. Infectious diseases consultation should be asked; appropriate microbiological samples for culture at the appropriate time, at sufficient amount and from the appropriate site should be obtained. Taking blood cultures should not be neglected in a febrile patient. Antimicrobial therapy should be revised as necessary according to the results of the cultures.

3. Hand washing in the most effective and inexpensive method of reducing hospital infections especially cross-infections. All the relevant health professionals must show sufficient attention to it. For this purpose, the necessary activities of training, monitoring, and feedback should be done on a regular basis by HICC.

4. All the disinfection and sterilization rules should be applied in the hospital. Sterilization control should be provided and the necessary records should be kept.

5. For single-use or re-use materials, the necessary measures should be taken and monitoring should be performed. The relevant standards, rules and sterilization of medical devices issued by the Ministry of Health under the name of disposables, including the management of the circular (02/09/2011, 2011/7) must be applied.

6. The continuity of good clinical and laboratory practices should be ensured. Laboratory results should be reported quickly. Clinical and laboratory data should be documented and kept accordingly. It should be noted that all incomplete and inadequate records are against hospitals and doctors.

8. The surveillance program should be sustained. Surveillance data should be analyzed at regular intervals and the relevant units should be informed in writing and verbally. Measures should be taken according to the data from the surveillance and if needed necessary changes should be implemented in protection policies.

9. Emerging epidemics should be noted at its early period and must be worked out to prevent. If necessary, the appropriate method of isolation should be started. In the case of a contagious nosocomial infection, the patients, the ones accompanying to patients and visitors should be informed.

10. After analysis of corporate infection rates, if the high rates of infection are detected, causes of the situation should be explored, and an effort should be paid to reduce the infections.

11. Institutions must follow standards, prepared instructions or protocols. Compliance should be monitored by the Hospital Infection Control Committee, reasons for non-compliance should be eliminated, health workers must be informed of the consequences of compliance and unit management. Inadequacy of a hospital in the application of its own rules can raise additional claims of responsibility.

12. Physical infrastructure, equipment, and materials of the hospitals should be provided at the global and national standards. Compliance to the rules for air-conditioning (installation and maintenance) should be ensured in operating rooms, intensive care units, bone marrow transplant units and in other clean rooms. A sufficient number of trained personnel equipped by global standards should offer a service. For example, a nurse in intensive care units of third level should serve a maximum of two patients. The relationship between staff and patients with infectious diseases should be reduced to a minimum. To detect the infectious disease of one of the staff remove him/her from the duty are among the tasks of the hospital management.

13. Each patient is informed and consent is taken prior to a transfusion, an invasive or surgical intervention. Informed consent is not a general information sheet, it should be prepared entirely

patient-specific. Physician should personally clarify for patients with a form of witness to read and write and sign a statement of approval. The patient and their family will be informed about hospital infections emerged accordingly.

14. Every precaution should be taken and all the immunizations should be done to protect hospital staff from infections. Post-exposure prevention measures should be taken and exposure accidents recorded and stored.

In conclusion, the legal responsibility of nosocomial infections in terms of institutions and health professionals are ahead of the most frequently encountered problems. The physical infrastructure of health care institutions, technical equipment and manpower deficiencies should be corrected; efforts should concentrate on patient safety; medical education should be updated; informed consent should not be neglected, the patient and their relatives should be given contact.

The most effective measures are compliance with the generally accepted rules and principles of medical science and follow the ethical values of the profession of the health care providers who give the service of diagnosis, treatment, prevention, and other medical facilities.

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Personal Protective Equipment in Oral and Dental Health Centres

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Every year 1.2 million people die because of the occupational accidents or diseases of which 250 million is from occupational accidents and 160 million is from occupational diseases in the world. When we examine the results, we've started to think what we should do to decrease the numbers in the results.

Thus, the matter of doctors, nurses, personnel, technicians; all the employees in the establishment wearing personal protective clothes and equipment to protect their own health and community health in the establishments which provide services in diagnose and cure becomes a current and serious issue.

Personal protective equipment are the tools, equipment and devices designed for the employees to wear and hold so that it can protect the employees from the threats which effects their health and safety and must be used against the risk of infections in the establishments which provides health service.

The most exposed group in the work environment consists of **doctors, nurses, technical staff, cleaning staff, other health employees and patients' relatives.**

Health and safety threats in healthcare establishments are radiation, noise, trauma, dangerous instruments, medical waste, the risk of being infected, allergens, facility-based faulty hardware electrical and electronic equipment and laboratory-based risks.

To avoid these threats;

- Collective protection practices,
- Personal protection practices are necessary.

The priority in protection are the collective protection practices (insulation-local exhaust ventilation -machine guards - general ventilation and general lighting - air condition - warning signs etc.)

To avoid these threats, personal protective equipment stands out as the most suggested practice.

Personal Protective Equipment in the Observations Generally

It can be varied as Head-Ear-Eye and Face-Respiratory System-Body and Abdominal region - Hand/Arm/Leg/Leg protectors-Skin and Body protectors.

Current Service Areas in Oral and Dental Health Centres

- Radiological
- Operation
- MSU
- Dental Prosthetics Laboratory
- Domestic/Medical/Dangerous Waste Depots
- Clinics
- Support Service Areas (laundry, general stores and stationery, patient admission areas)

ADSM Service Areas are available.

ADSM. The employees providing service here use Personal Protective Equipment such as **GLOVES-GLASSES-VISOR-BONE** routinely as other health employees. There may be some differences in the branches working with partially separations. These equipments;

APRON

It is used to cover the skin and personal clothes during the processes with the possibility to spoil them with blood, saliva or other body liquids. Apron should cover all the clothes of the employee and it should be tight for the liquids. It must be taken off before leaving the working environment, and if there is a contamination, it must be changed. The contaminated cloth should be folded towards insides so as to prevent it from contacting with the exterior surface.

SURGICAL GOWN

It must be made from tightly woven, stain-resistant and solid fabric. The fabric shouldn't be hairy or cotton. It should fit the body. According to the studies made on the gowns; 25% *Staphylococcus aureus* in the pockets and arms of the gowns used by 100 doctors, in all of the gowns of 100 medical students and 7% *Acinetobacter* are found. Furthermore *S. aureus* is also found in the top uniforms of the employees working in the administrative areas.

GLOVES

It must comply with the standards of N 455. It decreases the risk of pathogenic micro-organism infection with cross infection to the minimum level.

According to the work; examination, treatment, surgery type, and work gloves.

According to the material; Natural rubber latex (NRL), nitrile, neoprene (chloroprene), synthetic rubber (styrene-butadiene), vinyl (PVC), stretch vinyl, thin plastic (transparent).

According to the content; powdered and powder-free.

According to its sterilization; sterile and non-sterile.

The latex and vinyl gloves with low transparency are generally used in dentistry. Vinyl gloves are used in short works and the works with low contamination risk. It must be used while washing the hands, before wearing the gloves and after taking off the gloves. It must be changed if there is sweat or the work takes long.

MASKS

It is used to prevent the contamination of blood, saliva and body liquids to the mouth-nose mucosa. It must comply with the standards of N149. Its models vary as paper, cloth, foam or different synthetic structures. It must be changed when it is wet.

N95 Respiratory Mask: It is used when working on people with sicknesses that transmitted by droplet such as TB, measles, chicken pox and flu etc.

PROTECTIVE GOGGLES and FACE SHIELDS

It must be used to protect the eyes from water, aerosol and foreign particles. It must be comply with N149 standards. A mask must be used. There must be protective goggles and face shields at the surgical processes performed with laser and electrocautery.

RESPIRATORY SYSTEM PROTECTIONS

Hazardous substances in the workplace air such as metal powders, solvents cause various poisonings.

- Air cleaner masks,
- 2. Air-fed masks,
- 3. Respiratory devices which have clean air in itself.

BONE and CAP

It is used to cover the hair completely and to prevent hair from failing to the environment in the theatre room or invasive areas; it is also used to protect the person from spatters and scatters.

- It must be soft and air-permeable.
- It must be in the sizes for all staff to use.

NOISE

The employees should use ear plugs for the devices which have noise level higher than 85 VT.

RADIOLOGY UNIT

There are three important factors in the protection of the radiation employees from the external radiation.

Time Limit-Distance-Shielding

Protective aprons which are not permeable to X-rays should be used during the radiological tests according to the body regions.

PRECAUTIONS TO BE TAKEN IN HEALTH PERSONNEL

- Basic Safety Standards in Radiation Protection
- Dosimeter follow-up (2 months)
- Hemogram follow-up (1 year)
- Peripheral Smear (for suspicious results)
- Detection of the unnecessary films or faulty films and preventing their repeats.

LAWS AND REGULATIONS OF THE MINISTRY OF HEALTH AND MINISTRY OF LABOR REGARDING KKD

Regulations on the use of KKD in workplaces (2.7.2013) (Directive No 89/686/EEC)

Annunciation Regarding the KKD. Categorization Guide

Harmonised National Standards Annunciation Regarding KKD

Annunciation Regarding the Assignment of the Notified Bodies with KKD

- Occupational health and safety regulations.
- Health and safety conditions on the use of work equipment.
- Health and safety regulation on the use of work equipment.
- The regulation regarding the health and safety precautions which shall be taken in workplace, building and annexes.

- Medical waste control regulations.
- Hazardous waste regulations.
- Radiation safety regulations.
- The regulation regarding the prevention of the exposition risk to the biological factors.
- The regulation regarding the procedures and principles on the occupational health and safety training of the employees (15.5.2013).
- Noise regulation.

THE REGULATION REGARDING THE PROCEDURES AND PRINCIPLES ON THE OCCUPATIONAL HEALTH AND SAFETY TRAINING OF THE EMPLOYEES

Obligations of the employer

ARTICLE 5 -

(1) Regarding the occupational health and safety trainings of the employer and employees;

a) Preparation of the programs and their application,

b) A suitable place for the trainings, and procuring the tools and equipment,

c) Insuring the participation of the employees to the programs,

ç) Provides a participation document at the end of the program for those who participate.

Obligations of the employees

ARTICLE 9 -

(1) Employees participate to the training programs which are applied in the frame of occupational health and safety, and they use the information which they acquired from the trainings, in the works and processes, and comply with the instructions on the subject.

RESULT

Cross infection and contamination risk in the healthcare establishments are decreased with the compliance to the procedures and principles on the regulations regarding the KKD. This enables for the community and employee health to be protected; and bring along the numerical decreases on the occupational accidents and diseases and death rates.

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Dental Unit Water Quality

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The quality of water in dental units has a significant importance because both dental health care workers and patients are regularly exposed to water from dental unit water systems. Microbial contamination of dental unit waterlines (DUWLs) was reported for the first time in 1963. Since then, strong scientific evidence has proved that the water used for oral rinsing, irrigation or cooling of equipment during dental procedures can be heavily contaminated with microorganisms. Thus, aerosols and droplets delivered by dental instruments using water from DUWLs during dental procedures may contain microorganisms that can be opportunistic pathogens for patients and dental health care workers. The presence of high numbers of microorganisms including pathogens, such as *Legionella pneumophilia* and *Pseudomonas aeruginosa* delivered by DUWL system is an important issue because of an increased risk of cross infection, especially in immuno-compromised patients. Increased antibody titers to *Legionella* have also been reported in dental health care workers than other non-dental control population suggesting a potential health risk for these workers. A report of case in 2011 has shown that the disease can be acquired from a dental unit waterline during routine dental treatment.

The cause of microbial contamination of DUWLs may arise from different sources; water delivered to a dental unit, working handpieces of a unit or the biofilm formed inside the DUWLs. Water used in dental units comes from two different sources; the municipal water in the case of open water system and water coming from a reservoir, such as bottle and container, connected into the unit in the case of a closed water system. Most of the dental unites are directly connected to the municipal water system. Water arising from the municipal water system might become contaminated with a considerable amount of microorganisms. Microbial contamination of DUWLs may occur during suck-back of liquids from the patient's oral cavity through as a result of defective protective valve function or through handpieces removed or replaced incorrectly. It is known that suck-back can occur in high-speed handpieces without anti-retraction valves. Formation and the presence of the "biofilm" in DUWLs is one of the most important factors responsible for the high numbers of microorganisms in dental unit water. It has been known that there is always a biofilm including smaller or larger quantities of microorganisms in all water systems. Dental units contain many small-diameter tubings (1 to 2 mm) and this specific structure and design of dental units makes easier the formation and maintenance of the biofilm.

Biofilms can form anywhere there is moisture and also enough organic nutrients. Biofilms are microscobic structures and communities that consist mainly of naturally occurring water bacteria and fungi. Thus, biofilms are naturally occurred in aquatic environments, including community drinking water systems. It can be easily formed the interior of small-diameter tubing in dental unit waterlines because of the minimal and progressively decreasing flow rate in the lumen of the tubing. When dental units are not in use, water becomes stagnant and molecules precipitate from the water onto the interior wall of tubing system and promote following adherence of planktonic-microorganisms in the water. The precipitating microorganisms change their phonotype after being sessile. Biofilm is heterogenic, spatially organized structure, in which microcolonies of one or more microorganisms, exhibiting a specific metabolic activity, are surrounded by particles of extracellular, polysaccharide substance. The formation of biofilm consists of different consecutive stages; adhesion process, forming of microcolonies and extracellular matrix. At the beginning stage, mi-

croorganisms that have attachment factors such as fimbriae, adhere to the solid surface. Then, microorganisms need prolonged contact with the surface for adhesion to occur. In the following step, microorganisms secrete exopolysaccharides and thus adhesion becomes irreversible. Finally, adherent bacteria proliferate, bacterial colonies merge and biofilm is formed. After the formation of microbial population into the biofilm, a protecting coating, which is called "glycocalyx", forms on the bacteria. In biofilm phase, glycocalyx coating protects microbial populations in the biofilm from both naturally occurring antibodies and cell-mediated immunity. Thus, in this stage, minimum inhibitory concentration (MIC) of antibiotics in relation to the microorganisms in the biofilm is as much as 1000 times higher than the MIC in relation to the same organism in a free-floating, planktonic state. Microorganisms in mature biofilms are also resistant to chemical disinfection. There is a symbiotic relationship between the biofilm microorganisms helping to provide key co-factors required by each other. Biofilms also provide an environment that is convenient for the proliferation of other microorganisms such as fungi, algae, protozoa and nematodes. The microbial community of dental unit water (DUW) mainly includes bacteria, fungi and protozoa. Nematodes were also isolated less often. It has been reported that the most frequently isolated microorganism species in DUWLs are; *Pseudomonas, Legionella, Klebsiella, Moraxella, Flavobacterium* and *Escherichia* in general. The most frequently isolated oral microorganisms from DUWLs are; *Lactobacillus, Veillonella, Streptococcus, Bacteroides* and *Candida*. It is well known that some microbial species found in DUWLs are opportunistic pathogens for humans such as *Acinetobacter calcoaceticus, Aeromonas hydrophilia, Aeromona sorbia, Burkhlderia cepacia, Brevundimonas vesicularis, Methyobacterium mesophilicum, Pseudomonas aeruginosa, Pseudomonas fluorescens, Pseudomonas putida, Sphingomonas paucimobilis* and *Sthaphylococcus cohnii. Legionella pneumophilia, Mycobacterium* spp. and *Staphylococcus aureus* that are considered human pathogenic microorganism, have also been isolated from DUWLs. It has been reported that DUWLs can be colonized by free-living amoebae which may act as a reservoir for other potentially pathogenic microorganisms and protect them against disinfectants used for DUWLs. Isolation of some protozoa species has also been reported from DUWLs. High levels of endotoxin concentration arising from gram-negative bacteria were also reported. Dying or degenerating gram-negative microorganisms may release large amounts of endotoxin, a biologically active macromolecular lipopolysaccharide, into the dental unit water. Thus, increasing amount of endotoxin in DUWLs ruins the quality of water in dental units.

Formation of biofilms in dental unit waterlines-causes to deteriorate the quality of water in the system. Based on current knowledge, biofilm is accepted as the most important and most abundant source of microorganisms persistent in the DUWLs. Water entering DUWLs is frequently of good microbiological quality, but after shedding of bacteria from the biofilm, it becomes contaminated over the acceptable level of microorganisms. When the biofilm reaches to 30-50 μm in thickness widespread and unacceptably high levels of microbial contamination occurs in DUWLs.

Water used in dental procedures should be the same quality "as drinking water". According to the recommendation, which has been issued by the American Dental Association (ADA) in 1999, water used in non-surgical procedures should not contain more than 200 cfu/mL bacteria in DUWLs. This is accepted as a threshold value based on quality assurance standard established for dialysate fluid. The contamination of the DUWLs has been reported up to 10^6 cfu/mL. Thus, the possibility of the presence of such a high number of pathogens in dental unit water used in dental treatment generates a great concern and effective preventive measures should be taken.

The goal of infection control regarding DUWLs is to minimize the risk from exposure to potential pathogens and thus to create a safe working environment for both patients and dental health care workers. CDC recommended that dental unit waterlines should be flushed at the beginning of the day to reduce the microbial population in 1993. However many studies have shown that this procedure does not affect the biofilm in dental unit waterlines and safely improve the quality of water used during dental treatment procedures. Samples taken from dental unit water lines before flushing has shown a significantly greater amoebae population than that of tap water. Flushing can reduce the number of microorganisms transiently, but it has only little effect on the biofilm and can't lower the bacterial counts to the recommended number of 200 cfu/mL. It has also been reported that the flushing process did not reduce the presence of *Legionella* spp. or free-living protozoa. But, it should not be forgotten that flushing of the DUWLs between patients reduce any microorganism or material that entered to the system during treatment of the patients. On the other hand, waterborne

bacteria are aerosolized during dental treatment procedures and thus dental health care workers may be exposed to microorganisms and fragments of biofilm continually. Depending on these facts, CDC recommendations emphasise that flushing alone is not a reliable method for improving water quality used in dental treatment procedures.

In DUWLs, water with different quality and from different sources may be used; 1) Majority of DUW has been supplied by the municipal tap water. 2) Some dental units may use tank-fed systems with the capacity of 5-10 liters. Because of the small volumes of the tank, such systems would provide almost stagnant flow and suitable conditions for the growth of microorganisms. It is also difficult to access for chemicals into the tank and large volumes of flushing is necessary after using chemical agents. 3) Independent water reservoirs provide separation of dental unit from the municipal water and draw fluid from a separate reservoir bottle. Infection control strategies may apply more easily to the independent reservoir system. 4) DUWLs may be supplied by distilled or deiyonized sterile water systems. Unfortunately, with time even in sterile water reservoirs, used in DUWLs, may become contaminated because the bacteria gain access to the system and provide enough nutrients for biofilm growth. System can be designed as single used disposable or autoclavable tubing to by-pass DUWLs and provide sterile irrigation solution directly to the sterilized handpiece. For surgical procedures, including bone and implant surgery, CDC stated the use of only sterile solutions.

In 1993, Centers for Disease Control and Prevention (CDC) published Recommended Infection Control Practices for Dentistry and urged dental professionals to install and maintain anti-retraction valves to prevent oral fluids from being drawn into DUWLs. CDC also recommended flushing waterlines for several minutes at the beginning of the clinical work day and 20-30 seconds between patients to eliminate oral fluids which may be entered to the water line system during treatment. Although flushing can temporarily reduce the number of microbes in the water delivered to patients by clearing away many of the free-floating organisms in the waterline, biofilm bacteria continually break free and re-contaminate DUWLs during clinical treatment. The most effective method for maintaining good quality of water in dental units is regular or continuous treatment of DUWLs using a disinfectant, biocide or cleaning agent that removes the biofilm and inhibits its growth. Chemical disinfectants are considered the most effective methods to remove and prevent biofilm formation. A wide variety of commercial products and systems have been developed and marketed in recent years. Many of them have been reported to be effective at controlling biofilm in DUWL systems. However, some manufacturers considering the problem of DUWLs biofilm contamination have developed dental chair models with integrated semi-automated or automated DUWL cleaning systems that facilitate the regular cleaning of DUWLs with effective disinfectants that eliminate biofilm.

Although the infectious risks associated with DUWLs are not considered a major public health problem, the potential for transmission of disease from contaminated DUWLs still exists. Dental professionals should employ standard infection control principles such as biocide disinfectants, filtration or anti-retraction valves to eliminate DUWLs contamination. This is an important ethical issue for all dental health care workers.

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Logistical Improvements in the Operating Room

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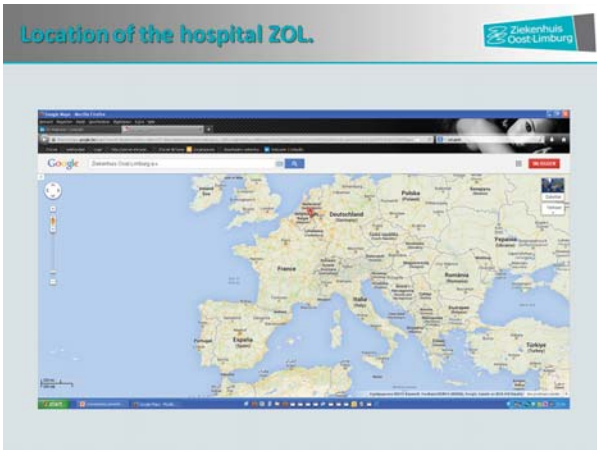


ZOL : Ziekenhuis Oost Limburg (Hospital East Limburg)

- a merger of two private hospitals with a public hospital.
  (André Dumont – St. Barbara – St. Jan)
- autonomous care institution .(anno 1996)
- 811 beds.
- 280 doctors and 2859 other employees.

The operating room : description

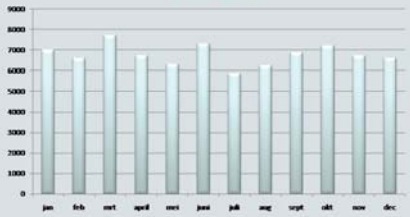
- Operating room is spread over three campuses.
- The surgical disciplines are grouped into five clusters.
- The recovery room is a separate cluster.
- 14+5+2 operating rooms are active.
- There are 4 more operating rooms under construction.

- 6 head nurses
- 1 Staffmember for training
- 127 FTE (7 fte ensure the material flow)
- Turnover 2012 : 33 181 surgical procedures.

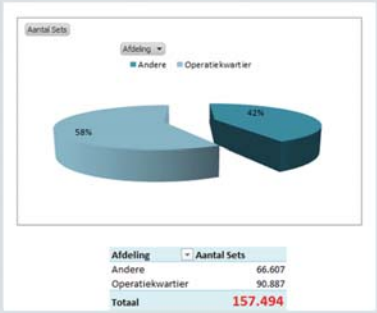
The CSSD

- the central sterilization is a separate department.

Stu per month 2010, now : +-82000/year +- 35 fte
2 headnurses



OR is the largest customer of CSSD



Afdeling	Aantal Sets
Andere	66.607
Operatiekwartier	90.887
Totaal	157.494

PROJECT IMPROVEMENT OF MATERIALS MANAGEMENT AND TRACEABILITY

Goals

- Instruments, consumables, implants and medication:
  - Occurence of stock ruptures.
  - Standardise of consumption .(cost reduction)
  - Traceability of instruments and the sterilization processes.
  - Traceability of implants.
- Ability to benchmark. (historical pricing)
- Automated prescription of implants and medication.
- Traceability of the acts and actors participating the workflow CSSD.

Goals

- Transparency in the flow of instruments in CSSD, for the OR
- Reducing the workload to treating instruments
- Traceability of the acts and actors in the preparation of the surgical procedures (logistic workflow)

Development of a logistics system in CSSD

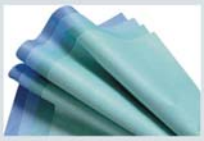
- Passing on of containers to non-woven packaging of instruments.
- Improving the infrastructure of the sterilization.
- Case carts and stericarts = 1 (Belintra)
- Installation of Software in the CSSD. (steriline, Aexis)
- Create table lists of instrument sets.

Development of a logistics system in OR.

- Developing and installing Software in the OR.(Orline, Aexis)
- Create pick lists for preparation of case sarts. (orline, Aexis)
- Labels with barcodes for the traceable making of the implants delivered by different external producers.
- Designing a Pick street : Consumbles and Pharmacy. (Belintra and Pharmacy)
- Expanding the number of Procedure paks in order to reduce preparation time. (Mölnlyke)
- Registration of consumption paks, consumbles, medication, implants, or-time,... .
- Creating deliveries for the OR. (consumbles, medication,...)

Passing on of containers to non-woven packaging of instruments. (2006)

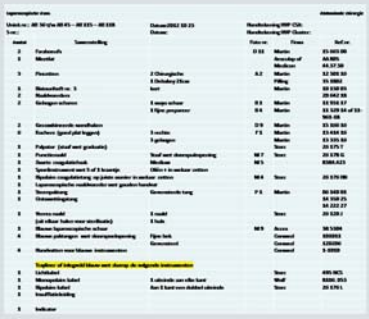
- Less acts.(cleaning of containers)
- Less weight.
- Less space to storage.
- easy to label.
- 2012 :Non woven becomes SMMS.



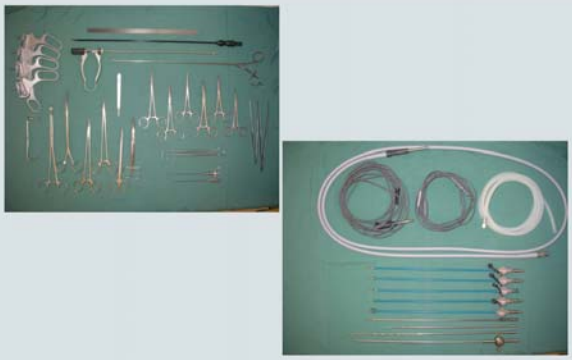
Improving the infrastructure of the CSSD 2006-2007

- Ergonomic work stations.
- Ultrasonic pre-cleaning.
- Cleanstation for stericarts.
- Floor loading autoclaves.
- Digital readout of test results.

Instrument information



Graphical information

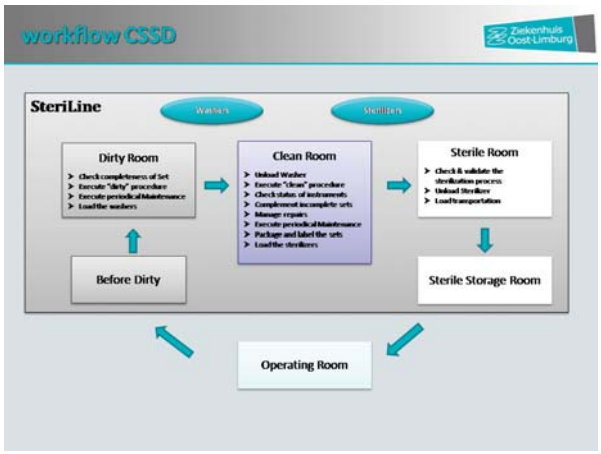


Choice of the steri cart. (=case cart.)

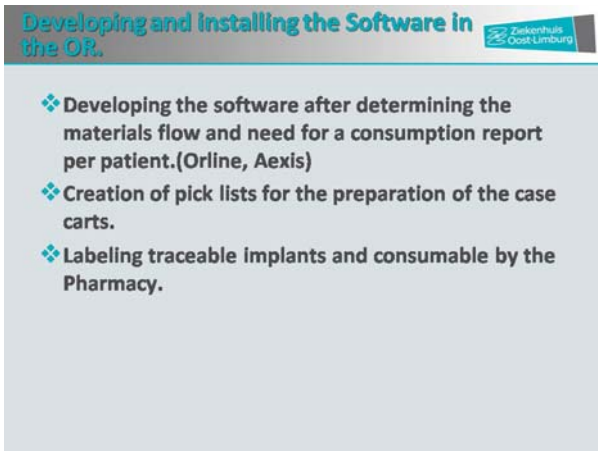
- autoclavable – washable wheels.
- Flexible *arrangement.* (sufficient positions - for shelves, baskets)
- The trolley is designed to *avoid formation of condensation* on the sterile packages.
- The *base is sufficiently shielded* from the sterile packages so that the wheels do not throw up any dirt from the ground.
- The trolley can be *cleaned easily* .
- The chosen *material* and the surface treatment are capable of withstanding the washing process and the autoclave.
- The trolley is *ergonomic* as it regards rolling resistance and can move around.
- The *castors* are contained completely *inside the base* (with regard to easy loading and unloading from the washing machine and/or autoclave)
- Is the *stability* of the trolley guaranteed (tilt angle > 15°)?
- The trolley can be *identified.* (also the different positions.)

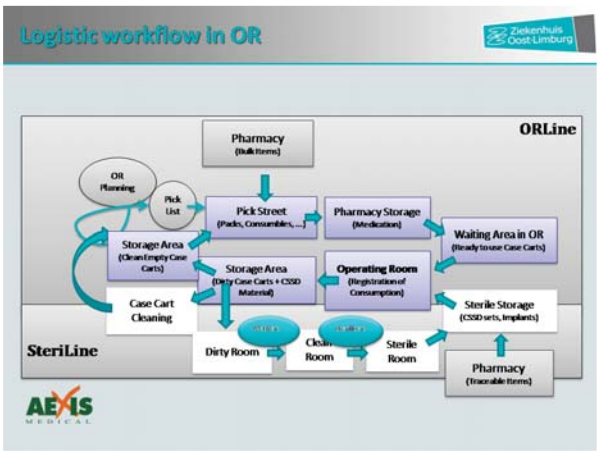
Installation of Software in the CSSD

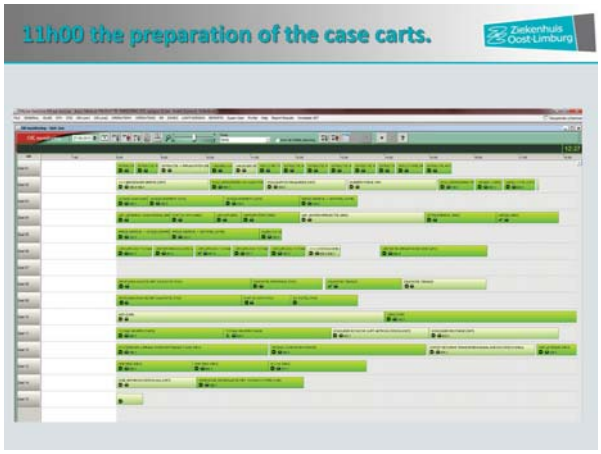
- implementation of steriline©(Aexis).
- scan times determined by an analysis of the workflow in the CSSD.
- Set-types creation of instruments.
- Making content lists and images of the instrument sets.

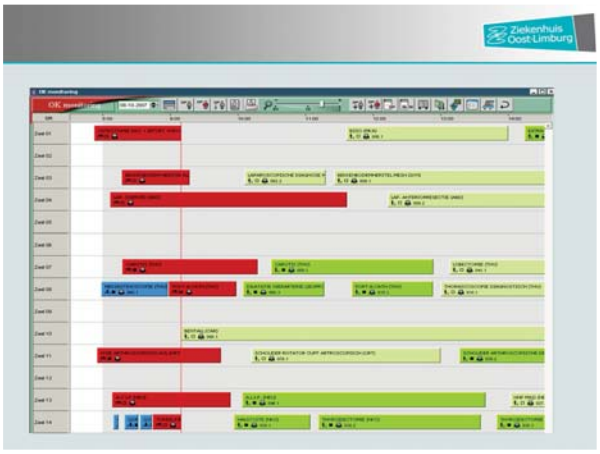

workflow CSSD
Ziekenhuis Oost-Limburg
SteriLine
Washers
Sterilizers
Dirty Room
Check completeness of Set
Execute "dirty" procedure
Execute periodical Maintenance
Load the washers
Clean Room
Unload Washer
Execute "clean" procedure
Check status of instruments
Complement incomplete sets
Manage repairs
Execute periodical Maintenance
Package and label the sets
Load the sterilizers
Sterile Room
Check & validate the sterilization process
Unload Sterilizer
Load transportation
Before Dirty
Sterile Storage Room
Operating Room


Ziekenhuis Oost-Limburg


Developing and installing the Software in the OR.
Ziekenhuis Oost-Limburg
Developing the software after determining the materials flow and need for a consumption report per patient.(Orline, Aexis)
Creation of pick lists for the preparation of the case carts.
Labeling traceable implants and consumable by the Pharmacy.

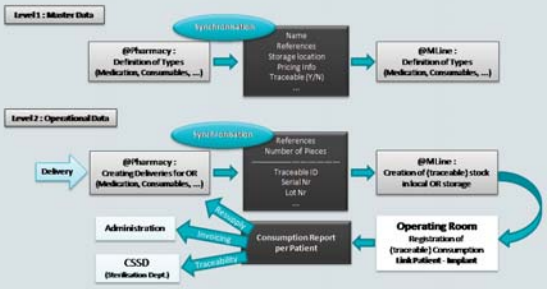

Logistic workflow in OR
Ziekenhuis Oost-Limburg
ORLine
Pharmacy
(Bulk Items)
OR Planning
Pick List
Pick Street
(Packs, Consumibles, ...)
Pharmacy Storage
(Medication)
Waiting Area in OR
(Ready to use Case Carts)
Storage Area
(Clean Empty Case Carts)
Storage Area
(Dirty Case Carts + CSSD Material)
Operating Room
(Registration of Consumption)
Case Cart Cleaning
Sterile Storage
(CSSD sets, Implants)
SteriLine
Dirty Room
Clean Room
Sterile Room
Pharmacy
(Traceable Items)
AEXIS
MEDICAL


11h00 the preparation of the case carts.
Ziekenhuis Oost-Limburg


Ziekenhuis Oost-Limburg

Pick list

Logistic information



Labels with barcodes of the implants delivered by different external producers.

- No uniformity from the producers of implants.
- The label should be easy to remove. (consignment)
- The label should contain the necessary information.
- The implants must be delivered individually packed.

Picture of our own label

Designing a Pick street : Consumbles and Pharmacy.

- Racks and positions must be numbered. (magnetic number plates)
- The consumables are in chronological order on the picklist. (order of positions)
- The consumables must be offered in a FIFO–system.
- Delivering and simultaneously consume should be possible. (wide corridors)
- Ergonomic solutions.

Pick street

pick list chronologically ordered

Pick street : ergonomic solutions

Pick street : FIFO-system

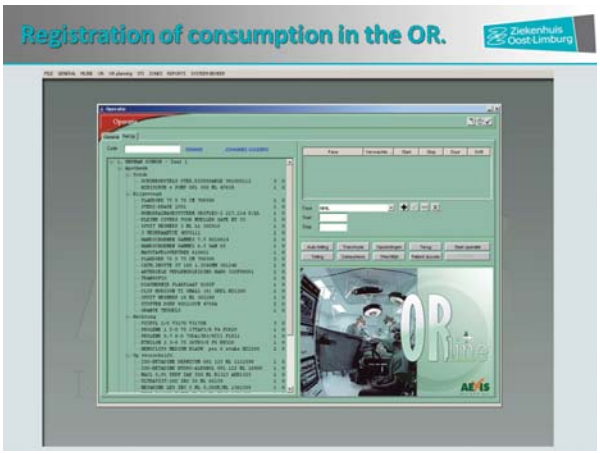
Expanding the number of Procedure paks

- Reduce the preparation time bij using procedure paks.
- The procedure paks contain the minimum consumables to boot a surgical procedure.
- The procedure paks are traceable.

MÖLNLYCKE HEALTH CARE ProcedurePak


Ziekenhuis Oost-Limburg


Complete the cart with instrument sets.
Ziekenhuis Oost-Limburg


Registration of consumption in the OR.
Ziekenhuis Oost-Limburg


Consumption of Narcotics.
Ziekenhuis Oost-Limburg


Request for delivery to the OR.
Ziekenhuis Oost-Limburg


Emergencies
Ziekenhuis Oost-Limburg

Automatically created cockpit views.

- Notification of stock ruptures when booking.
- Monitoring the flow of urgent instrument sets in the CSSD. In order to be able to do "in real time" assessment of the further course of the operation program.
- Collection and analysis of data in preparation for a benchmarking with other health care facilities.

Monitoring of instrumentsets.

Benchmarking.

- 2012 benchmarking with the 10 most common procedures, with 8 other hospithals:

Challenges : new targets.

- registration and preparation of consume pre and postoperatively.
- gps for case carts.
- just in time ore sequence delivery versus time saving, versus vision of the surgeons.

Appreciation and consultation structure.

- Meeting OR-CSSD.
- Operational consultation is structurally.
- New employees of OR get an introduction on the CSSD.

Goals for the producers of implants

- One universal code
- Goods individually packed.
- RFID leads to less scanning

Thank you for your attention.

Koen Vandormael
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Water Management in Healthcare Services

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It is recognized that patients becoming increasingly infected from water supply systems in hospitals. There are many nosocomial infections caused by *Legionella* spp., *Pseudomonas aeruginosa* and *Acinetobacter* spp. sourced from water and water supply systems. Recently, managing of water safety in healthcare services is an important concern and subject of meetings. Basic steps of water control in hospitals are constructions during and after building, disinfection methods, monitoring and outcomes. Infection control practitioners, facility engineers, risk managers and other professionals in hospital should be work together for management of water safety.

As mentioned in WHO guideline, water should be suitable for consumption and for usual domestic usage, including personal hygiene in hospitals. Biofilm formation in plumbing systems of hospitals is very important because of microorganisms can embedded themselves in this matrix of extracellular organic polymers. Biofilms can be found in pipes, hot water tanks, cooling towers, faucets aerators, shower heads and etc. Prevention of biofilms in hospital water system is crucial for control the waterborne pathogens. For newly installed water distribution systems, it is important using disinfectants before a biofilm develops. After the formation of biofilm, it is difficult to remove the bacteria and biofilms from water supply systems.

Design and construction is the first step for controlling waterborne pathogens. The water pipes in distribution system should be as short as practical. For preventing of stagnation, long dead legs should be avoided and insulated recirculation loops for hot water should be considered especially in high risk applications. There should be a widespread valve system and vacuum-breakers or similar devices in the lines to prevent back-flowing into the water systems. Hot and cold water tanks should have a drainage facility that located at the lowest point. Decorative fountains and fish tanks should not be placed in patient-care areas. Water temperature is an important point to prevent microbial contamination of distribution systems. *Legionella* die very quickly at temperatures > 65°C. CDC recommended the hot water temperature at the return should be maintaining ≥ 51°C (≥ 124°F) if it is possible. If it is not, periodically increasing the hot water temperature to ≥ 66°C (≥ 150°F) at the point of use or chlorination and flushing can be applied. However personnel and patients should be informed to ovoid scalding. The temperature of cold water tanks should be under 20°C.

Thermal control, chlorine dioxide, copper-silver ionization, ozone and ultraviolet irradiation are used as disinfection methods. Systemic water disinfection methods to prevent controlling *Legionella* were reviewed by Lin et al. Copper-silver ionization method was reported as the only disinfection technology that has been validated and the best available method. But, high pH and low ion concentrations of hospital water can cause failures in controlling *Legionella* with this method. The other promising disinfection methods are monochloramine and chlorine dioxide that need long term studies, although monochloramines are not allowed using in some countries. Ultraviolet light irradiation can be effective when used in new buildings before biofilms developed if a systemic disinfection method used concurrently. Also ultraviolet irradiation has no effect on preexisting biofilms. Ozone and ultraviolet irradiation have no residual effects on water systems.

Routine water cultures for *Legionella* colonization for patients who have a high risk in hospital was recommended by the "Centers for Diseases Control and Prevention (CDC)". There was no consensus among the scientists about how often and how many water cultures should be taken. However, water cultures usually have been taken four times in a year in some countries. The other healthcare facilities that do not provide care for severely immuno-compromised patients should establish a surveillance to detect health care associated Legionnaires disease but routine water culture is not recommended.

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Microbiological Control of Hospital Environment: When and How?

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It was not long ago when we were told to conduct regularly scheduled culturing of the air and environmental surfaces even floors, walls, and tabletops. Although CDC and the American Hospital Association have been advising against continuation of this practice for the last 40 years, routine environmental culturing is still a confusing issue for some of us. Healthcare-associated infections are not relatedto microbial contamination of air or environmental surfaces; therefore, random and undirected sampling should not be performed.

Environmental sampling may be helpful only if conducted by defined protocols and if you're sure you know what to do with your results. It is an expensive,time-consuming and hard to interpret process which is complicated by many variables.

HICPAC recommends that it may be performed in 4 situations.

1. To support of an investigation of an outbreak when environmental reservoirs are suspected. Environmental sampling should only be conducted if there is no plan for interpreting and acting on the results obtained. If the results suggest a link between isolates from environmental samples and patients,molecular epidemiology is a crucial step.
2. For research purposes.
3. To monitor a potentially hazardous environmental condition, confirm the presence of a hazardous chemical or biological agent.
4. Quality assurance to evaluate the effects of a change in infection control practice.

Several instruments are available for sampling airborne bacteria and fungi. Sedimentation or depositional methods use settle plates and therefore need no special instruments or equipment. This method is not generally recommended when sampling air for fungal spores since single spores can remain suspended in air indefinitely. It has been used mainly to sample for particulates and bacteria. Air samplers are designed to meet differing measurement requirements.

Water sampling in healthcare settings is used as needed to detect waterborne pathogens of healthcare concern or to determine the quality of finished water in a facility's distribution system. However, routine testing of the water in a healthcare facility is usually not indicated. Sampling in support of outbreak investigations can help determine appropriate infection control measures.

Routine environmental surface sampling in healthcare settings is neither cost-effective nor warranted. Surface sampling is currently used for research, as part of an epidemiologic investigation, or as part of a comprehensive approach for specific quality assurance purposes.

To conclude, even though microbiologic sampling of the environment appears at first glance to be a simple task, each of the sampling strategies and methods is complex, and the success of the sampling endeavor depends on meticulous attention to details in sampling design and aseptic technique. Environmental sampling may never be extremely precise because of all the variables that come into play when utilizing culture methods. A good sampling strategy for the various investigation phases, a consistent approach, understanding the limitations of the different sampling methods, and knowledge of the target microorganism are the most important factors in obtaining the best possible information from a microbiologic environmental sampling event.

Central Sterile Service in Japan

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In Japan, steam steriliser was put on the market in Early 1900s. In the University of Tokyo Hospital, surgical theathres were centralized in July 1955, and Central Sterilisation and Supply Service was established in April 1964.

On 29 October 1968, 1st Conference on Sterilisation, the Japanese Society of Medical Instrumentation (JSMI) was held in the University of Tokyo Hospital chaired by Professor Sataro Jitsukawa, the University of Osaka and it continued until 109th conference in 1995. The Conferences were so helpful for the development of sterility assurance in Japan. After then Hospital Supply Conference was annually held for five years in 20 century chaired by Hiroyoshi Kobayashi independently. And the conference became one of official conference of JSMI thereafter because of many requests to continue.

In 1987 in the University of Tokyo Hospital, total container system for surgical instrument supplies and robotic removal system were employed. They were the first time to employ in Japan, however for those ten years after then, the container system with packing and filter became popular in many hospitals.

In 2000 the programme for Certified Sterilization Service Technician (CSST: 2nd grade) was started with publication of "Guideline for Sterility Assurance in Healthcare Settings" JSAMI edited by H. Kobayashi, and then in 2002 that for Certified Sterilization Specialist (CSS: 1st grade) JAMI was started with publication of the text for CSS. As of September 2013, 3,202 CSSTs and 245 CSSs had been certified. These certification programmes have promoted the recognition of importance of central sterilization and supply services by hospital personnel, especially by hospital administrative persons.

Validation of Automated Endoscope Reprocessors

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Cleaning and disinfection of flexible endoscopes is a highly complex activity. Ineffective disinfection can lead to transfer of contaminations from one patient to another. Between applications of flexible endoscopes the instrument has to be cleaned and disinfected according to protocolled procedures by trained staff. The use of an automated endoscope reprocessor (AER) ensures that the result of the disinfection will be reproducible. Reproducibility of the disinfector itself must be monitored by validation.

The specifications of the AER should regularly be assessed.

Starting with compatibility within your disinfection process the AER must be maintained in good condition. The specifications of this instrument have to be monitored by regular tests. The aim is that the operator of this instrument can obviously rely on the functionality of the AER. There must be maintenance according to the advice of the manufacturer by trained and qualified staff.

All AERs should be validated. Validation of AERs means monitoring technical, functional and microbiological aspects:

- Technical validation has to be performed by an independent validation officer.
- Functional aspects of validation can be performed by the operator of the AER.
- Determination of microbiological aspects should be performed by a laboratory for microbiology.

This presentation yields aspects of validation and results from validations of AER's in the Netherlands. Validation procedures show irregularities in 10 to 20% of the validated instruments. Based on advised procedures and results of validations of AER's the importance of validation of AERs will be concluded.

The National Health Training Package- "The Australian Way"

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Introduction: More than a decade ago, there has being a number of reviews of the National Health Training Package (NHTP). In our industry of Sterilising Technology, this is for the Certificate III & Certificate IV Sterilisation Technology.

In 2012, the Commonwealth of Australia has introduced a number of Vocational Education Training reforms aimed at streamlining Training Packages. Hence a major project to streamline and review the HLT07 Health Training Packages included qualifications, units and skill sets.

The aim of this presentation is to provide background and reviewing the new national template requirements. The review has been carried out in close consultation with industry through Industry Reference Groups (IRGs). The IRG's provided industry advice for the training and recognition system and skills for the Community & Health Services industry.

Materials and Methods: The success to implement changes across the Australian States requires consultation, open communication and team work to negotiate and to be prepared to be flexible. Therefore, Subject Matter Expert Groups (SMEG) have been developed for each training package.

Local issues are explored from an industry perspective. This has resulted impact from the physical environments, work loads, clinical practice and the Australian & New Zealand Standard 4187.

In addition, to drilling down to the State level of comparisons and differences:

- Number of Registered Training Organisations (RTO) presenting the course,
- Mode of delivery and,
- Qualifications linked to Industrial Awards.

Results: The benefits of the NHTP have enabled industry to work collaborately together to achieve the most realistic outcomes for staff training in Australia.

Use of Antiseptic-Soaked Items in Patient Care to Prevent Hospital Infections

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The foreign materials used in the human body may cause bacterial colonization and infection in a short period of time. In order to prevent or delay this, it has been considered that devices such as urinary catheters, endotracheal tubes, intravenous catheters and catheter dressings be covered with antiseptics. Furthermore, antiseptic-covered gloves have come to be used in medical practice for protecting against blood and fluid secretions. Literature studies consist generally of experimental studies carried out in vitro or on animals. There are very few comparative, prospective studies conducted on human subjects. Therefore, not many recommendations exist in the guides in relation to the use such devices. To list these devices in order:

1. Urinary Catheters

Silver alloy/hydrogel-coated catheters, catheters coated with chlorhexidine combinations or antibiotic-impregnated urinary catheters reduce short-term bacterial colonization and urinary infection risk (< 1 week)[1,2]. However, not enough data are available in relation to long-term and indwelling catheters. They are not routinely prescribed in the light of updated data.

2. Endotracheal Tubes

Silver-coated endotracheal tubes reduce ventilator-associated pneumonia (VAP) incidence and delay recovery from VAP in comparison with other tubes. However, no differences were found in relation to mortality, hospital stay and use of antibiotics[3]. Similar results were obtained with tubes coated with chlorhexidine and Gentian violet mixture (Gendine). However, this study was in vitro; therefore, in vivo studies are required[4].

3. Antimicrobial Catheters

Antibiotic or antiseptic-impregnated catheters are the devices that have been studied the most. The catheters of which the outer surfaces are impregnated with chlorhexidine and silver sulfadiazine are classified as first generation catheters; the catheters of which both surfaces are impregnated with chlorhexidine are classified as second generation catheters. At the same time, catheters of which inner and outer surfaces are coated with minocycline and rifampin are also used. The catheters that contain topical silver ions releasing silver, platinum and carbon are classified as third-generation catheters. It was reported that 40% decrease was achieved in catheter-related blood stream infections with the use of antimicrobial-impregnated catheters[5].

Minocycline-rifampin-coated catheters were found to be more effective than the first generation, chlorhexidine-silver-sulfadiazine-coated catheters[6]. No significant differences could be found between second-generation chlorhexidine-silver-sulfadiazin catheters and standard catheters in terms of preventing catheter-related bloodstream infections (CRBSI)[6].

It has been reported that minocycline-rifampin-coated catheters are effective for longer periods[7]. The first-generation catheters can remain effective for 8 days on average[8]. A study related to doxycycline-rifampin-coated catheters reported that these catheters remained in the vessel for 68.2 days on average and they were effective in the reduction of CRBSI[9]. However, antibiotic-coated catheters theoretically involve the risk of raising the resistance rate[10].

Cost-efficiency studies demonstrate that they were cost-effective in high risk patients. Minocycline-rifampin-coated catheters were reported to be more economical than chlorhexidine-silver-sulfadiazine-coated catheters and that they would be effective on a longer term, hence save more cost-saving. A review that assessed eleven randomized studies reports that the role of antimicrobial-impregnated catheters in CRBSI is controversial and that their routine use should be assessed again[11].

The new guidelines recommend such catheters for centers and patients that have unacceptably high CRBSI rates in spite of all infection control measures that have been taken[12]. None of these catheters may reduce CRBSI on its own and they can be used only as additional measures in cases where other measures fall short. Also, studies conducted on various patient sub-groups in relation to longer durations are needed since the questions on the duration for which they should remain in the vessel remain unanswered.

4. Catheter Dressings

The highest number of studies related to antiseptic-impregnated dressings have been conducted on chlorhexidine-impregnated dressings. It was demonstrated in a meta-analysis that chlorhexidine-impregnated dressings increased vascular and epidural catheter bacteria colonization and that they were also associated with a decrease in the rate of CRBSI[13].

American anesthesiology association practical guide recommends transparent bio-occlusive dressings in order to protect against central venous catheter infections. It is reported that chlorhexidine-impregnated dressings can be used unless there are counter indications[14].

A randomized controlled study which compared the chlorhexidine-impregnated dressings, non-chlorhexidine-containing, standard catheter dressings and highly adhesive dressings found that chlorhexidine-impregnated dressings reduced catheter-related infections whereas adhesive dressings increased skin and catheter colonization[15]. Another study conducted on dialysis patients with chlorhexidine foam dressing found that it did not reduce CRBSI[16]. Some studies with a small number of patients also found that chlorhexidine-impregnated patches did not reduce bacterial colonization[17]. Erosive contact dermatitis cases were reported with chlorhexidine and it recommended that caution be exercised. More caution is especially advised for pediatric and immunosuppressive patients[18].

5. Antiseptic-Coated Double-Fold Gloves

Using gloves to protect against infections contracted via blood or secretions ranks the first among standard infection controls. However, contaminations with viral infections ranking the first are at stake due to the tear of normal gloves and occasionally due to micro-tears that are not visible. For this purpose, double-fold gloves were worn to enhance protection measures. However, this proved inadequate, too. Therefore, new gloves were developed with the addition of virus-inhibiting materials were into the space between two folds of gloves. A clinical study conducted with virus-inhibiting surgical gloves found no side effects in 100 patients operated on by 6 surgeons. The surgeons also felt more comfortable than double-fold gloves in mechanical terms[19]. However, the numbers of surgeons and procedures in this study are low, therefore, studies with higher numbers are needed. An in vitro study demonstrated that these gloves reduced HSV-1 infection rate as compared to single-fold or double-fold gloves[20].

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Burn Wound Care

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Major burn injury is the biggest trauma and can be classified according to extent and depth of the burns. Every year, approximately 500.000 burn injuries happen in the USA. These injuries are typically not severe, although about 50.000 patients with burns still need admission and treatment at a burn centre or burn hospital. Every year, nearly 5000 cases of burns result in death from complications related to thermal injury. Burns compromise the physical and chemical protective mechanisms within the skin, which facilitates the colonization of burn wounds by different microorganisms. These microorganisms may come from the host's skin, respiratory, or gastrointestinal flora or, they may be transferred to the patient through contact with other environmental sources, including the hands of healthcare workers. Improved outcomes can be attributed to specialized burn centers, advances in resuscitation, specialized critical care, improved coverage of wounds and treatment of infections. Deaths caused by burns generally happen either immediately after the injury or weeks later as a result of infection or sepsis, multisystem organ failure, or hypermetabolic catabolic responses. In the past decade, the cause of death has changed profoundly. Ten years ago, the major cause of death in patients who had been severely burned and admitted to a burn centre was anoxic brain injury, followed by sepsis and multiple organ failure. Nowadays, the major cause of death in burned patients is sepsis followed by multiple organ failure. Burn wound care includes burn surgeries, infection control, maintenance of organ function, and attenuation of hyper metabolism.

Partial-thickness burns can be categorized as either superficial or deep burns. Superficial wounds usually heal between 7 and 14 days, whereas complete re-epithelialization of deep dermal burns can take up to 4-6 weeks, with scarring often resulting from the loss of dermis. A large variety of topical creams and agents are available for treatment, and many are silver-based for anti-infective effects. Recent studies support the use of synthetic and biosynthetic membranes. These membranes decrease the number of dressing changes and the amount of pain drugs associated with these dressing changes. Bioengineered approaches have also been tested for use in patients with partial-thickness burns. Examples include keratinocyte-fibrin sealant sprays, fibrin sealant containing growth factors, and cell suspensions.

Full-thickness burns are deep wounds that will either not heal or heal with an ugly scar. These burns are treated by excision and coverage with auto or allo skin graft. As already mentioned, if complete autografting is not possible because the burn is large, allograft or other dermal or epidermal analogs are needed. The scientific and commercial community agrees that applying autograft is the golden standard. Cultured epithelial autografts became a surgical option in the management of patients with massive injuries involving more than 95% TBSA burned. Cultured epithelial autografts are created in vitro from autologous keratinocytes and as the name suggests, consist of keratinocytes. The promise of this technique has not been fully realized because of costs and the low quality of the neo-skin; however, it is regarded as a emergency modality for massive burns.

Stem cells represent a new hope in the management of burns. These cells play an important part in wound healing, both locally and systemically, and several of the mechanisms underlying their actions in wound healing have been described. In human beings, stem cells can be obtained from adipose tissue, bone marrow, umbilical blood, and

the blastocystic mass of embryos. Another important characteristic of stem cells is their lack of immunogenicity, which would allow them to be transplanted with relative ease. Stem cells present in the bone marrow migrate to tissues affected by injury and help the healing and regeneration process. Embryonic human stem cells can be differentiated into keratinocytes in vitro and stratified into an epithelium that resembles human epidermis. This graft can then be applied to open wounds on patients with burns as a temporary skin substitute while autograft or other permanent coverage means become available.

Wound Care and Antiseptics

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It is not seldom that surgeons and physicians dealing with wound care confront with the healing difficulties of contaminated or infected wounds which may predispose systemic infections. Delayed wound healing is an important issue in wound care leading to increased cost of treatment and longer hospitalisation time. One of the reasons of delayed healing is wound infection. Invasion can be multibacterial, and/or with multiresistant bacteria. In this case, morbidity and mortality rates may increase.

Acute Wounds

Wound infection may be as high as 40% in contaminated acute and traumatic wounds. Depending to the mechanism of injury, acute traumatic wounds can be very serious and predispose to the devolopment of invasive infection. Some evidence suggest that wound cleansing is not always necessary(1), and some authors recommend not to use antiseptics in acute wounds(2). However, the need of cleansing and appopriate topical antisepcy in contaminated soft tissue injuries is widely accepted by the majority of surgeons. Prophylactic use of antisepic solutions can reduce the rate of infection. But standards for topical antiseptic wound therapy are missing. Solutions that have been used for wound cleansing range from tap water to saline to various antiseptics. Normal saline is favoured since it is an isotonic solution with no interference with the healing process.

Chronic Wounds

Wound cleansing plays an integral role in chronic wound management. The essentials of wound care in infected chronic wounds are debridement of slough and dead tissues together with microbial burden, systemic antibiotic administration, topical antisepcy, and the use of appropriate dressings. Systemic antibiotics should be administered by an ifectious diseases specialist: The major cause of antibiotic resistance in infected wounds is misuse or overuse of antibiotics.

Antiseptics

An antiseptic is a substance that inhibits the growth of microorganisms causing critical colonization and infection. Antiseptics are avaliable in different forms such as liquid, paste, oinment, powder, spray or inpragnated dressings. The most commonly used products in clinical practice today are povidone-iodine, clorhexidine, alcohol, boric acid, hydrogen peroxide (H_2O_2), potassium permanganate, polyhexamethyl biguanidin (PHMB), silver products and sodium hypochlorite.

A good antiseptic solution must have a biocompatibility index higher than 1, which means that its antiseptic efficacy is higher than its citotoxicity. It should have no systemic effect, no allergenicity, and no resorption. An antiseptic that is both bacteriside and fungucide and effective against biofilm is an ideal choise. Before applying an antiseptic solution, the location and type of the wound and patient condition must be taken into account. Gross contamination should be removed by irrigating the wound with saline. Timely and appropriate use of topical antiseptics may contribute to wound healing.

Polihexanide (0.04%-0.02%) and octenidine are two antiseptics that meet with above mentioned criteria. Polihexanide (Lavasept, Serasept, Lavasorb, Prontosan...) is suitable for both acute and chronic infected wounds. For orthopedic irrigations its concentration must be lower (0.005%) since in higher concentrations it causes hyaline cartilage toxicity. Contrindications are the use as an irrigation solution in peritoneal cavity, in the central nervous system, in the middle and inner ear or intraocularly, and in cases of allergy to polihexanide. The dura-

tion of application is usually 2-5 days and should not exceed 2-3 weeks. The needed minimum contact time of polihexanide is 10-15 minutes[3].

Octenidine (0.1-0.2%) is ideal for almost every type of chronic wounds. It is effective after 30 seconds. It is safe, has no systemic effect, no allergenicity, and no resorption. It inhibits multiplication of or kills many microorganisms. It also is effective against biofilms.

Potassium permanganate is avaliable as solution, or tablets for dissolving in water. It is used as a soak and has astringant effect. It may be used for cleaning exudating wounds, especially for venous ulcers.

Sodium hypochlorite solution (0.06%) is an another choise, but reletively less effective. It's use is not recommended unless suitable alternatives are unavaliable[4,5].

Sting- cut- bite injuries, and injuries at risk for HBV or HIV infections requires a PVP-Iodine dilution of 10%[6]. Povidone iodine solution should not be used on other wounds because of its citotoxicity and hazrdous effects. Absorption of iodine compounds (povidone iodine, cadexomer iodine...) depends upon the concentration of iodine and is increased in the presence of demaged tissue[7].

Dressings

Impregnated dressings containing PHMB mainly used for burns. Dressings containing silver is a good choise for chronic infected wounds. The experience of many clinicians, recent systematic reviews and meta-analyses have confirmed positive effects of silver dressings when used appropriately: Silver dressings should be reserved for use in wounds with or at risk of high bioburden or local infection. In the treatment of children, silver dressings should not be used for more than two weeks without good clinical reasons[8]. Occasionally, ionic silver dressings cause staining of the wound bed and surrounding skin which is usually reversible.

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Validation of an Endoscope Drying Cabinet for Extended Storage of Non-Channelled Endoscopes-a Clinical Prespective

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Standards and recommended practices for endoscope decontamination, require that, when endoscopes are placed in a validated storage cabinet for heatliable endoscopes (SCHE) they must be reprocessed after a 72 hour storage period, even if the scope has not been used on a patient. Data collated from the Children's Hospital, over a two year period identified that less than 1 in 3 processed nonchannelled nasendoscopes were used on patients. In the past two years, SCHE manufacturer's claim that research has shown that storage times for endoscopes can be increased from 72 hours to 31 days. The literature review noted that this research was carried out in controlled (ideal) laboratory conditions rather than a clinical setting.

The aim of this study was to evaluate the efficacy of increasing the storage time of non-channelled endoscopes in the outpatients clinical setting, under normal operational conditions, to a maximum of seven days using guidance documents and draft standards as a framework for the study.

The efficacy of extending the storage time for nonchannelled endoscopes was evaluated using qualitative and quantitative methods, testing nine criteria and included surface and airborne contamination, air cleanliness, air changes, temperature, and relative humidity. Overall the storage cabinet performed well within the test parameters of Draft EN 16442:2012 and maintained the microbiological integrity of the test endoscopes stored within the device over the eight day period. Early data indicates that this change in practice will reduced endoscope reprocessing activity significantly, minimise the exposure of endoscopes to harsh chemicals and improve clinician access to essential equipment.

Operating Room Areas, Clothing and Traffic

Deborah L. Spratt[1]

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ABSTRACT

Ms. Spratt will be discussing two of the 2013 Association of peri-Operative Registered Nurses [AORN] Recommended Practices. The "AORN Recommended Practice on Attire" and the "AORN Recommended Practice on Traffic Patterns in the Perioperative Setting" will be described in detail and practical suggestions on implementation will be shared. The speaker will also briefly highlight the process of developing a recommended practice.

Safe patient care is the responsibility of the entire perioperative team. For many years AORN has focused on the creation of a safe environment for the patient and for the healthcare team. Evidence based practice is recognized and accepted as the basis for our care and are used to develop the recommended practices. They are a step by step guideline that can be used to create policies for use in a university teaching hospital, community hospital, ambulatory surgery or office- based surgery setting to assist in the reduction of surgical site infections.

International and European Standardization of Sterilization Processes and Equipment

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[1] *Germany*

The technical cooperation between ISO and CEN, stipulated in the "Vienna agreement", recognizes the primacy of international standards and generates concurrences of International and European Standards. But in practice, a standard is the result of reconciling any conflicting arguments from all interested parties; the discussions can lead to modified definitions for a given concept, vaguer test procedures or lack of acceptance criteria, and consensus is often obtained on the costs of coherence and relevancy of the standard. For harmonized European standards coherence of terminology, test procedures and acceptance criteria is crucial, because harmonized standards play a very important role: If cited in the European Official Journal, they provide presumption of conformity of a product with essential requirements of directives and regulations.

For example, in support of the European Medical Device Directive, EN ISO 17665 provides a framework for the characterization and validation of sterilization processes for identified health care products, and EN 285 contains specifications of general purpose steam sterilizers for health care settings with a variety of different sterilization loads. For the responsible party in the health care settings, looking upon the voluntary application of standards, it is vital to analyze both harmonized standards and identify relevant specifications and verification procedures.

Surgical Site Infections Linked to Contaminated Surgical Instruments

Stephanie J. Dancer[1]

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This presentation describes an investigation into a sudden increase in surgical site infection rate following "clean" surgical procedures. We identified 15 orthopaedic and five ophthalmology patients who presented with serious post-surgical infections. An outbreak committee was covened in order to find the cause of the sudden increase in surgical infections. Initial investigations included epidemiological and patient analyses, and environmental and clinical audits of wards and theatres. Following reports of contaminated surgical sets, surgical instruments and packaging were examined using a standardised laboratory protocol. Microbiological processing of packs revealed coagulase-negative staphylococci and *Bacillus* spp. from inner packaging as well as from instruments themselves. Similar microbial flora were recovered from a range of patient specimens, inclusing tissues retrieved at further surgery. Clinical and microbiological staff visited the sterilisation plant and found inadequate autoclave management and poor handling practices. This was compounded by lapses in inspection of surgical sets by theatre staff. The outbreak terminated following a review of operator training, supervision and staffing at the sterilisation plant, in conjunction with formal inspection and reporting of damp/stained sets by theatre staff. It was concluded that the sudden increase in deep surgical site infections in patients requiring "clean" surgery was linked with post-sterilisation contamination of sets containing surgical instruments. Eleven patients required futher surgical attention. Close collaboration and cooperation between sterile services providers, managers and clinical staff was extremely important during the investigation of this outbreak. The presentation will describe the structure set up to safeguard current and future sterilisation services for this healthboard.

POSTERS
PS-001/PS-154

PS-001

Development and Evaluation of PCD for Washing and Disinfection in Automated Endoscope Reprocessor (AER)

Makoto Ikeda[1], Masaki Takashina[2], Atsuko Kiuchi[1], Hiroshi Honda[3], Masamichi Murakami[3]

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Objective: There are quite a few contamination models quoted in ISO15883-5 regarding evaluation of AER. PTFE used for lumen of endoscopes is so smooth material that it's very hard to contaminate it. So, we developed totally new PCD to evaluate performance of AER.

Materials and Methods: We have applied lipid ingredient mixed with coagulation factor to the PTFE tubes (inner diameter of ϕ4 mm x 2 m long) using Endo-Swab® for the ingredient to be homogenized on the wall surface of PTFE lumen. Then, sheep blood with *E. faecium* mixed beforehand was injected to the lumen. After excess blood was pushed out, we have applied lipid ingredient again on the wall surface and developed cleaning evaluation PCD. PCD was cleaned by AER and the cleaning performance was evaluated by an enrichment culture method using TGC liquid medium, TSA II 5% sheep blood agar and BTB lactate agar. PCD was also visually evaluated by colored lipid ingredient fixed to PTFE tube lumen under the different cleaning condition.

Results: Culture test shows that one out of five samples has proven positive. Our visual check shows that there is good correlation between cleaning condition (use and non-use of detergent, or washing time) and residual color.

Remarks: Since PTFE tubes are easily contaminated by the lipid accounting for 15% of the organism ingredient, we used lipid as fixation material for lumen wall surface. Our PCD for AER is obviously highly resistant to washing.

Keywords: Flexible endoscope, PCD, lipid

PS-002

Are Reusable Medical Devices Appropriately Handled After Having Been Used on Prion Risk (PR) Surgery? An Audit in the French University Hospital of Grenoble

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[1] Department of Pharmacy, University Hospital of Grenoble, France

Introduction: French regulation about prion was modified in December 2011. We've deployed a new procedure in our sterilization unit in March 2013.

Aim: The objective of this study is to ensure that the new procedure abides by the new regulation.

Materials and Methods: We have conducted a prospective study from June to July on 30 surgical interventions.

Results: 97% of interventions identified as PR were justified. 100% of which were accurately described on the liaison sheet. When cleaning, none of the agents had the appropriate attire. 90% of the devices were correctly identified (platelets). 97% of devices were compatible with washing disinfectors, prion programs were chosen every time. 100% of hollow devices were correctly swabbed, but one handler didn't operate the correct dilution to prepare the cleaning solution. In 23% of interventions, trays and cupules were separated from the rest of the devices to be treated with the non-PR devices, as they were used to regroup them for cleaning.

Conclusion: Visuals were identified to clearly explain how to prepare a correct dilution and what is the appropriate attire. An additional training will be held to use only UU swabs for pre-cleaning and to keep trays and cupules with the PR devices. This study showed a rather appropriate handling of PR devices, even though a few process steps could be improved. Our next study will assess if non-PR intervention really are non-PR interventions.

Keywords: Prion risk, cleaning

PS-003

Test of Cleaning Effectiveness of Medical Device

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Introduction: The cleaning efficacy of medical device is a key factor in the sterilization process and patient safety. The Center for Materials Sterilization has a responsibility to ensure and certify that all stages of processing medical device meet safety requirements.

Aim: The aim of the study was to establish the washing cycle (minutes) and rinsing cycle (minutes) to prove the cleaning effectiveness of medical device through ultrasonic cleaner using enzymatic detergent.

Materials and Methods: It was used design of experiments (DOE) to identification, through experiment, the factors that are significant to the response. The method of analysis used in the execution of the experiment was a multiple regression using Minitab. The experimental matrix cannot be defined, because the experiment was not planned. The controllable factors in this experiment were coded in a range of -1 to 1 for the determination of the significant factors. The factors kept constant were dilution of the enzymatic detergent (2 ml/l), drying cycle of the cleaner (7 minutes) and the type of load (full). The temperature (° Celsius), washing cycle (minutes), and rinsing cycle (minutes) were the varied factors.

Results: The results show that the washing cycle, and rinsing cycle were considered significant factors for effective cleaning.

Conclusion: It can be concluded that the temperature which the variation was between 45 °C and 55 °C was not a significant factor, in other words, did not influence in the effectiveness of the cleaning. The washing cycle and the rinsing cycle were considered significant factors for effective cleaning, with a positive effect. The optimum condition was 9 minutes for washing cycle and 4 minutes for rinsing cycle.

Keywords: Patient safety, design of experiments, washing and rinsing cycle

PS-004

Effectiveness in the Surgical Instruments Quantity Standardization in Washer Disinfector Baskets

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Introduction: The suitable automated process cleaning of surgical instruments depends on measures taken and actions that enable safe and effective process. It is essential to standardize washer disinfector baskets to validate protocols. Some factors affect the cleaning results as: water quality, detergents, correct assembly and quantity of surgical instruments in baskets and correct program.

Objective: The aim of this study was to ensure effectiveness and efficiency in the instrumental amount standardization in baskets.

Materials and Methods: It was a field study quantitative and qualitative. Were defined the amounts of instrumental in standard and control baskets and performed cycles with biological material contaminated load after surgical procedure and compared to artificial contamination, using cleaning indicators, as load check (stainless steel plate impregnated with synthesized protein) and protein test (protein reagent tube, wich changes the color to blue in the presence of the same), in addition to the instrumental visual inspection, using inspection lamp.

Results: From the results of the cleaning quality index - CQI obtained by visual inspection, it was evaluated comparatively the amount of standardized instruments in basket, considering satisfactory CQI results with rates higher than 97%, since all results from commercial monitors brought no differences between them. The use of CQI as evaluator of instrumental amount indices showed between 94.1% and 97.6% for instrumentals up to 19 cm with 60 and 50 units respectively and 95.2% and 98.1% for instrumentals with 20 to 26 cm with 30 and 20 units respectively. Based on the value of the CQI we validate standard baskets with 50 units sizes up to 19 cm and baskets with 20 units in sizes from 20 to 26 cm.

Conclusion: The number and size definition of instruments in basket is an indispensable factor in the cleaning step. The CSSDs should evaluate their surgical storage to define their baskets standard, ensuring the cleaning, reducing the return of materials to soil area and increasing quality indices defined in the service.

Keywords: Cleaning quality index, cleaning, baskets standardization

PS-005

Scan Technology Cleaning Biolumnescence: Development a Minimum Levels Security Protocol to Endoscopes Processing

Teresinha Neide De Oliveira[1], Antonia Fenelon De Menezes[2], Islane Costa Ramos[1], Maria Beatriz De Paula Tavares Cavalcante[1], Karine Vieira De Vasconcelos[1], Patricia Borges Barjud Coelho[1]

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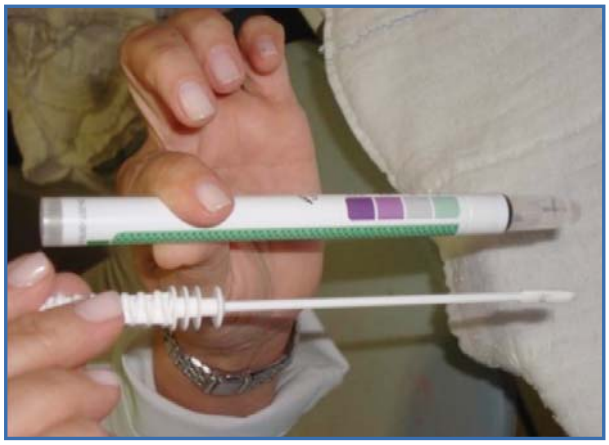
Introduction: Guidelines for processing endoscopes involves manual and automated cleaning with brushing and exposure of structures to enzymatic detergent with rinse, disinfection, sterile rinsing and drying. The processes are well-defined, rigorous and guided by ANVISA guidelines. Each patient is a potential source of infection, and the interruption of a chain link is enough for the user's exposure to the risk of the adverse event.

Aim: The research aims to standardize in RLU, minimum safety standards for the use of the endoscope.

Materials and Methods: Thirty samples were collected from the process water of gastric endoscopy. For each endoscope three samples were collected: immediately after patient use after cleaning and the last after disinfection. For analysis of collected was used cleaning indicator which is based on ATP-bioluminescence pathogens still present at the end of the process. Their results are measured in relative light units (RLU), bioluminescence emanating from the sample, the smaller the amount of RLU, safer process. The collection was processed in the months of September and October 2013, being held by the same collector. Sample, mark the endoscope, and enzyme responsible for cleaning were random. The institution is a specialized service offered, given 750 procedures/month.

Conclusion: We have developed a protocol for cleaning and disinfecting using scanning technology cleaning with a view to patient safety.

Keywords: Bioluminescence, protocol, desinfection



Bioluminescence 1

Bioluminescence 2

PS-006

Study on Cleanliness of Loan Instruments by Adenosine Triphosphate (ATP)

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Objective: Loan instruments (LI) is essential in orthopedic implant surgery. In the Guideline of Japanese Society for Operating Medicine 2008, it is recommended to wash LI before and after using in clinical settings and also after returning to suppliers. ATP values of LIs just after receiving from suppliers and after washing in my hospital were studied to evaluate practical cleanliness of LIs.

Materials and Methods: From 16 November 2011 to 6 June 2012, 149 items just after receiving from suppliers and 157 items after washing in clinical settings of Kinki University Hospital were evaluated on the ATP values by ATP measurement reagent (UXL100 clean traceTM, 3M).

Results: 7.0% of LIs after washing and 38.9% of LIs just after receiving showed more than 100 Relative Light Unit (RLU). In the results the uneven part and narrow space of both LIs just after receiving and after washing are apparently contaminated. But most of them are not found visually.

Conclusion: Rather higher rate of contaminations were found among both LIs just after receiving from suppliers and after washing in clinical settings, however they were not easily found visually. More studies on the residual contaminations of LIs must be performed carefully.

Keywords: ATP, loan instruments, contamination

PS-007

The Importance of Revers Osmosis Water System in Central Sterilization Units

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The quality of water to prepare the tools for reuse has significantly effective on the protection of nature. Demiralized water should be used in thermal disinfection devices or surgical instruments and materials that are manually subjected to decontamination or performed its sterilization at sterilizer after decontamination. The quality of water to prepare the tools for reuse has significantly effective on the protection of nature. Washer disinfectors reprocessing method with a pre-wash and main wash demiralized water is recommended to optimize the processing steps, because under the pre-wash in cold water to clean the blood and the results of research based on gradually increasing the washing phase materials could harm the water hardness. Water spots, and corrosion on the plates can be prevented with the use of demiralize water. Composition and method for the preparation of a water re-use unsuitable tools-as well as adversely affect the appearance and raw materials. Therefore, plumbing water features must be taken at the planning stage. Used in different water qualities, based on water hardness and difficult-soluble at room temperature can lead to the formation of a hard layer and even under this layer, corrosion can occur. Hard layer dissolve in acid and is extracted by acid-based detergent. After the water evaporates, its ingredients appear and the mineral remains as evaporation residue. Chlorides, dissolved in water are particularly critical, because a higher concentration of instruments made of stainless steel puncture can cause breakage (Figure 1).

In general, the risk of chloride-induced pitting increases in the following cases.

- Increased rate of chloride
- Increasing the temperature
- PH value falls
- Longer exposure time
- Inadequate drying
- The increase in concentration due to drying

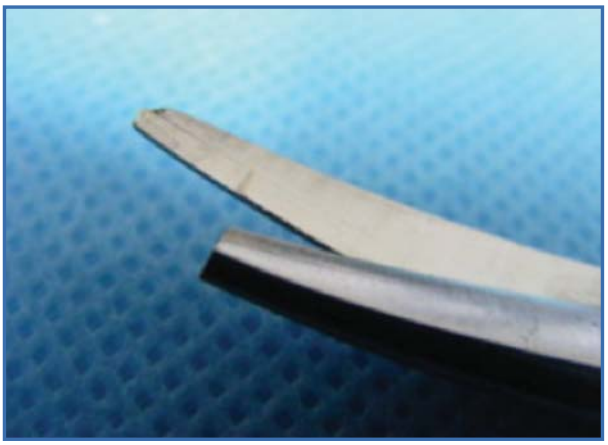
Alize iron for the final rinse using water as described above is recommended for the prevention of corrosion at the same time preventing the occurrence of stain. For anodized aluminium surfaces in general, it is also advisable to stabilize them.

DIN EN 285, Annex B standard medical instruments prepared for use again, cleaning and disinfection of the boiler feed water is recommended values shown in Table 1. On the elements of the specified values, the use of feed water or steam sterilizer equipment and significantly reduce operating time may result in the loss of the manufacturer's guarantee.

Demiralized water should be used in thermal disinfection of devices or surgical instruments and materials that are manually subjected to decontamination or performed its sterilization. The expenditure of large financial resources indispensable for the surgery, surgical instruments, decontamination and sterilization of instruments used in the process, and central sterilization units disinfectors and sterilizers are an indispensable fixture of the extension of useful life of these units will be under construction, which will be established through reverse osmosis water systems. With this system, devices, surgical sets, extended lifetime, hospitals contribute to the country's economy will be achieved by using financial resources rationally.

Keywords: Demiralize water, sterilization central unit, reverse osmosis

Burst as a result of lime resistance



Corroded surgical instrument

Table 1. Water features should be used in central sterilization unit DIN 285

Characteristic of water	Rate
Evaporation	≤ 10 mg/L
Silicon oxide	≤ 1 mg/L
Iron	≤ 0.2 mg/L
Lead	≤ 0.005 mg/L
Traces of heavy metals	≤ 0.1 mg/L
Chlorides	≤ 2 mg /L
Phosphates	≤ 0.5 mg/L
Conductivity (at 20°)	≤ 15 µS/cm
pH (acidity)	5 with 7 inter
Color Colorless, transparent, residues	Colorless, transparent, residues
Hardness (Σ alkaline earth ions)	≤ 0.02 mmol/L

PS-008

Verification of Cleaning Surgical Complex Instruments: Breaking the Boundaries of Invisibility

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[2] *Institut de Prevençao do Câncer do Estado do Ceará, Brazil*

Introduction: The complexity of cleaning is directly proportional to the material's complexity, and it must precede disinfection and sterilization. Assess its effectiveness is a difficult task considering the process limitations.

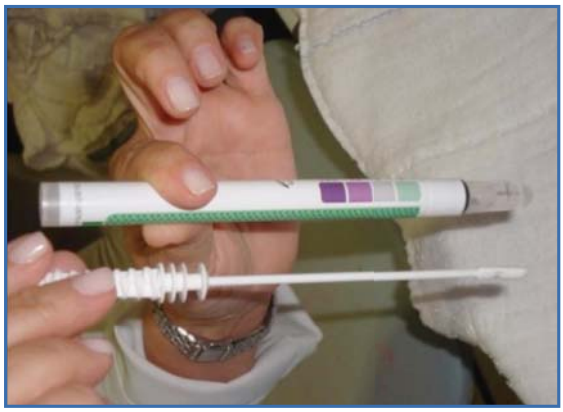
Aim: The research aimed to verify the cleaning process of complex surgical materials.

Materials and Methods: Experience report based on the results of verification of cleaning performed in daily practice, the Central Processing Materials in a private hospital located in Fortaleza, Ceará, in the period from January to March 2013. Selected materials were laparoscopic.

Results: A hundred samples were tested using an indicator of the presence of protein. The test applied is verified by a jig color indicating protein residues in small, medium and large quantity, representing dirt invisible to visual inspection. Of the 50 samples tested at first, 32 (64.0%) were in compliance with regard to cleaning and 18 (36.0%) were non-compliant. Device parameters used for verification indicate failure in the cleaning process that was not detected by visual inspection; against this result, there is need for rapprochement to the material to ensure quality processing and not compromise the next phase. After this intervention the other samples were tested for instrumental videosurgery; following the proposed roadmap, identifying 47 (94.0%) in accordance with the cleaning and only 3 (6.0%) vehicles that were not in compliance.

Conclusion: The experience contributed to changes in work processes. It pointed to the need to review the processes and establish the institution as a routine verification of cleaning, using indicators of protein residues.

Keywords: Cleaning, complex surgical materials, biofilm



Bioluminescence 1

Bioluminescence 2

Bioluminescence 3

PS-009

ATP Bioluminescence and Visual Inspection for Environmental Cleaning

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Objective: The inanimate environments of healthcare facilities harbor niches which support growth of large numbers of micro-organisms. Adenosine triphosphate (ATP) bioluminescence is a rapid indicator of levels of biologic material present on surfaces. Bioluminescence based ATP testing of environmental surfaces has become well established in hospital settings. The aim of this study was to compare the results of ATP bioluminescence test with the visual control of surface cleaning of two critical care units.

Materials and Methods: The study was carried out in two critical care units within three month period. There were 165 simultaneous assessments of environmental surfaces following the terminal cleaning processes. Subjective visual inspection (nine different reasons) and commercially available adenosine triphosphate (ATP) test system were used to measure cleaning quality of patient environment. ATP measurement was in relative light units (RLUs). Equal or more than 250 RLU was taken as the cut-off point for dirtiness. ATP measurements were done on the samples taken from eleven different critical surfaces after the visual inspections.

Results: One hundred and thirty three samples out of 165 (80.6%) were identified ineffectively cleaned by ATP or visual inspections. One hundred and five samples (63.6%) were identified as ineffectively cleaned according to the ATP measurements and visual inspections, 77 of them (46.7%) were identified dirty with both methods. Although"dust" was the most frequent reason for ineffective cleaning in visual inspection,"stain" was the most frequent reason in cases which were identified clean by ATP test but dirty by visual assessment (46.4%). Mean ATP level was 1821 RLU in ATP fail group (> 250 RLU), it was 1460 RLU in visually fail group and 742 RLU in visuallypass group ($p< 0.01$).

Conclusion: It is shown that thecompliance with the appropriate cleaning processes in the critical care units of the study hospital was poor. Since the ATP test system is objective with quantitative result, it can be used for control of cleaning in critical care units.

PS-010

Financial Benefits After the Implementation of Antimicrobial Copper in Intensive Care Units (ICUs)

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[3] *National Health Operations Centre Ministry of Health, Greece*

Aim: Aim of this study was to evaluate the reduction on intensive care unit (ICU) microbial flora after the antimicrobial copper alloy (Cu+) implementation as well as the effect on financial - epidemiological operation parameters.

Materials and Methods: Medical, epidemiological and financial data into two time periods, before and after the implementation of copper (Cu 63% - Zn 37%, Low Lead) were recorded and analyzed in a general ICU. The evaluated parameters were: the importance of patients' admission (Acute Physiology and Chronic Health Evaluation - APACHE II and Simplified Acute Physiology Score - SAPS), microbial flora's record in the ICU before and after the implementation of Cu+ as well as the impact on epidemiological and ICU's operation financial parameters.

Results: During December 2010 and March 2011 and respectively during December 2011 and March 2012 comparative results showed statistically significant reduction on the microbial flora (CFU/mL) by 95% and the use of antimicrobial medicine (per day per patient) by 30% (p= 0.014) as well as patients hospitalization time and cost.

Conclusion: The innovative implementation of antimicrobial copper in ICUs contributed to their microbial flora significant reduction and antimicrobial drugs use reduction with the apparent positive effect (decrease) in both patients hospitalization time and cost. Under the present circumstances of economic crisis, survey results are of highest importance and value.

Keywords: Antimicrobial copper in ICU, financial benefits, antibiotics cost reduction

PS-011

Local Medical Waste Management Success: ESOGU Hospital

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Introduction: Medical waste, to be disposed of separately from other waste collection and proper disposal of special waste. It is very important to minimization of waste separation and correct seperation of medicine today. According to the regulations on medical waste disposal costs in Turkey are covered by the budget of the hospital is an important addition to the load.

Aim: It was targeted to reduce medical waste and economic loss with the scheduled work team.

Materials and Methods: At the beginning of 2012, hospital medical waste management has been reorganized. The work program; theoretical and practical training of medical waste producers, waste minimization on source separation and awareness and behavior change towards ensuring remedy the lack of necessary equipment, implementation supervision, regular recording system, relevant feedback, good prefixes rewarded, bad examples to be trained again outline formed. It was made the evaluations the performance of the amount of waste per patient year and annual paid to compensate for the costs with medical waste.

Results: With the 18-month-programmed, we reduced the amount of medical waste with team work hospital bedside 1.98 kg/patient/year from 1:04 kg/patient/year rate. Table 1: is shown in. To compensate for the increased costs of medical waste each year, with a reduction in economic earnings are directly proportional to the amount of medical waste was found. Despite this, in 2011 for the disposal of medical waste per 747.000/year in 2012 to £ 553.000/year and £ 231.000 in 2013/6 months paid.

Conclusion: It is very difficult to reduce intensive medical care medicine during the presentation of the correct seperation of waste. However, the absolute support of the management of the hospital and it was established in accordance with the scale of the waste management plan and a process for the hospital practitioner of this plan can be achieved with a team of special waste. As a result of, economic gain reduces the burden on the budget of the hospital.

Keywords: Medical waste

PS-012

Injury Risks in CSSD

Anoop VA[1]

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Decontamination and cleaning area
Handling sharps in the decontamination
Hold sharps ends away from your body
Avoid placing hands in a container that you cannot see instruments
Utilize tool that allow you to handle instruments without direct use of hands
Manually cleaned instruments
Lifting racks in to the carts, moving, moving cart in and out of washing instrument
Place body at a level that is comfortable to the level of the surface you are working on, use proper body mechanics.
Washing equipment in decontamination
Operating, cleaning and performing routine maintenance to washing equipment's
Be aware of safety mechanisms
Look for instances in which electricity and water are in close proximity
Hot surfaces
Wet floor in decontamination
Splashes while manually washing spill while working around washing equipment
Pay attention to signage
Immediately block of any wet area
Remove spill as soon as possible
If infectious materials or chemicals, follow department procedure for removal.
Handling sharp in the packaging and preparation area
Removing racks or carts from automated washers
Non-metallic grips on racks and carts
Handling chemicals in the sterilization area
Sterilize instruments that cannot be exposed to high temperatures.
Chemicals include ETO and H_2O_2
Steam sterilization area
Operating performing routine maintenance and removing instruments from sterilizer.
Use thermal insulated gloves when removing instrument set s,
Low temperature sterilization hydrogen peroxide
Wear gloves while handling
Spilling or leaking of chemicals from cassette or cup
Low temperature sterilization-ethylene oxide
Higher risks of exposure
Damage or leaking canisters
Utilize ethylene oxide badges as instructed by your department
Keywords: Decontamination area, packaging and sterilization area

PS-013

Equipments Qualification at the Manufacturer's Factory Before Delivery Example of Washer-Disinfectors

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[1] *CSSD, CHRU Lille, France*

Introduction: Our new CSSD, designed on an industrial model, is equipped with: 10 washer disinfectors (WD), 7 steam sterilizers, 4 washing cabines to process about 1000 operating trays a day. The validation of all these equipments is long to implement and must be carefully planned.

Aim: It seemed relevant and more convenient to achieve a part of the validation [some criteria of installation qualification (IQ) and operational qualification (OQ)] directly at the manufacturer's factory. It allows anticipation of equipments' adjustments before delivery and thus saving time for further validation's stages.

Materials and Methods: At the factory, keys criteria have been checked, according to standard EN ISO 15-883.

A WD (290 Belimed) was installed on a test bench allowing impossible or difficult testing to run in a CSSD:

- Water consumption
- Chemicals dilution (measurement of withdrawn volume and water consumption)
- Cleaning water sampling (to be measured by the chemical's manufacturer)
- Soil tests
- Safety tests

WD's compliance with our specifications was also checked.

Results:

Concerning the compliance with our specifications: the printer was on the wrong side.

Safety tests were all OK.

First chemical dilution needed a new adjustment.

Soil tests showed the cleaning's efficacy and reproducibility.

Drying has also been validated.

Conclusion: These tests enabled us to correct the nonconformities and adjust the programs parameters before the reception in the CSSD.

The whole validation process (IQ OQ PQ) has been carried out in the CSSD.

This way of proceeding shows all its relevance on a project of this scale.

Keywords: Qualification, CSSD, factory

PS-014

Comparison of the Nosocomial Infection Pathogens Observed in Ministry of Health Katip Celebi University, Izmir Ataturk Training and Research Hospital Between 2009-2011

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Objectives: The incidence of nosocomial infections vary depending on which hospital and service the patient lies. Hospital infections are seen more frequently in teaching hospitals and university hospitals and are less common in small hospitals. The distribution of hospital infection in each hospital by years varies upon used antibiotic policies.

Materials and Methods: In this study it was examined the rate of microbial agents isolated from the outpatients diagnosed with hospital infection according to the definitions of the the Centers of Disease Control of Prevention (CDC) in the Ministry of Health Katip Celebi University, Izmir Ataturk Training and Research Hospital between the years of 2009-2011.

Results: The patogens isolated from various clinical samples of patients with the diagnosis of nosocomial infection between years 2009-2011 in our hospital are given in Table 1. *P. aeruginosa* was the most frequently isolated pathogen in 2009, while in 2010 and 2011, *Acinetobacter* spp. was the most frequently isolated pathogen. The rate of gram-positive bacteria *S. aureus* and CoNS (coagulase-negative staphylococci) is less than gram-negative bacteria, and had decreased over the years.

Conclusion: The result of this study suggest that the increased rate of the *Acinetobacter* over the years is a result of the cross-contamination, and shows us the importance of hand hygien.

Keywords: Nosocomial infection

Table 1.

	2009		2010		2011	
Strain	**n**	**%**	**n**	**%**	**n**	**%**
Acinetobacter	177	18.5	239	18.89	377	26.30
P. aeruginosa	181	18.9	189	14.9	177	12.35
E. coli	118	12.3	174	13.75	123	8.58
Klebsiella spp.	78	8.17	133	10.51	170	11.86
Enterobacter spp.	29	3.03	27	2.13	52	3.62
Proteus spp.	21	2.20	22	1.73	16	1.11
Enterococcus spp.	65	6.81	87	6.87	127	8.86
S. aureus	116	12.1	27	2.13	50	3.48
CoNS	84	8.80	107	8.4	90	6.28
Candida	49	5.13	86	6.79	91	6.35
Other	36	3.77	151	11.93	135	9.42

PS-015

Establishing a Central Sterilization Unit (CSU)

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Introduction: In sterilization units; decontamination, disinfection, dehydration, maintenance/repair, packaging, sterilization, storage and distribution activities take place. Hence, establishing a CSU requires well-organized good planning.

The purpose of this study is; to provide guidance for entities which decide to establish a CSU and to prevent them from facing any potential problems throughout CSU establishment process.

Materials and Methods: This study is performed by gathering data and visual documentation while establishing a CSU in Afyon Kocatepe University. By carefully examining the facility renovation, air-conditioning, procurement, mounting, calibration and functional use processes, existing gaps within the contract award process are determined.

Results: For CSU establishment; choosing the right place and allocating necessary funds have the utmost importance. Pre-analysis shows, whether these 2 factors will suffice for fulfilling requirements. Same factors play a key role during technical requirements review. Shortening contract award timeline, procuring durable devices and assuring proper conditions for them, technical support, maintenance, repair, training and safety issues also exist in the requirements list.

Conclusions: In Afyon Kocatepe University, existing facility is renovated and dirty-clean-sterile areas are separated from each other via a single contract. Magnetic locks are mounted which permit only the authorized personnel to enter in. Hygienic air-conditioners installed for clean/sterilled areas and particle count test is performed. All devices are procured with 2 doors. Reverse osmos system with 3 tons capacity is established. After all, CSU begin functioning.

Keywords: Establishing, problems,sterilization units

PS-016

Sharp Injuries Among Hospital Support Personnel; Laundry Workers, Cleaners, Porters and Central Supply Workers

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Introduction: Healthcare workers (HCWs) are at risk of exposure to blood borne pathogens by needle stick and sharp injuries.

Aim: The aim of this study was to determine the frequency and distribution of percutaneous injuries among HCWs of a community hospital.

Materials and Method: A five-year retrospective study was undertaken in 280-bed community hospital. Between May 2008 and May 2013, there were 34 needle stick accidents among 34 hospital employees in Afyon pediatrics, obstetrics and gynecology hospital. Each injury was reported to infection control committee by affected employee.

Results: Of 34 injuries, 18 were from known sources and 16 from unknown sources. From known sources, 2 were seropositive for hepatitis B virus (HBV) (5.88%). The most often executed procedures with injury risk for hospital support personnel are: intramuscular or subcutaneous injection, collecting, transporting, and disposing of medical wastes in the health institutions medical waste. Occupational exposure to waste is a possible risk factor for HBV infection. Hepatitis virus infection has been a problem among hospital employees. HBV infection is now controlled by hospital safety practices limiting exposure to blood and other body fluids and by both passive and active immunization. In our hospital an active HBV immunization program has been applied for hospital support personnel 4 years ago.

Conclusion: The healthcare personnel is not the only professional group exposed to the risk of occupational HBV, HCV or HIV infections in hospitals. Sharp injuries of cleaners in healthcare settings have so far received little attention in the scientific community. It is necessary to provide education programs about active HBV immunization, isolation precautions and medical waste management for this group of staff.

Keywords: Sharp injuries, hospital support personnel

Sociodemographic characteristic of participants

	n	%
Total injury	37	100
Nursing staff	9	26.5
Midwife	5	14.7
Nursing students	3	8.82
Hospital support personel	17	50

Causes of injuries

	n	%
Collecting or transporting medical wastes	17	50
During injection administration, blood collection, or needle recapping	12	35.29
Using surgical blade	3	8.82
During suturing	4	11.76
IV line administration	2	5.88

Demographic and serologic characteristic of hospital support personnel

	n	%
Hospital support personel	82	100
Male	18	21.95
Female	64	78.04
Injury	17	20.73
Anti-HBs positive	46	56.09
Anti-HBs negative	36	43.90

PS-017

All Autoclaves Suddenly Stopped!

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Introduction: Saiseikai Fukuoka General Hospital (SFGH) is a medium-sized hospital with a tertiary emergency center in the downtown of Fukuoka in Kyushu island located in the south of Japan. We have 380 beds and have 8 operating rooms, where neurosurgery, otolaryngology, orthopedics, obstetrics gynecology, plastic surgery, ophthalmology and cardiac surgery have performed many kinds of operations. We experienced the event that all three autoclaves of the CSSD suddenly stopped in SFGH. We report this case was studied with and countermeasures that cause investigation.

Purpose: The CSSD in SFGH has several kinds of sterilizer and measures of failure of each device is made. But we have no countermeasures against the whole CSSD failures of water supply. The purpose is to make countermeasures against all accidents in CSSD.

Materials and Methods:

1) Recovery of sterilization equipments as soon as possible.

2) Establish another methods of sterilization if we cannot restore sterilization equipments in 24 hours.

Results:

1) The cause was to decrease in water supply pressure to the autoclave.

2) We could make all autoclaves normally re-operate.

3) We have established a cooperative framework of emergency and CSSD of neighborhood hospital.

Conclusion: Because in the CSSD, it is sterilized all of the surgery equipment, not only measures of failure of individual equipment, the establishment of a crisis of the CSSD as a whole, including power failure and water supply is important.

Keywords: Autoclave, water supply

PS-018

Evaluation of the Effectiveness of Phosphor Method of Cleaning Processes

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Introduction: The cleaning is the first step of disinfection process. The efficiency and control of this step are made by inspectors observation. Making the cleaning stuff believe the importance of things not seen is also difficult situation. The effectiveness of the cleaning process, the event controllability, and create awareness of important effects of training.

Objective: The study was designed to determine the effectiveness of hospital cleaning procedures and cleaning visibly by the usage of purple light source and pigment stuff.

Materials and Methods: Primarily, a coloring material in a 10 mg/mL solution that flashes under purple light is applied by particle spraying method to a room which is planning to be cleaned. Hygiene personnel was unaware of this observation. After the cleaning process by the help of light source and measuring device bed/door handle/shelf/pump were measured. Surface which flashes under purple light were shown to hygiene personnel. The training video is also shared with whole hygiene personnel. After the next control study which is applied to uninformed personnel there was a significant decrease in specialized area after the measurement.

Result: Monthly hygienic control methods applied to randomized rooms increased the quality of hygienic procedures. They are also proposed to be an effective tool in personnel education.

Keywords: Control of cleaning, phosphor

Measurement results

Clean the specialized fields	The first check after cleaning/m^3	After education the first control/m^3	% change
Bed	34	4	-88.2
Dining table	55	7	-87.3
Shelf	31	2	-93.5
Pump	27	16	-40.7
Door handle	53	6	-88.7

PS-019

Sharp Injuries in Healthcare Workers in Occupational Diseases Hospital

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Introduction: At any time while caring for patients, health care workers are at risk to exposure to bloodborne pathogens potentially resulting in infections such as HIV or hepatitis B and C, due to needlestick, sharp injuries and splashes. The aim of this study to determine epidemiology of sharp injuries in occupational diseases hospital during five years.

Materials and Methods: The retrospective study is carried out by reviewing the medical records of medical stuffs working in hospital during 2009 and 2013.

Results: The distribution of duties of medical stuff that had sharp injuries: nurses were in the first place (57.9%) and cleaners (34.2%) were followed them. The most common way for the sharp injuries was needlestick injuries (86.8%). The study showed that 71% of the medical stuff who had sharp injury used preventative barrier at the time of the injury.

Conclusion: It is an important fact that, an estimated 12 billion injections are administered to patients worldwide and due to this fact each year an estimated 800.000 to one million needlestick injuries occur in the US. The US Department of Labor Occupational Safety & Health Administration (OSHA) indicates that one in every seven healthcare workers is accidentally stuck with a needle each year. Healthcare workers need to be aware of needlestick and other sharps injuries whenever they are around them or handling them. Over 80% of needlestick injuries can be prevented with the use of safe needle devices. And education of healthcare workers and control of practises are also important for preventing of sharp injuries.

Keywords: Healthcare workers, sharp injuries

PS-020

The Importance of Computerized Documentation and Follow Up System on Textile Control

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Introduction: Surgical equipments come in mind firstly when the term sterilization is used in hospitals. Of course the proper sterilization, cleaning, maintenance and package of surgical equipment is very important. Because the disposable surgical clothes and drapes are not have been used commonly in our country yet, textile sterilization is still an important part of work load in central sterilization units. Control of folding, package and sterilization of textiles are very sensitive like surgical equipment and needs attention (Figure 1). The cleanliness, durability, content, even the difference in regular folding of textiles make central sterilization unit personals come up against surgeons and surgery nurses.

Purpose: To decrease the unproper usage of surgical drapes and clothes by nurses and surgeons, that becomes ready to use after spending a huge effort and time for folding, packing and sterilization. To follow up the textiles sterilized in central sterilization unit by recording them and also give to usage under recording, and by this way to follow up in which unit, by which doctor/nurse, to which patient, when and how many textiles are used (Figure 2).

Application: The textile/pack record-package item on the computed documentation control system is opened and package entrance is selected. The stickers of equal number to packages, that is double sticky, containing barcode number and non-erasable writings on are selected from the textile material list that is previously described on the system and written from documentation system automatically (Figure 3). The sticker containing textile/pack information, sterilization date, expiry date and barcode number on it, is followed up with barcode system from sterilization until usage. With this system we are able to get statistical data by comparing the packed and used textile number, so we could able to question the unproper usage and decrease the costs.

Keywords: Documentation system, sterilization, textile

Figure 1. Sterile material record form

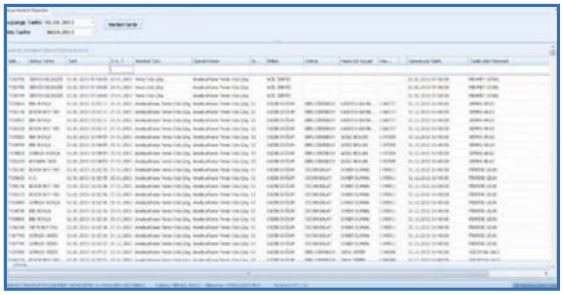

Figure 2. Register with computerized monitoring and documentation system

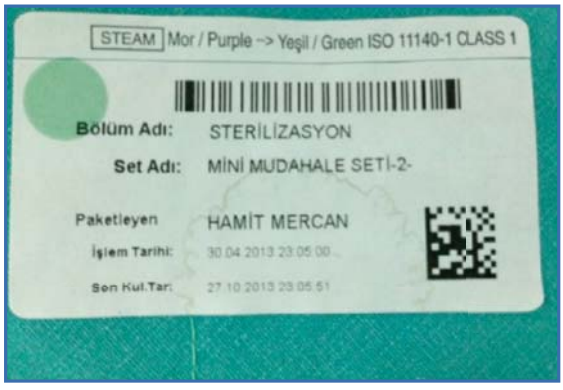

Figure 3. Mini barcode

PS-021

Comparison of the Knowledge Level of Nurses Working in Kartal Dr. Lutfi Kirdar Education and Research Hospital and Ardahan State Hospital About Infection Control Precautions

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Background-Aim: Hospital infections (HI) constitute a major problem with increasing significance in our country as well as worldwide. They cause increased rate of mortality, morbidity and treatment-costs. Turkish Ministry of Health has published regulations that impose obligation in provision of preventive infection control precautions (ICP) against HI. Nurses are the foremost healthcare workers with direct contact with patients. Therefore, they primarily need to be informed and educated about the importance of ICP. In this study, we aimed to compare the knowledge level of nurses working in the 706-bed Kartal Dr. Lutfi Kirdar Education and Research Hospital (LK-KERH) and the 150-bed Ardahan State Hospital (ASH) about ICP.

Materials and Methods: This is a descriptive cross-sectional study conducted between 30th April and 20th July 2013. The universe of the study is composed of 627 nurses employed in LK-KERH and 90 nurses working in ASH. Overall, 255 nurses from LK-KERH and 90 nurses from ASH were randomly sampled. A self-completed questionnaire consisting of 8 and 16 questions on demographic characteristics and ICP, respectively, was distributed to them. A response rate of 100% was achieved. The level of knowledge (LOK) about ICP was assessed by the number of correctly-answered questions (each correct answer corresponded to "1 point") and ranked as follows; ≥ 14 points: excelllent, 10-13: good, 5-9: poor/insuffient. All data were analyzed by SPSS 17 (Chicago, IL., USA) software. Descriptive statistics were used for analysis of demographic characteristics. Categorical variables were measured as percentages and were compared by X^2 test and Mann-Whitney U test. To evaluate and compare the education level, Spearman's correlation was used. $p< 0.05$ was considered to be significant.

Results: General demographic and occupational characteristics of the nurses working in either LK-KERH or ASH, their distribution according to various clinics, and their educational status on ICP were demonstrated on Table 1 and Table 2. When the two group of nurses were compared; LK-KERH-nurses had a significantly much higher LOK than that of ASH-nurses (> 10 correct answer/points: 74% vs. 11%) ($p< 0.0001$). A significant difference was detected in age group, educational status, duration of occupational experience, distribution according to various clinics and LOK about ICP of nurses between the two hospitals ($p< 0.05$). No significant correlation between the LOK and receipt of education on ICP ($p= 0.42$), age group (LK-KERH: rho= 0.47, $p= 0.46$, ASH: rho= 0.004, $p= 0.97$), education level (LK-KERH: rho= -0.024, $p= 0.7$, ASH: rho= 0.13, $p= 0.9$), and occupational experience (LK-KERH: rho= +0.77 $p= 0.22$, ASH: rho= -0.17, $p= 0.12$) was detected. There was a significant association in LK-KERH-nurses ($p= 0.002$), but no significant association in ASH-nurses ($p= 0.75$) in terms of LOK about ICP according to various clinics.

Conclusion: Nurses working in LK-KERH (a central tertiary hospital) had much higher LOK about ICP than those employed in ASH (a peripheral secondary hospital). Continuous and repeated in-service education about ICP should be given to all hospital staff, especially those working in emergency units and peripheral hospitals in order to increase awareness and reduce incidence of HI. All health-care staff should receive comprehensive education on ICP irrespective of their age-group, educational and occupational experience status.

Keywords: Education, infection control, knowledge level

Table 1. General demographic and occupational characteristics of the nurses working in either LK-KERH or ASH

Variables	LK-KERH n (%)	ASH n (%)	p
Age group			< 0.0001
19-24 years	29 (11.4)	28 (31.1)	
25-30 years	61 (23.9)	42 (46.7)	
31-35 years	57 (22.4)	14 (15.6)	
36-40 years	55 (21.6)	4 (4.4)	
41-45 years	33 (12.9)	1 (1.1)	
46-50 years	15 (5.9)	1 (1.1)	
≥ 51 years	5 (2)	0 (0)	
Gender			0.24
Female	227 (89)	84 (93)	
Male	28 (11)	6 (7)	
Educational status			< 0.0001
Health occupational highschool	33 (12.9)	33 (36.7)	
Associate degree	60 (23.5)	22 (24.4)	
Licence	130 (51)	34 (37.8)	
Graduate degree	32 (12.5)	1 (1.1)	
Occupational experience			< 0.0001
1-5 years	64 (25.1)	51 (56.7)	
6-10 years	47 (18.4)	27 (30)	
11-15 years	44 (17.3)	6 (6.7)	
16-20 years	30 (11.8)	4 (4.4)	
≥ 21 years	70 (27.5)	2 (2.2)	
Clinics employed in			0.007
Medical	96 (37.6)	18 (20)	
Surgical	78 (30.6)	35 (38.9)	
Intensive care unit	30 (11.8)	17 (18.9)	
Emergency unit	31 (12.2)	5 (5.6)	
Operating theatre	15 (5.9)	10 (11.1)	
Pediatrics	5 (2)	5 (5.6)	

Table 2. Education on ICP, vaccination status and level of knowledge of the nurses working in either LK-KERH or ASH about ICP

Variables	LK-KERH n (%)	ASH n (%)	p
Receipt of education about ICP			0.206
Yes	241 (94.5)	88 (97.8)	
No	14 (5.5)	2 (2.2)	
Hepatitis B vaccination status			0.22
Vaccinated	227 (89)	77 (85.6)	
Not vaccinated	24 (9.4)	13 (14.4)	
Unknown	4 (1.6)	0	
Influenza vaccination status			0.49
Vaccinated	48 (18.8)	14 (15.6)	
Not vaccinated	209 (81.2)	76 (84.4)	
Level of knowledge about ICP			< 0.0001
≥ 14 points: Excellent	15 (5.9)	0	
10-13 points: Good	173 (67.8)	10 (11.1)	
5-9 points: Poor/insufficient	67 (26.3)	80 (88.9)	

ICP: Infection control precautions.

PS-022

An Evaluation of *Staphylococcus aureus* Strains Isolated from Clinical Samples at Samsun Training and Research Hospital Microbiology Laboratory

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Aim: *Staphylococcus aureus* is the most frequently isolated microorganism in laboratories. In humans it may lead to varying presentations, from a simple surface skin infection to fatal systemic infections.

This study aimed to evaluate the profiles of MRSA and MSSA distribution and resistance of *S. aureus* strains obtained from samples sent to Samsun Trainiing and Research Hospital Microbiology Laboratory.

Materials and Methods: A retrospective evaluation was made of a total of 722 *S. aureus* strains obtained from various clinical samples at Samsun Training and Research Hospital Microbiology Laboratory between 1 January 2012 and 1 January 2013.

Results: In the defined period, a total of 722 *S. aureus* proliferation were determined at the laboratory. Of these samples, 382 (52%) were determined as methicillin sensitive (MSSA) and 340 (48%) as methicillin resistant (MRSA). The distribution of the MSSA samples was 150 (39%) wound culture, 119 (31%) blood culture, 31 (8%) sputum culture, 25 (6%) tracheal aspirate culture and 22 (5%) urine culture. The MRSA samples were 194 (58%) wound culture, 99 (29%) blood culture, 19 (6%) tracheal aspirate culture, 15 (4%) urine culture and 13 (3%) sputum culture. In the MSSA samples, while sensitivity was found in all strains (382) to vancomycin, teicoplanin, oxacillin, ciprofloxacin, trimethoprim-sulfamethoxazole, gentamicin ve linezolid, sensitivity in isolation to penicilin was determined in 16 (5%) and resistance in isolation to erythromycin in 12 (3%), and tetracyclin in 4 (1%). In the MRSA samples, while 340 strains (100%) were found to be resistant to penicillin and oxacillin, resistance in isolation was determined to erythromycin in 142 (41%), to trimethoprim-sulfamethoxazole in 22 (6%), gentamycin in 49 (14%), tetracyclin in 88 (25%) and cyprofloxacin in 34 (10%). No strain was encountered which was resistant to vancomycin, teicoplanin or linezolid.

Conclusion: To bring *S. aureus* infections under control, it can be considered necessary for hospitals to know the resistance profile. Thus, it will be beneficial to determine the hospital resistance patterns at certain intervals in respect of knowing appropriate and cost-effective treatment to enable the rational use of medication.

Keywords: *Staphylococcus aureus*, methicillin sensitive (MSSA), methicillin resistant (MRSA)

PS-023

Implementation of Antimicrobial Copper in Neonatal Intensive Care Unit (NICU)

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Aim: The aim of this study was to investigate the effectiveness of the application of antimicrobial copper alloys (Cu+) in a neonatal intensive care unit (NICU) in relation to the reduction of microbial flora.

Materials and Methods: At a Level III NICU of a pediatric hospital, with the capacity of 26 incubators, antimicrobial copper (Cu+) was implemented on touch surfaces and objects. The copper alloy contains Cu 63% - Zn 37% (Lead Low). Microbiological cultures were taken in three different time periods, before and after the application of Cu+, using dry and wet method technique.

Results: In the above NICU, the reduction of microbial flora after the implementation of the antimicrobial copper (Cu+) on the selected surfaces and objects was statistically significant (n= 15, $p < 0.05$) and was recorded at 90%. The pathogens isolated at high rates (CFU/mL) prior to copper implementation were as follows: *Klebsiella* spp., *Staphylococcus epidermidis*, *Staphylococcus aureus*, *Enterococcus* spp.

Conclusion: This study highlights the positive impact of antimicrobial copper (Cu+) and demonstrates that copper implemented surfaces and objects are effective in neutralizing bacteria, which are responsible for health care acquired infections in the nosocomial environment (HCAIs).

The innovative implementation of antimicrobial copper in the NICU and the significant reduction of microbial flora heralds the reduction of antimicrobial drugs use, and a possible reduction of hospital acquired infections and hospitalization time.

Keywords: Antimicrobial copper use in NICU, microbial flora reduction

PS-024

Digital Antimicrobial Thermometer for Axilliary Usage: A New Device for Measuring the Temperature of the Body for the Reduction of Cross-Infections

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Aim: The aim of this prospective comparative study is to evaluate the reduction of microbial flora on the surface of an axillary digital thermometer, made of antimicrobial copper, in relation with a common digital thermometer.

Materials and Methods: A brand new digital electronic thermometer implemented with antimicrobial copper (Cu 70% - Nic 30%, Low Lead) on the two edges of the device (top & bottom: World Patent Number WO2013064847 and Register Number by the Hellenic Copper Development Institute No 11) was manufactured and a comparative study with common digital electronic thermometer was conducted on 9 intensive care unit (ICU) patients of three different hospitals. The thermometry was performed in accordance with the projected International Nursing Protocols for boby temperature mesaurement. A total of 108 microbiological samples were taken from the axilery area of the patients, using both of the investigated body temperature devises. Simultaneously the "Halo" phenomenon (phenomenon "Stefanis") was studied at the non-antimicrobial copper-implemented parts of the antimicrobial digital electronic thermometer.

Results: In all samples collected from the surface of the antimicrobial electronic digital thermometer, the reduction of microbial flora (*Klebsiella* spp., *Staphylococcus aureus*, *Staphylococcus epidermidis*, *Candida* spp., *Pseudomonas* spp.) was progressively reduced to 99% in two hours after the thermometry. The above flora was found in the axillary cavity remained the same in common thermometer. The statistical analysis (SPSS 21) showed a statistically significant reduction of the microbial load ($n= 108$, < 0.05).

Conclusion: The hospital-acquired Infections are linked to the transfer of pathogens due to the multi-usage of medical devices from both health professionals and patients, such as axillary thermometers. The use of antimicrobial digital electronic thermometer minimizes microbes' transportation between patients and health professionals while having all the conditions of reliability, proper functioning, security, ease of use and reduced cost.

Keywords: Antimicrobial axilliary thermometre, antimicrobial copper, armpit infections

PS-025

Determination of the Knowledge of Nursing Staff About Measures for Preventing of Nosocomial Infections

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Introduction: Nosocomial infections are major causes of mortality and morbidity throughout the world. Nosocomial infections are infections that patients acquire during the course of receiving healthcare treatment for other conditions. These infections related to medical care can be devastating and even deadly. Nosocomial infections in hospitals impose significant economic consequences on the nation's healthcare system. They affect 1 in 10 patients admitted to hospital. Annually, this results in 5000 deaths with a cost to the National Health Service of a billion pounds. On average, a patient with hospital acquired infection spent 2.5-times longer in hospital and caused £3000 additional cost more than an uninfected patient. Healtcare workers especially nurses have an important role on preventing nosocomial infections. This study was made to evaluate the knowledge levels of nurses in our hospital on measures for preventing of nosocomial infections and to evaluate the necessity of an additional training in accordance with the results.

Materials and Methods: Our research which was designed as descriptive and carried out between 1st-15th August 2013, included 30 nurses who work in different wards in the hospital. A questionnaire was prepared to measure the knowledge levels of nurses on measures for preventing of nosocomial infections was administered to the nurses.

Results and Conclusion: The average age of the nurses was 33 ± 6.9, 43.5% were graduates of school of nursing, average professional experience was 13 years, 95.6 % had been trained about nosocomial infections, 95.6 % knew the definition of nosocomial infection, 65.2% knew the most frequent nosocomial infections, 78.3 % considered washing hands as the measure absolutely required, all of them knew that control of antibiotic use is important in preventing of nosocomial infections. As a result of this research, it was revealed that, in general, the knowledge of the nurses on nosocomial infections, is adequate. Thus, it was concluded that practice or observing of current processes of measures for preventing nosocomial infections will be beneficial.

Keywords: Nosomial infection, nursing

PS-026

Phenotypic and Genotypic Analysis of *Acinetobacter baumannii* Strains

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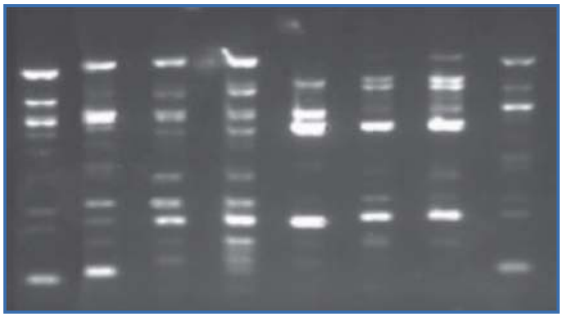
Aim: *Acinetobacter baumannii* is one of the most frequent pathogen triggering hospital acquired infection, worldwide. Although the clinical importance of *A. baumannii* multidrug resistant infection in intensive care unit (ICU) has been well known, the knowledge of *Acinetobacter* virulence factors is still at an elemantary stage. In addition to already known properties of *A. baumannii* such as the capsule, lipopolysaccharide and outer membran protein, *A. baumannii*'s ability to produce the gelatinase enzyme which is effective in tissue damage by hydrolising peptides, ability to grow under iron-deficient conditions, are also defined as virulence factors. Ability of *A. baumannii* to survive on dry surfaces for prolonged periods has been explained with its ability to form biofilms.

Materials and Methods: In this study *A. baumannii* strains isolated from patients in the intensive care unit during the period 2005-2010 were divided into two groups. First group included patients (n= 41) with *A. baumannii* strains isolated from both deep tracheal aspirate (DTA) and blood cultures and the second group (n= 40) where *A. baumannii* was isolated from DTA only. Two groups have been compared to each other in terms of their antibiotic susscebtibility and virulence factors (biofilm production, gelatinase production and the ability of growth under iron limiting conditions), furtherly *A. baumannii* strains of the same patient have been genotyped in order to search the clonal relationship between DTA and blood isolates in the first group.

Results: All isolates were multi drug resistant and were able to grow under iron-deficient condition. Even though the biofilm production rate of blood isolates has been found higher than that of DTA isolates either from same patients or from patients with DTA isolates only, the difference was not statistically significant. Gelatinase production has been detected only in 11% of isolates and there was no difference by type of specimen. When band profiles of DTA and blood strains from 41 patients (n= 82) were compared to each other; 32 patients strains from different samples were same, whereas 9 patients strains different profile were exhibited. Although in 4 patients DTA and blood strains were exhibiting the same band profile, biofilm formation and gelatinase production were different. As a result this study found no statistically significant difference in virulence factors between DTA and blood isolates. Furtherly REP-PCR results suggest that *A. baumannii* could lead to polyclonal infections in ICU.

Keywords: *Acinetobacter baumannii*, REP-PCR, biofilm



REP-PCR pattern of strains

PS-027

Work Place Safety and Risk Management of Central Sterile Supply Department (CSSD) in "DHARMAIS" Cancer Hospital

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The services of Central Sterile Supply Department (CSSD) in hospital are services that used pay attention especially on occupational health and safety due to the high risk that it could lead. CSSD workers must always analyze and detect any potential risk of accident working at CSSD, ones should raise awareness and discipline on following the sterilization manuals to reduce any potential risk.

This study is aimed to identification and analyze the potential risk the services of sterilization process due to the workers and environment at CSSD "Dharmais" Cancer Hospital, and how to manage their potential risks. This study was a descriptive analysis study using cross sectional observation at CSSD "Dharmais" Cancer Hospital Indonesia in September 2010. The method are risk identification, risk assessment, risk control strategies.

The result of the study showed that CSSD workers are potentially exposed to workplace injury: pinched, electrical shock, back injury, needle stick injury, hazardous materials, burns hazards, carpal tunnel syndrome of the wrist, and respiratory irritation. The risk control strategies are use correctly the procedure of using trolley and autoclave, warning label to avoid pinched and electrical shock, use personal protective equipment (PPE), manual handling technique to minimize back injury, continuing education, and comply to material safety data sheet to handle the hazardous materials.

The conclusions of the study are the risks of sterilization process due to the workers and environmental at CSSD can be identification and control to eliminate or reduce their effect. CSSD workers should raise awareness and disciplines on following manuals and procedures, warning labels, and comply in use PPE reduce any potential risk.

Keywords: Work place safety, management of occupational health and safety, Central Sterile Supply Department (CSSD)

PS-028

What Is Our Level of Progress in Applying the Multimodal Hand-Hygiene Improvement Program? A Self-Evaluation

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Aim: To determine the progress level of the multimodal hand-hygiene improvement program applied at the Okmeydani Training and Research Hospital, as well as the aspects required to enhance it. Evaluation of the hand-hygiene program is essential for quality improvement.

Materials and Methods: Self-evaluation was performed from January 2011 to December 2012, using the "Hand Hygiene Self-evaluation 2010" control list developed by the World Health Organization.

Results: The self-evaluation demonstrated that the System Change (100), Evaluation and Feedback (100), and Reminders (100) components achieved the highest scores, and it showed that Training and Education (90) and Safety Climate (85) had the lowest scores.

Conclusion: The total score obtained from the evaluation was 475, indicating that our application of the multimodal hand-hygiene improvement program is at an advanced level.

Keywords: Self-evaluation, hand hygiene

Table 1. Multimodal strategy components and achieved scores

Components	Maximum score	Achieved score	Achievement %
System change	100	100	100%
Training and education	100	90	90%
Evaluation and feedback	100	100	100%
Reminders	100	100	100%
Safety climate	100	85	85%
Total score	500	475	95%

PS-029

Evaluation of the Effectiveness of Surgical Aseptic Technique Teaching Given to Students of Operating Room Services Program

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Introduction: Operating Room Services Program (ORSP), is a staff training program for surgery and central sterilization units. ORS program is a theoretical and applied associate degree program and students graduate from different departments of vocational high schools are accepted. University students to learn to do self-evaluation of knowledge and skills to rise to the level of the learning advocated. In addition, peer evaluation and self-evaluation is reported to be a positive contribution to learning.

Objective: This study evaluated the effectiveness of surgical aseptic technique teaching given to students.

Materials and Methods: The research was carried out in the academic year 2012-2013 in the Ege University ORSP. Students of ORSP were the population of the research (n= 14). Operating Room Technology-I course students were given nine hours of theoretical lectures with the help of educational tools for surgical asepsis techniques (ppt, video). Surgical hand washing, wearing gowns and sterile gloves (open-closed method) wearing skills, using skills check lists in laboratory, each student was shown and was applied in practice. Then the students were asked to repeat the same skills with their peers in their own and to draw on the skills of self-evaluation. The applications repeated until the correct application of each item in the skills lists made, students are asked to take video skills. By the instructors in charge of video recordings were evaluated using the standard skill lists. Evaluation of surgical hand washing, wearing gowns and sterile gloves (open-closed method) were grouped under three main headings as wearing skills. The steps in the correct sequence for each section (1) point and the steps to the development of zero (0) points giving a total of 100 achievement points score was obtained 30/35/35. The mean score of students who are 75 and over total success skills were considered sufficient and successful. Students were given feedback after assessment.

Results: The distribution of the students for the schools that they graduated; (n= 7, 50%) of the Department of Aged Care Services, (n= 7, 50%) Department of Emergency Medical Services. Students surgical hand washing, wearing gown and sterile gloves (open-closed method) wearing skills video images were evaluated for surgical hand wash (full score 35), surgical dressing (full score 30) and sterile gloving (full score 35) the success skills average scores respectively were 30.8 ± 3, 27.6 ± 2, 30.6 ± 4. Overall grade point average of 86 ± 9. As a result of the statistical analysis, there was no significant relationship between the mean scores of success in graduating students with their department ($p= 0.90$. $p= 0.54$, $p= 0.26$, $p> 0.05$).

Conclusion: Students found to be successful in terms of surgical aseptic technique skills. The use of demonstrate-perform method in teaching, repeating skills on their own with their peers through the repetition of the missing and correcting errors, assuring a successful video skills was considered a positive effect on mean score. In practical sections, more common use of self-evaluation method with the use of video is proposed.

Keywords: Surgical aseptic technique teaching, teaching methods

PS-030

The Evaluation of the Level of Knowledge of the Student Nurses, Who Have Started Probation at Kartal Dr. Lutfi Kirdar Education and Research Hospital, About the Control and Prevention of Hospital Infections

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Introduction: Hospital infections (HI) is one of the most important health problems of modern medicine, or in other words infections related to health care service are predictable and controllable problems. Constant training is essential in areas of health services. In the area of health service, all personnel are to be aware of scientific innovations in the field of infection control and new skills brought by technological innovations.

Aim: This research has been carried out to evaluate the level of knowledge of nursing students who have started probation at Kartal Dr. Lutfi Kirdar Education and Research Hospital (LK-KERH) to control and prevent HI.

Materials and Methods: This is a cross-sectional descriptive study between 30th April and 30th July 2013. Four hundred and seven nursing students who were interning at LK-KERH became the research population and randomly picked 177 students which became sample for the research. A questionnaire was designed by researchers and a procedure was used to gather data. The questionnaire consists of 21 questions which 8 are about socio-demographic and general features, another 13 are about control and prevention of HI. The data was gathered through face to face interview with the volu ntary participated students and analyzed by SPSS 17 (Chicago IL, USA) program. The findings of students joining the survey have been given; moreover the chi-square test and has been used to make comparisons. In evaluating level of the knowledge, while ones who correctly answered 7 or more questions out of 13 are considered sufficient, others answering 6 or less are insufficient about control and prevention of HI. Each correct answer was 1 point.

Results: It's found out that 95.5% of the participants are between the age of 19-24, 69.6% are private university students, 53.1% are 2nd year students, 64.4% were trained for controlling and preventing infection at school and 79.1% are immune by hepatisis B. When the state of being immune by hepatisis B, levels of knowledge are compared, statistically meaningful difference is found (p= 0.004). It's understood that 85.5% of students having sufficient level of knowledge are immune by hepatisis B. It's understood that 13.6% of participants are unaware of the infection control committee unit and 57.1% of them declared that the committee consists of nurses. When the grades of students and the state being aware of the elements of committee compared, statistically meaningful difference is found out (Table 1). 72.8% of students were seen to have enough knowledge. No statistically significant difference compared to the level of knowledge of students with classes (Table 2). It's understood 23.1% of students having been educated about HI have insufficient level of knowledge. When the grades of students and the state was aware of the existence of the infection control committee were compared, statistically meaningful difference is found out (p< 0.0001). It's understood that when the class level of students increases the rate of the state of being the committee may increase up to 100%.

Conclusion: It's found out that students' grade levels, elevated levels of knowledge about infection control and prevention and they know that the infection control nurse is a member of the committee. However all the groups lack of sufficient knowledge about the other committee members. Due to the fact that it's observed that the level of the knowledge of trained students is insufficient, these trainings must be a part of the control program and done regularly.

Keywords: Hospital infection, level of knowledge, nursing student

Table 1. Comparing the grades of the trainee nurses with the state of being aware of the elements of infection control committee

	Infection control committee					
Classes	Infection control nurse n (%)	Infection control doctor n (%)	Others (Laboratory specialist, sterilization management, hospital director) n (%)	Unanswered n (%)	Total n (%)	p
						< 0.0001
1st Class	5 (13.5)	1 (2.7)	6 (16,2)	25 (67.6)	37 (20.9)	
2nd Class	63 (67)	5 (5.3)	14 (17.1)	10 (10.6)	92 (51.9)	
3rd Class	15 (65.2)	8 (34.8)	0	0	23 (13)	
4th Class	18 (78.3)	3 (13)	1 (4.3)	1 (4.3)	23 (13)	

Table 2. Trainee nurses with the resources to investigate levels of classes

	Level of knowledge about ICP			
Classes	**(7-13 points) Good/sufficient n (%)**	**(6 points or less) Poor/insufficient n (%)**	**Total n (%)**	**p**
				< 0.0001
1st Class	17 (45.9)	20 (54.1)	37 (20.9)	
2nd Class	76 (80.9)	18 (19.1)	94 (53.1)	
3rd Class	14 (60.9)	9 (39.1)	23 (13)	
4th Class	22 (95.7)	1 (4.3)	23 (13)	
Total	129 (72.8)	48 (27.1)	177 (100)	

PS-031

Retrospective Analysis of the Distribution of Microorganisms Isolated from Wound Samples

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Aim: Skin and subcutaneous tissue infections which are frequently encountered bacterial infections in the society. Wound infections, tissue rupture in this area with the establishment of microorganisms, reproduction and dissemination are caused by. Wound infections in patients receiving maintenance continue to be a serious problem. The aim of this study was the Samsun Education and Research Hospital, sent to our laboratory in 2012, a variety of clinical microorganisms isolated from wound retrospective study of distributions and their sensitivity to various antibiotics.

Materials and Methods: Laboratory from 1 January 2012-31 December 2012 sent 910 pieces of a variety of clinical wound between sample were incubated under appropriate conditions passage routine production mediums. At the end of incubation, the cultures that are breeding, conventional methods BD Phoenix automated system (Beckton Dickinson, USA) was identified and antibiotic susceptibility was determined using the BD Phoenix automated system.

Results: January 1, 2012-December 31, 2012 between the sample were sent a total of 910 wounds evaluated. Examples in order of frequency on the first burn service (179), plastic surgery (154), infectious diseases (86), orthopaedics (83), and general surgery service (80) belonged. The distribution of the samples of isolated microorganisms 162 (17%) percent *Pseudomonas aeruginosa*, 129 (14%) were *Acinetobacter baumannii*, 121 (13%) were methicillin-susceptible *Staphylococcus aureus*, 112 (12%) *Escherichia coli*, 79 (8%) were methicillin-resistant *S. aureus*, 73 (8%) were coagulase-negative staphylococci, 53 (6.0%), *Proteus* spp., 49 (5%), *Klebsiella* spp., 44 (4%), *Enterococcus* spp., 31 (3%) *Enterobacter* spp., 19 (2%) percent *Citrobacter freundii*, 17 (2%) were *Serratia marcescens*, 12 (1%) and *Morganella morganii*, 3 (0.3%) Other *B. cepacia*, *Achromobacter* spp., *A. stenotrophomonas*, respectively. *E. coli*, *Klebsiella* spp. strains, imipenem and meropenem resistance has not been found. Imipenem and meropenem resistance of *P. aeruginosa*, respectively, 39 (24%) 35 (21%) were found. Resistance to imipenem and meropenem in *Acinetobacter*.

Conclusion: In this study, the most frequently isolated pathogens, *P. aeruginosa A. baumannii*, methicillin-susceptible *S. aureus*, *E. coli*, methicillin-resistant *S. aureus* and coagulase-negative staphylococci, *Proteus* spp., *Klebsiella* spp., *Enterococcus* spp., *Enterobacter* spp. is.

P. aeruginosa A. baumannii strains in high rates of antibiotic resistance to many antibiotics do not increase to include the rational use of antibiotics should be given importance.

As a result, the treatment of wound infections is important for improving the culture and antibiogram think that the evaluation of the success of treatment.

Keywords: Wound infection, *P. aeruginosa A. baumannii*, *Escherichia coli*

PS-032

Laboratory Evaluation of the Level of Knowledge About the Safety of Their Employees Microbiology Laboratories

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Aim: Medical laboratories working for the protection of human health and the environment, certain rules must be followed. Techniques for working safely in the laboratory, laboratories, and laboratories, including non-work areas to improve health and safety conditions of all employees with the necessary responsibilities include measures to be taken. In this study, employees of microbiology laboratories, laboratory safety level of knowledge on the scope of in-service training, to compare the before and after training.

Materials and Methods: Samsun Education and Research Hospital, Medical Microbiology 28 laboratory technician working in laboratories, laboratory, safe working methods, the use of personal protective equipment, bio-safety levels and risk factors encountered in laboratories, including questions relating to the measures to be taken in a pre-test was performed.After this test, the employees were trained. After training, the final test was performed. Test scores compared to both the employees and their answers. After training with feedback about the application, South East Thames (Seth) was taken with a short didactic and interactive course rating scales.

Results: Pre-training was found to be 66% of the pre-test, the success level of the employees. In a recent test, the success level of post-training of staff was increased to 92%. Seth training their employees' satisfaction rate with the results of feedback scales were identified.

Conclusion: According to the results of the pre-test were not subjected to continuous training of laboratory staff were always low level of knowledge. Caused by the increased level of information and personnel, the satisfaction of the training have been identified. Inform about the safety of the laboratory to improve the in-service training should be planned in order to improve the level of knowledge building and teamwork. However, in accordance with the continuous training in order to maintain the proper laboratory safety are needed to continue.

Keywords: Laboratory safety, biosafety levels, in-service training

PS-033

Bacteriaes Isolated from Various Clinical Samples and their Antibiotic Susceptibilities in Intensive Care Unit Patients

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Aim: Due to the high rates of antibiotic usage and resistance, intensive care units (ICU) are risky hospital places in terms of infections. The aim of this study is to determine the microorganisms isolated from various clinical samples and antibiotic susceptibilities from the patients that hospitalized in ICU between June 2012-June 2013 in Gazi State Hospital.

Materials and Methods: Samples that sent from ICU to microbiology laboratuary are planted to the blood and EMB agar. Bact/ALERT 3D (bioMeriéux, Durham, NC, USA) system was used for isolation of bacterial strains from blood specimens. Respiratory tract specimens are also planted to the chocolate agar. Identification of microorgansims and antibiotic susceptibility tests were carried out by both Phoenix automatised system and conventional methods according to Clinical and Laboratory Standarts Institute (CLSI) standarts.

Results: Of the 1651 samples, a total of 550 (33.3%) reproduction has been identified. Of the 349 (63.5%) isolated microorganisms were gram-negative and 201 (36.5%) were gram-positive. According to the sample types was determined as 223 (40.6%) from blood, 157 (28.5%) from urine, 131 (23.8%) from respiratory tract and 39 (7.1%) from wound. Distribution of the samples are shown in Table 1. The most frequently observed gram-negative microorganisms are *E. coli* with 93 (27%), and *Pseudomonas* spp. with 81 (23%), *Acinetobacter* spp. with 71 (20%), *Klebsiella* spp. with 70 (20%) and the others (*Citrobacter* spp., *Enterobacter* spp., *Proteus* spp. and *Serratia* spp.) with 34 (10%) respectively. Thirty-four of 93 *E. coli* strains (36.5%) and 39 of 70 *Klebsiella* spp. strains (55.7%) produced extended spectrum beta-lactamase (ESBL). One hundred-twenty (59.7%) of the gram-positive strains were coagulase-negative staphylococci (CoNS), 50 (24.9%) of the starins were *Staphylococcus aureus*, and 31 (15.4%) of them were *Enterococcus* spp. Distribution of the gram-negative and gram-positive isolates are shown in Table 2 and 3 respectively. Resistanse to methicillin was 90.2% in CoNS and was 47.8% in *S. aureus* isolates and no resistance was detected to vancomycin in gram-positive isolates. The most active antimicrobial agents against *E. coli*, *Klebsiella* spp. and other *Enterobacteriaceae* was amikacin, against *Pseudomonas* spp. was piperacillin/tazobactam. While all of the *Acinetobacter* species had multidrug resistance, they were all sensitive to colistin.

Conclusions: Nosocomial infections are important problem in ICUs. To get under control and prevent these infections, every hospital has to resume surveillance works for ICU infections. These data can contribute to take accuse for infections and make appropirate empirical therapies in the ICUs.

Keywords: Intensive care units, antibiotic resistance, ESBL

Table 1. Distribution of the samples

Samples type	n	%
Blood	223	40.6
Urine	157	28.5
Respiratory tract	131	23.8
Wound	39	7.1
Total	550	100

Table 2. Distribution of isolated gram-negative microorganisms

Gram-negative microorganisms	n	%
Escherichia coli	93	27
Pseudomonas spp.	81	23
Acinetobacter spp.	71	20
Klebsiella spp.	70	20
Others (*Citrobacter* spp., *Enterobacter* spp., *Proteus* spp. and *Serratia* spp.)	34	10

Table 3. Distribution of isolated gram-positive microorganisms

Gram-positive microorganisms	n	%
Coagulase-negative staphylococci (CoNS)	120	59.7
Staphylococcus aureus	50	24.9
Enterococcus spp.	31	15.4

PS-034

Antibiotic Susceptibility of Nosocomial *Acinetobacter baumannii* Strains

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Introduction: *Acinetobacter baumannii* has been a gram-negative coccobacillus that has become increasingly important in recent years. It has been found in the hospital environment. Strains of *Acinetobacter* that causes pneumonia, bacteremia, urinary tract infection, wound infection in hospital, are resistant to many drugs.

Aim: It is to investigate the sensitivity of antibiotics of *A. baumannii* strains that are isolated from various clinical specimens and identified as hospital infectious agent.

Materials and Methods: One hundred-twenty eight *A. baumannii* strains that are defined as hospital infectious agent and are isolated from various clinical specimens from Firat University Medical Faculty Hospital inpatients that are sent to the Department of Infectious Diseases Laboratory between January and December 2012, were included in the study. Antibiotic susceptibility of isolated strains was determined with Kirby-Bauer disk diffusion method. Moderately susceptible strains were considered as resistant.

Results: *A. baumannii* was isolated in 128 samples received from 75 men (62.5%), 45 women (37.5%), total of 120 patients. The distribution of these strains according to clinical samples are given in Table 1. Sensitivity to colistin of isolated *A. baumannii* was found in 97.6%. Susceptibility to imipenem was found in 5.6%. Antibiotic susceptibility of *A. baumannii* isolates are presented in Table 2.

Conclusion: To determine of each hospital's its own sensitivity profile against to *Acinetobacter* strains has been great important in treatment and prevention of nosocomial infectious due to these bacteria in recent years because of increase in nosocomial infections due to *A. baumannii* and many of these bacteria developing resistance to the many drug.

Keywords: *Acinetobacter baumannii*, antibiotic, sensitivity

Table 1. The distribution of A. baumannii strains according to clinical samples

Sample	Number	%
Respiratory system*	111	86.7
Urine	9	7
Blood	4	3.1
Wound	2	1.6
Cerebrospinal fluid	2	1.6
Total	128	100

* Sputum, tracheal aspirate, broncho-alveolar lavage fluid.

Table 2. Antibiotic susceptibility of A. baumannii isolates

Antibiotics (n)	Number of susceptible strains	%
Colistin (128)	125	97.6
Cefoperazone/sulbactam (125)	90	72
Trimethoprim/sulfamethoxazole (124)	25	20.2
Piperacillin/tazobactam (128)	15	11.7
Ciprofloxacin (128)	9	7
Imipenem (125)	7	5.6

n= Tested number of strains.

PS-035

The Importance of Clean Prevention of Infection in Hospital Personnel

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Activities to prevent hospital-acquired infections in our country since 2004, the Scientific Advisory Board of Hospital Infections, and in 2005 began with the work of Treatment Institutions of Infection Control Regulations of the publication, and gained great success in health service quality standards.

The activities conducted in the area of preventive and treatment services have been overcome by strengthening primary health care services.

Although occupational physicians and nurses trained in the prevention of hospital infections, infection, check with the aim of providing medicine and receive a certificate in nursing has sought to prevent hospital-acquired infections. However, the cleaning staff have an important role in the fight against nosocomial infections, and only in-service training for caregivers is applied.

Working within the framework of the procurement of services related to the educational status of the cleaning staff and caregivers plays an important role in the prevention of nosocomial infections arrangements.

Which has an important place in the country's economy, tourism and hospitality industry, it needs the elements that make up the basic infrastructure of vocational schools, although upbringing, health, safety, and the slightest error which may have cost the lives of people working in the health sector, a sector that training of nurses and cleaning personnel in vocational schools can be opened to provide a more informed and professional service.

Compliance with the terms of the vocational training hospital personnel, equipment used, it will be easier material recognition process.

Keywords: Infection, cleaning staff, education

PS-036

Oral and Dental Health Centers Central Sterilization Units National Survey Results

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Introduction: Oral and dental health centers make a big progress in our country recently. In this progress central-sterilization-units (CSU) have improved fastly. So we have conducted a survey to state the current status of CSU in oral and dental health center.

Materials and Methods: We conduct a survey about CSU with 44 questions on digital media to the national 50 oral and dental health center, public hospital, dendistry faculty. Thirty five center have replied and informs about their replies of this survey by digital media. Outcomes are interpreted and the statistics are made up.

Results: The survey were replied by 33 oral and dental health center, 1 public hospital and 1 dentistry faculty. There arent any CSU units at 2 of these centers (5.7%). 27 (77.14%) of these units can work as an independent unit. In 15 centers (42.85%) of all, the infection commission makes a decision about the sterilization. CSU decides this matter in 10 centers (28.57%). And, in 10 centers (28.57%), management decides this issue. In 8 of these centers (22.85%),there aren't any written guide about CSU. Twenty three centers (65.71%) serve only withiin working-hours. But 6 of (17.14%) these centers serve 24 hours a day. There aren't any secretarait department in 33 (94.28%) of these centers. In the 20 of these centers (57.14%) there are situated standard household types air conditioner. But in 8 of these centers (22.85%) there are situated central air conditioner. Washing and disinfection exist only in 26 of these centers (74.28%). But ultrasonic-washing exists only in 29 (%) centers. The paperworks of these washing in 15 centers (42.85%) are prepared within each application. But in 16 centers (45.71%) these paperworks are prepared weekly. In 26 centers (74.28%) there isn't any usage of container. Single-serving packet/package isn't used in 31 centers (88.57%). But green fabric packages are only used in 24 centers (68.57%).

Conclusion: When we calculate the centers which conduct this survey, we can see that the participation of Oral and dental health centers are high. Although they are currently in an improvement process, most of these centers remedy the deficiency of CSU. Nevertheless we think that, some of these centers should study on CSU and go on their training.

Keywords: Central sterilization units, oral and dental health center

PS-037

Istanbul Anatolian South Public Hospitals Union Intensive Care Units Medical Waste Amounts

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Introduction: Although the medical wastes only constitute 1-2% of the general solid waste produced in the hospitals, they exhibit great danger for human and environmental health due to the presence of infection-rich materials. Since the risk of spreading infections caused by medical wastes is high, World Health Organization (WHO) states that it is necessary to perform studies to reduce waste production. To evaluate the efficiency of the studies on waste reduction the amount of the waste produced must be known and must be compared with the previous values. "Specific Waste Amount (SWA)" (kg/totalbed.day) value is based for the comparison of the waste amount in medical places. It is accepted that the high rate of specific waste amount is the indicator of the lack of care for minimizing the waste amount in its source.

Aim: The aim of this study is to evaluate the status of the waste reduction studies by determining the SWA and the waste amount produced in special services like intensive care units (ICU) in training and research hospitals.

Materials and Methods: Third level ICU of Dr. Lutfi Kirdar Kartal Training and Research Hospital, Marmara University Pendik Training and Research Hospital and Kartal Kosuyolu High Specialization Training and Research Hospital, having 133 total beds are selected for the pilot study. Daily medical waste amounts of these units are measured, Z-test applied and SWA values are evaluated with patient number and (bed) fullness.

Results: As a result of the measurements in intensive care units, in internal medicine 1 ICU with 10 beds 100% fullness rate 401.65 kg waste produced having 5.74 SWA value. In cardiovascular surgery 1 (CVS) ICU with 10 beds and 84.29% fullness rate 333.02 kg waste produced in 1 week, 4.76 SWA value according to bed number and 5.64 SWA value according to actual bed number recorded. In internal medicine 2 ICU with 8 beds, 33.93% fullness rate, 200.46 kg waste produced, 3.58 SWA value according to bed number, 10.5 SWA value according to actual bed number recorded. In CVS 2 ICU with 58 beds, 69.46% fullness rate, 1686 kg waste produced, 4.15 SWA value according to bed number and 5.97 SWA value according to actual bed number recorded.

Finally it is reported that; 3905.98 kg waste produced and average waste amount per bed is ± 2.34 kg, 5.43 kg. Internal Medicine ICU is the most waste producing unit and waste production in CVS ICU is more than the surgery units and above the average. Also it is recorded that when the day and the bed number increases, amount of waste produced increases.

Conclusion: It is observed that the waste production in internal medicine and CVS intensive care units is high. It is also observed that the SWA value must be evaluated according to the actual bed numbers since the units producing waste below the average according to the bed number produces waste above the average according to the actual bed number. To provide the minimization of the waste in the source, these units are supported by training and the observations about the waste amounts are in progress.

Keywords: Intensive care unit, medical waste, specific waste amount

Table 1. Unit based medical waste amount

Foundation	Unit	Bed fullness rate	Bed number	Actuel bed number	Patient day	Weekly total waste amount (kg)	Specific waste amount	Waste amount according to actual bed	Z value
Dr. Lutfi Kirdar Kartal Training and Research Hospital	Emergency Surgical ICU	104.76	15	16	110	577	5.5	5.25	-0.07
Dr. Lutfi Kirdar Kartal Training and Research Hospital	Internal Medicine 1 ICU	100	10	10	70	401.65	5.74	5.74	+0.13
Marmara University Pendik Training and Research Hospital	Surgical ICU	85.71	16	14	96	361	3.22	3.75	-0.71
Marmara University Pendik Training and Research Hospital	CVS 1 ICU	84.29	10	8	59	333.02	4.76	5.64	+0.08
Marmara University Pendik Training and Research Hospital	Pediatric Surgery ICU	96.43	8	8	54	155.35	2.77	2.87	-1.09
Marmara University Pendik Training and Research Hospital	Internal Medicine 2 ICU	33.93	8	3	19	200.46	3.58	10.5	+2.16
Kartal Kosuyolu High Specialization Training and Research Hospital	CVS 2 ICU	69.46	58	40	282	1686	4.15	5.97	+0.23
Kartal Kosuyolu High Specialization Training and Research Hospital	Pediatric CVS ICU	91.07	8	7	51	191.5	3.42	3.75	-0.71

PS-038

A Point Prevalence Study on Proper Waste Sorting At-Source in a 500-Bed Training and Education Hospital

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Objective: All wastes produced by hospital should be sorted properly at-source without threatening health of patients, patient companions, visitors and employees. This observational study aimed to research applied procedures of waste sorting, improper waste sorting and sources of false applications.

Materials and Methods: A point prevalence study was conducted in the inpatient treatment services and intensive care units to observe disposal status of the waste sorting during one week based on "Medical Waste Control Regulation". The infection control nurses used a form prepared by the infection control team during the observational study. Observation fields within the observed clinics involved treatment preparation room, dressing room, nursing room, patient room (intensive care beds were accepted patient rooms) and service corridors. Waste sorting was based on sharps bins, medical waste bags, glass waste bags, domestic waste bags and paper waste containers-packaging wastes. Observations were performed at any time within working hours of weekdays. Criteria for improper waste sorting were accepted medical waste, domestic waste, packaging waste, gloves, injector, needle, ampoules, flacons and other wastes within improper container/bag beside overfilled and uncovered waste bags.

Results: Totally 806 waste container/bags were observed in waste sorting. Of observations; 32%, 26%, 22%, 11% and 9% were sharps bins (SB), medical waste bags, domestic waste bags, glass waste bags and paper-packaging wastes, respectively. Proper sorting at-source was detected in 58%, 74%, 87% and 77% of the sharp and medical wastes, glass wastes, domestic wastes and paper wastes, respectively (Figure 1). Improper waste container/bags demonstrated injectors (51%), flacon bottles (18%) in SB wastes, packaging (38%) and domestic wastes (18%) between medical wastes, gloves (32%), medical wastes (10%) between domestic wastes, especially fluorescent light (28%) accepted as hazardous waste between glass wastes and domestic wastes (53%) between paper wastes. Beside improper waste sorting, it was detected that SB and medical waste bags were more than ¾ full and domestic waste bags were overfilled. Waste containers were found uncovered for easy use (2% of SB and 34% of medical waste containers). Another noticeable point of this observational study was exposed needles (3%) in the medical waste bags (Table 1).

Conclusion: Since wastes produced by health facilities stay permanently in air, water and soil and deteriorate ecological balance differently from domestic solid wastes; they are classified as hazardous and harmful wastes. Such medical wastes interact directly or indirectly with enviroment and human beings during process from production time until the end of elimination procedure. Therefore, waste sorting at-source is important. As a conclusion, proper waste sorting will reduce elimination costs significantly due to continuation of human and environmental health, reduced waste amount, recirculation, recycling and easy elimination.

Keywords: Environmental health, hospital waste, waste

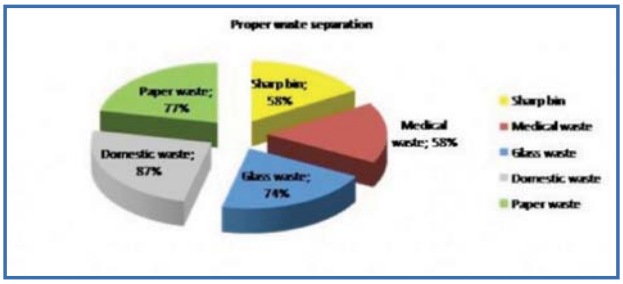

Figure 1. Ratio of proper separation of waste

Table 1. The ratio of waste separation by impropriety categories

Waste bin/bag	Medical waste	Domestic waste	Packaging waste	Glove	Injector	Needle	Ampoul	Flacon	Other wastes	Uncovered waste bag	Over filled
Sharps bin	10%	2%	7%	-	51%	-	-	18%	8%	2%	2%
Medical waste	-	18%	38%	-	-	3%	-	-	3%	34%	4%
Domestic waste	10%	-	6%	26%	-	-	-	-	16%	32%	10%
Glass waste	6%	12%	12%	12%	6%	-	-	-	28%	24%	-
Paper waste	10%	53%	37%	-	-	-	-	-	-	-	-

PS-039

Efficacy of Various Concentration of Garlic Solutions in Reducing *Enterococcus faecalis* within Root Canals of Extracted Human Teeth

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The aim of this study was to evaluate antibacterial effect of garlic extract on Enterococcus faecalis. In this study fifty extracted permanent lower single rooted human premolar teeth were used. The crowns were removed and roots were prepared by using ProTaper root canal instruments. The specimens were sterilized by ethylene oxide. The roots were randomly divided into 4 test (n= 10) and 1 control groups (n= 10). All roots were infected for 24 hours with E. faecalis (ATCC 29212). The samples of control groups were only irrigated with physiologic saline. The tested solutions are as follow: 5%, and 20% garlic solutions, 2% chlorhexidine gluconate, and 2.5% NaOCl. 10 µL of prepared bacterial suspension were inoculated into the root canal system. Three days after inoculation each of irrigation solutions were used 2 ml, and waited two minutes. Then, each root canal was irrigated with 1 mL physiologic saline. Sterile paper points were used to sample bacteria from the root canal and were transferred to tubes containing 1 mL of BHI broth. The antibacterial activity was measured by comparing the percentage reduction in colony counts (%RCC) before and after intracanal medication at three time intervals The percentage reduction in colony count was calculated. Results were evaluated by colony counting method. According to results 20% garlic solution showed inhibitor effect on *E. faecalis*, but this effect was lower than NaOCl and chlorhexidine gluconate. 5% garlic solution was found not effective.

Keywords: Garlic, *Enterococcus faecalis*, irrigation solution

PS-040

Operating Environment Sink Taps, Liquid-Soap and Sink Reservoirs Microbial Contamination Investigation

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Objective: This study was conducted in order to guide the work of the hospital infection control, the source of hospital infections thought to do liquid soap, sink and faucet reservoirs microbial contamination.

Materials and Methods: For this purpose, cultures were taken from the hospital operating room taps (12 taps) and liquid soaps and reservoirs of hand-washing sinks (54 samples), before (at 11:00) and after cleaning hours (at 16:00). Samples were subcultured onto 5% sheep blood agar medium and EMB agar and were incubated overnight at at 37°C.

Results: Bacterial growth was detected 25% of the taps before cleaning and 17% after cleaning. Of basin reservoirs approximately 50% had bacterial growth before cleaning, and 12.5% after cleaning. There was no growth in the reservoirs of liquid soap before and after cleaning. Results are statistically evaluated, cleaning found a statistically significant difference between the pre-and post-VRE isolations.

Conclusion: Effective cleaning of faucets and sink reservoirs in twice a day in high risk areas is important to prevent cross infections. Cleaning staff must be informed and trained about cleaning and disinfection procedures of the relevant units.

Keywords: Nosocomial infection, disinfection culture, operation

PS-041

Measurement of Knowledge Levels About Waste Sorting At-Source of the Healthcare Staff Employed in a 500-Bed Training and Research Hospital

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Objective: All wastes released in the healthcare facilities are called as hospital wastes and are leading factors causing environmental pollution. Such wastes create risks for hospital employees, patients and public health. Health sector wastes were sorted as medical and other wastes whereas they are currently collected under titles such as hazardous, glass and packaging wastes beside medical and domestic wastes. The hospital wastes should be collected and eliminated at-source by people staying permanently or temporarily such as employees, patients, visitors and companions. This survey aimed to measure knowledge levels about waste sorting at-source of healthcare employees from inpatient services of Bagcilar Training and Research Hospital.

Materials and Methods: This survey included 317 healthcare employees from inpatient services of Bagcilar Training and Research Hospital. According to literature, a survey form involving questions regarding waste sorting at-source was prepared to be answered by healthcare employees. Survey form involved two sections. First section included participant demographics (age, gender, education level, profession, hospital work duration, working unit); while second section included 5 questions on waste sorting at-source. Healthcare employees answered questions under supervision of a surveyor.

Results: Survey involved 62% female, 38% male participants including 100 physicians, 134 nurses and 83 cleaning employees. All questions were answered correctly by 47%, 61% and 65% of the physicians, nurses and cleaning employees, respectively. Of the surveyed 317 healthcare employees; 57% (62% female, 48% male participants) answered correctly all questions. The highest correct answer rate was found by 63% in healthcare employees aged ranging 31-50 years. Of the subjects who answered all questions correctly; 61% had hospital working duration more than 5 years. When education levels of surveyed subjects were examined; 77% postgraduate nurses and 68% primary school graduate cleaning staff were leading whereas physicians had least correct answer score by 42%. From 20 services measured for knowledge levels; Cardiology and Plastic Surgery Services place in the first place by scores respectively 100% and 90% while Ear-Nose-Throat Service took the last place by 30%. The most common correct answer was "needle" by 98% for the question asking which material shouldn't be removed by medical waste pouch whereas highest false answer by 29% was "only to prevent harm to environment and human health" for the question asking why waste sorting is needed.

Conclusion: Wastes of health facilities are classified as hazardous and harmful wastes since they deteriorate ecological balance. Proper waste sorting will also reduce the costs significantly due to continuation of human and environmental health, reduced waste amount, recirculation, recycling and easy elimination. Therefore, increased awareness of healthcare employees, continued education and informing whole staff about same procedures are important.

Keywords: Hazardous waste, hospital waste, waste collection

PS-042

Development of CSSD Technician Course for Provision of Quality Services of CSSD to End Users

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Introduction: Shaukat khanum memorial cancer hospital has big CSSD. Professional education was not available for technicians. They were learning during work. lt is not enough for CSSD technicians. They have to know how to perform their job. They must also know and understand why they do what they do. If they know about rationales they can improve quality of work.

Objective: Development of CSSD technician course for provision of quality services of cssd to end users and for reduce error of DSSD

Materials and Methods: Last three months errors were caculated retrospectively for evaluation of course in future. course content was finalized according to need.course started in 2011. Duration was six months. Errors were colected carefully for next three months.pre and post result were compared. Interviews of technicians after course was done to assess satisfaction level with their work after this course.

Results: Errors were reduced up to 70% after this course. Technicians were highly satisfied with knowledge based for.

Conclusion: Education has an impressive role for development of professionals. It is critical that CSSD personnel establish quality levels for the production and and services. If cssd personnals have the knowledge of effective problem solving,decision making and understanding that every step in cssd has direct impect on infection control they can perform their job effectively and carefully.

Keywords: Quality

PS-043

The Evaluation of the Ventilator-Associated Pneumonia Cases Monitored in the Intensive Care Unit

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Objective: This study aimed to evaluate the demographic features of the patients diagnosed ventilator-associated pneumonia in 2012 and difference between antibiotic costs.

Materials and Methods: This study has retrospectively investigated age, gender, underlying diseases, total hospitalization duration, interval between hospitalization admission and diagnosis of VAP, duration and administered antibiotics for treatment of VAP, daily costs of diagnostic antibiotics and total antibiotic costs and endpoints of the hospitalized patients who were diagnosed in the reanimation intensive care unit in 2012. The total costs were calculated based on the invoice amounts by our hospital.

Results: The study group consisted of 18 female and 35 male patients who had a mean age of 57. Mean hospitalization duration of the patients was found 55 days and diagnosis of VAP was established in averagely 25th hospitalization day. The rationale of for hospitalization were operation, traffic accident and respiration failure in 32%, 32% and 17% of the patients, respectively. Hypertension, diabetes mellitus, malignancy and chronic obstructive pulmonary disease were found in 25%, 17%, 15% and 13% of the hospitalized patients, respectively. Of the 53 patients, 40 became exitus while 13 were discharged. Totally 60 factors for VAP, as 32 *Acinetobacter baumannii* and 28 other factors, have be en isolated in 2012 in the reanimation intensive care unit. Daily cost of antibiotic treatment for VAP infection caused by *A. baumannii* factor, total antibiotic cost and mean antibiotic cost per patient were calculated 172 TL, 89.683 TL and 2802 TL, respectively. Daily cost of antibiotic treatment for VAP infection caused by other factors, total antibiotic cost and mean antibiotic cost per patient were found 153 TL, 61.964 TL and 2213 TL, respectively.

Conclusion: The costs of the patients were compared in terms of VAP infection caused by *A. baumannii* and other bacteria. VAP is a disease associated with high mortality and the preventive precautions planned to be taken were reviewed.

Keywords: *Acinetobacter baumannii*, intensive care unit, pneumonia

PS-044

Hand Hygiene Compliance rate in a 500 Bed Research and Education Hospital Through 5 Year Period

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Objective: Hand hygiene, is the most important element in prevention of hospital acquired infections in health services. The pathogens causing hospital acquired infections are not limited with the open wound infections moreover these pathogens can be found to be colonized on intact skin of these patients. In this study, the effect of compliance for procedures proposed for hand hygiene and the effect of feed back to clinics on compliance for these procedures are examined.

Materials and Methods: This study is done at Bagcilar Training and Research Hospital (BTRH). Through years 2009-2013, total 1697 health worker observed, through years 2011-2013 the health workers were informed about the study. The study is done according to WHO guide "Multimodal Hand Hygiene Improvement Strategy" which is released in year 2007 by the infection control nurses. The compliance results are recorded to the forms that prepared according to WHO guide. All clinical unit, ICU and patient room equipped with soap, antimicrobial soap and hand disinfectant. In this study the 5 moments that requires hand hygiene described as: Before patient contact, before aseptic tasks, after body fluid exposure risk, after patient contact and after contact with patient surroundings. During the study period wearing the gloves is not accepted as replacement of hand washing and hand rubbing with disinfectant. The results are shared with clinics, every 3 months period. Every period the hand disinfection educations repeated and feedbacks sent to them.

Results: Through years 2009-2013 1697 health care worker observed. The observations without notice is done through years 2009, 2010 and 2012 and done with informing the workers about the study through years 2011 and 2013. The compliancy data is tabulated at Table 1. According to the results the compliancy differs within the cases such that: compliancy before patient contact and before aseptic tasks are different than after body fluid exposure risk and after patient contact. There is also an indication that contact with patient surroundings is not considered as important as others, so staffs do not pay enough attention.

Conclusion: Our observational study showed that health care workers mostly cleaned their hands after patient treatments and passing from one patient to another however they preferred to wear gloves instead of washing their hands while performing routine tasks requiring contact with the patient. Compliance rate was found to be increased after lessons on hand hygiene and use of gloves in health care and in cases of pre-informed observations. Importance of hand hygiene compliance is very important to control infections in health services. The feedbacks on compliance of hand hygiene procedures are as important as education to raise hand hygiene compliance rates to the projected levels. In this hand hygiene awareness study we conclude that feedback to healthcare workers is extremely important and feedback and education increase compliance rates.

Keywords: Hand hygiene procedures, nosocomial infection prevention

Table 1. Hand hygiene compliance (5 moments of hand hygiene) according to years (compliance rate increases)

5 moments of hand hygiene rule	2009 (without notice) n= 34	2010 (without notice) n= 221	2011 (noticed) n= 237	2012 (without notice) n= 820	2013 (noticed) n= 385
Before patient contact	8	17	26	15	33
After patient contact	31	53	77	54	75
After body fluid exposure	21	54	73	52	74
Before aseptic tasks	4	17	46	39	53
After contact with patient surroundings	10	30	78	41	58

PS-045

500-Bed Education and Research Hospital Transmission Path for Insulation Applications Information Level Measurement Survey Results

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Objective: Patients with more contagious or epidemiological important infections which diagnosed or suspected are applied towards isolation measures path. With this survey; measurement of the level of knowledge of staff about the isolation measures targeted related to transmission path isolation measures.

Materials and Methods: In our hospital, 317 people (100 physicians, 134 nurses, 83 cleaning personnels) have been conducted an 11 questions survey one-on-one by hospital infection control nurses at clinics. The survey included the first six questions demographic information (age, gender, educational level, occupation, work year and the work unit). In the second part, they was interrogated with regard to information on the levels of the transmission path towards isolation measures, meaning of logos implemented by the Ministry of Health, use of the protective equipment and diseases which have to be taken under isolation.

Results: 50% of the employees were 31-50 age group, female gender was compised 62% of working group and 79% of the participant is accounted for the time in the hospital less than 5 years. 66% of the participants were University educated, 14% were high school educated and 20% were elementary educated. Internal Service employees comprised 40%, employees of the surgical service participants comprised 38%, whereas participants in the intensive care workers 22% of the region. With rules about patient rooms to be complied contact isolation regarding correct answer 90%, those who have known the Red Star logo contact isolation sign 79% and blue flower logo which is the sign of driplet insulation has been recognised by 70%. Cognizant of Respiratory protective equipment that should be used in N95 filter that requires isolation of respiratory mask was 55%, "which disease needed to be isolated?" question answered correctly by 81%. The survey questions answered correctly by the occupational groups respectively is 70% at doctors, 75% at cleaning staff and 80% at nurses.

Conclusion: By this survey; general rules to be observed in the isolation patients knowed by participant but the isolation standardized logos of the Ministry of Health has been identified as shortcomings are established. In this study, resulting in one of the other is if the result is isolation knows what diseases that need to be taken in the group's medical personnel (doctor 89%, nurse 87%, cleaning staff 66%), isolation logos (Red Star and Blue flower) is the group that knows what it means, mostly cleaning staff (doctors 56%, cleaning staff 86%). As a result; transmission path for the prevention of infections associated with health service isolation measures to achieve full compliance with the confirmation that isolation of the patients, which were standardized in isolation, what means should be used in protective equipment logos and features about education planning survey results will shed light on the subject.

Keywords: Isolation logos, isolation measures, protective equipment

Figure 1. The correct response rate by occupational group

PS-046

A Serious Threat in ICU's; Carbapenem Resistant *Klebsiella pneumoniae*

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Aim: To investigate the properties and risk factors of carbapenem resistant *Klebsiella pneumoniae* (CR-KP) infections.

Materials and Methods: Data was taken out from hospital infection control database for CR-KP in 2012. The clinical samples collected from the patients were tested by Vitek-2 system (Biomerieux, France). Statistical analysis was performed using the SPSS software v11.5.

Results: Totally 105 *K. pneumoniae* isolates were found in 2012. Multiple isolations were excluded and the first one was taken into analysis. Carbapenem resistance was found as 48%. Ninety eight patient was taken for risk factor analysis. 56 (57.1%) patients were 18 years and older. There was no difference between groups (p= 0.105). Of the patients 61 (62.2%) (p= 0.534) were male and the mean and median ages were as follows: 30.4 ± 29.8 and 25 (0-93). Age and duration of stay according to carbapenem resistance was shown in Figure 1. Duration of stay was longer in the resistant group (p= 0.026). Diagnoses of the patients according to carbapenem resistance are shown in Table 1 (p= 0.051). Mortality was 48% in the whole group and 44.7% and 51% in the carbapenem resistant end susceptible groups respectively (p= 0.533). Antibiotic use was 73.2% in the carbapenem resistant group and 52.9% in the susceptible group (p= 0.061). There was a relationship between meropenem use and resistance (p= 0.030). Meropenem use was 34% in the resistant group where it was 13.7% in the latter. Third generation cephalosporin use was also different; 23.4% vs. 7.8% (p= 0.048). The other risk factors found in univariate analysis are as follows: immunosupression was 8.5% vs. 0% in the resistant and susceptible groups, OR: 2.186 (1.754-2.724), (p= 0.049). Nazogastric catheter use was 36.2% vs. 13.7%, in the resistant and susceptible groups, OR: 3.562 (1.317-9.634), (p= 0.018). Peripheral arterial catheter use 38.3% vs. 19.6% in the resistant and susceptible groups, OR: 2.545 (1.027-6.307), (p= 0.047).

The place of admittance was found as a risk factor p= 0.026). Admitting to the neurosurgical unit was found to be a risk factor where burn unit was found to be protective. In the neurosurgical unit carbapenem resistance was 76.9% and it was 43.5% at the rest of the hospital (p= 0.036), OR: 4.324 (1.110-16.842). In the burn unit carbapenem resistance was 11.1% where at the rest it was 51.7%. (p= 0.032), OR: 0.117 (0.014-0.973).

Conclusion: As a conclusion restriction of carbapenem use and invasive procedures along with infection control precautions and disinfecion policies may be effective in reducing the carbapenem resistance in ICU's.

Keywords: Carbapenem resistance, *Klebsiella pneumoniae*, risk factors

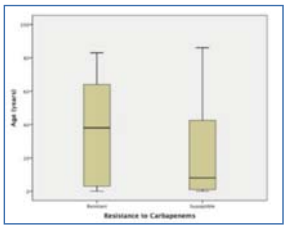

Figure 1. Relationship between age and carbapenem resistance.

Table 1. Age and duration of stay according to carbapenem resistance.

	Carbapenem resistance	Mean	N	Std. deviation	Median	Min	Max	p*
Age	Resistant	36.66	47	29.807	38	0	83	
	Susceptible	24.67	51	27.552	8	0	86	0.053
	Total	30.42	98	29.136	25	0	86	
Duration of stay	Resistant	37.30	47	50.838	19	1	280	
	Susceptible	29.94	51	94.558	11	3	682	0.026
	Total	33.47	98	76.474	14	1	682	

* Mann-Whitney U test

PS-047

The Effect of Hand Hygiene Compliance on Surgical Site Infections (SSI) in Cardiovascular Surgery Clinics

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Objective: The compliance to hand hygiene, the sterilization and disinfection of devices used on patients and educated, enough healthcare staff constitutes the bases of infection control. This principle is valid for all infection related with medical services. The purpose of this study is to investigate the relation between hand hygiene compliance at cardiovascular surgery (CVS) and post-op surgical site infections.

Materials and Methods: in CVS clinics an active surveillance system based on laboratory and patient is used as CDC (Centers for Disease Control and Prevention) advices. Additionally hand hygiene observations are done by infection control nurses with reference of WHO Multimodal Hand Hygiene Improvement Strategy guide that released in 2007. As an illustrative and sectional type study, the surgical infections and hand hygiene observations are retrospectively investigated during the dates 2012 (April, May, June)-2013 (April, May, June). In CVS clinics surgical categories that surveillance done: Coronary artery by-pass grafts, aorta valve replacement and mitral valve replacement. The required conditions that needs hand hygiene determined: Before patient contact, before aseptic tasks, after body fluid exposure risk, after patient contact and after contact with patient surroundings. During the study period wearing the gloves is not accepted as replacement of hand washing and hand rubbing with disinfectant. The results are calculated for every 3 months period.

Results: The hand hygiene observations and the determined surgical site infections is can be viewed at Table 1 by years. When we look the hand hygiene compliance between second quarters of 2012 and second quarter of 2013 there is a 56% increase, and at the same terms surgical site infections (SSI) decreases 3.03%. In first and second quarter of 2013 the hand hygiene compliance increased so SSI decreased inversely. Studies on infection control procedures with clinic, educations, infection rate reports of clinics and suggestions on prevention, observation of hand hygiene compliance seems effective in this decrease.

Conclusion: The hands of healthcare workers are playing an important role in cross contamination. For this reason the compliance to hand hygiene is the most effective process in preventing pathogens. There are 3 main targets in preventing SSI: decrease microbial contaminations, surgical technics that speed-up healing of wounds and finally by reducing contamination of patients rising fighting capacity of patients themselves. The microorganisms that tagged as hospital infections are transmitted to the hands of healthcare staff with direct contact with patients or contact with the surfaces at the patient surroundings. The patient's skins also colonized by hospital acquired microorganisms. As a result: the compliance to hand hygiene is a big factor in SSI but not enough alone.

Keywords: Cardiovascular surgery, hand hygiene, surgical site infections

Table 1. Hand hygiene compliance and SSI in CVS clinics

Terms	Hand hygiene compliance (%)	SSI that surveillance done (%)
2012/2	25	6.06
2013/2	81	3.03

PS-048

The Effect of the Supervision and Feedback on the Hand Hygiene Compliance

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Objective: Hand hygiene compliance studies are one of the most important parts of the hospital infections prevention. Supervision and feedback are important as the education for increasing the hand hygiene compliance. It is aimed to show the effect of the supervision and feedback to the hand hygiene compliance ratios with this study.

Materials and Methods: Between the fourth period of 2009 (including October 2009-November 2009-December 2009) and the fourth period of 2012 (including October 2012-November 2012-December 2012), an informed observation is held on the whole personnel of the Anesthesia Reanimation ICU of the Hospital. Between the second period of 2011 (including April 2011-May 2011-June 2011) and the fourth period of 2012 (including October 2012-November 2012-December 2012), the same observation is also held at the clinics on the 10% of the working personnel. The observation is done according to the five indication methods. The results of the observation are listed below.

Dr. Abdurrahman Yurtaslan Ankara Oncology Training and Research Hospital, Comparison of Hand Hygiene Observation Results of 2009-2012 between the ICU and clinics.

Results: As it can be seen from the observation results, a longer supervision is held at the ICU and higher compliance ratios are recorded. This results show that, an increase in the volume of the supervision is resulted with the increase in the compliance ratios.

Keywords: Hand, hygiene

Table 1. 2009-2012 hand hygiene compliance results - ICU

ICU	2009 %	2010 %	2011 %	2012 %
	1. Period: -	1. Period: 67.5	1. Period: 90	1. Period: 88
	2. Period: -	2. Period: 43.28	2. Period: 84	2. Period: 100
	3. Period: -	3. Period: 69.6	3. Period: 88.75	3. Period: 100
	4. Period: 66.6	4. Period: 68.57	4. Period: 100	4. Period: 100
	Total: 66.6	Total: 62.25	Total: 90.5	Total: 97

Table 2. 2011-2012 hand hygiene compliance results - Clinics

Clinics	2009 %	2010 %	2011 %	2012 %
	1. Period:	1. Period:	1. Period:	1. Period: 85
	2. Period:	2. Period:	2. Period: 85	2. Period: 91
	3. Period:	3. Period:	3. Period: 77	3. Period: 86
	4. Period:	4. Period:	4. Period: 80	4. Period: 90
	Total:	Total:	Total: 80.6	Total: 88

PS-049

Microorganisms Isolated from Various Clinical Samples of Intensive Care Unit Patients and Their Antibiotic Susceptibility

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Introduction and Aim: Intensive care unit infection is the one of main cause of mortality and morbidity. Various medical invasive procedures, using the broad spectrum antimicrobial drugs, colonization of multi resistance microorganisms and other context increase intensive care unit infection risk.

Materials and Methods: In this study main aim was to learn frequency of microorganisms isolated from intensive care unit patients and their antibiotic susceptibility. 1281 in-patient were examined between July 2012-July 2013. Samples were cultured on eosine methylene blue (EMB) agar, on blood agar containing 5% whole sheep blood, Saburo agar, chocolate agar containing 5% whole sheep blood. For blood culture we use automatically system Bactec. Further identification of the bacteria was carried out by conventional methods and Vitec 2. Antibiotics susceptibility performed by Kirby-Bauer's method, also by Vitec. Nosocomial infection rate calculated by number of hospital (infection/number of in-patient) x 100 formula.

Results: Among 1515 samples 84 (5.6%) were distinguished as intensive care unit infection. Nosocomial infection rate was 6.5. The most frequent types of nosocomial infections were urinary tract infection (UTI), surgical-wound infection, pneumonia, and bloodstream infection (BSI). The most frequent types of clinical samples are presented on Table 1.

E. coli (50%) was the most common gram-negative bacilli isolated from 36 urine samples suspected intensive care unit infection. 16.7% of strains were gram-positive bacteria, 16.7% *Acinetobacter* spp. and 8.9% *Candida* spp. *E. coli* had the highest resistance rates to penicillins, cephalosporins and 69% of strains were ESBL positive. ESBL positive strains were susceptible to imipenem (100%), amikacin (95%) and ciprofloxacin (89%).

Coagulase-negative staphylococci (CNS) and *Klebsiella* spp. were most frequently isolated microorganism from blood samples. *S. hominis* (66.7%) showed resistance to penicillin, oxacillin, gentamisin and fosfomycin. *S. hominis* isolates show highest susceptible to vancomycin (98%), teicoplanin (99%), fusidic asid (87%). All of *Klebsiella pneumoniae* (33.3%) strains were ESBL positive.

From other clinical samples gram-negative bacteria (83%) were the most prevalent microorganism that have been isolated. Among the isolated strains 9.6% were *Enterococcus*, 6.4% *Staphylococcus* and 1% *Candida* spp.

Conclusion: Similar study has been carried out by H. Ghadiri, in Tehran. The most prevalent BSI pathogen was CNS. The highest resistance rate of CNS was against penicillin (91.1%) followed by ampicillin (75.6%), and the lowest rate was against vancomycin (4.4%). *E. coli* was the most prevalent pathogen isolated from UTI.

Related findings have been observed by I. Romanus, April 2013. Among the 289 different clinical specimens collected 85 organisms were isolated which includes; five gram-negatives [(*E. coli* (25), *Klebsiella* spp. (24), *Proteus* spp. (7), *Citrobacter* spp. (6) and *Pseudomonas* spp. (6)] and two gram-positive organisms *S. aureus* (15), and *Streptococcus* spp. (2). Antibiotics susceptibility studies showed that gram-negative and gram-positive organisms were all susceptible to amikacin. CNS and *E. coli* were the most common isolated bacteria from clinical samples. Vancomycin was the most effective antibiotic against gram-positive bacteria, and ciprofloxacin, amikacin, and imipenem are proposed for treatment of nosocomial UTI caused by gram-negative bacteria. Finally, to reduce the incidence of nosocomial infections, the regular surveilance and improving control precaution is proposed.

Keywords: Nosocomial infections, urinary tract, bloodstream infections

Table 1. The most frequent types of clinical samples

Name	Number
Urine	36
Blood	18
Sputum	15
Wound swab	9
Body fluid	6

PS-050

Comparison Between Results of 2011 and 2013 Point-Prevalence Surveys of Our Hospital-Acquired Infections

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Introduction: A point-prevalence survey conducted throughout the hospital has the advantage of providing rapid data about hospital-acquired infections (HAIs).

Aim: The aim of this one day point-prevalence survey was to determine the prevalence of HAIs in our hospital and compare its results with the results of previous survey conducted 2 years ago.

Materials and Methods: We evaluated all inpatients in our hospital for HAIs in one day of June in 2013 as in 2011. Center for Diseases Control and Prevention standard definitions for HAIs were used. Data was collected by a detailed questionnaire form for each patient. Descriptive analysis of data was performed. Hospital infection rate (HIR) was calculated as a formula of (number of HAIs/number of inpatients)x100.

Results: A total of 543 patients, 41 of them in intensive care units (ICUs) and 502 of them in wards were evaluated in 2011. We determined a total of 32 HAIs, 26 of them in several wards and 6 in ICUs. Of 32 patients with HAIs, 8 (25%) had surgical site infection (SSI), 7 (22%) blood-stream infection (BSI), 6 (19%) urinary-tract infection (UTI), 4 (13%) ventilator-associated pneumonia (VAP) and 3 (9%) skin and soft tissue infection (SSTI). The overall HIR in our hospital was 5.8%. The HIR in ICUs was 18.7%.

A total of 592 patients, 64 of them in ICUs and 528 of them in wards were evaluated in 2013. We determined a total of 19 HAIs, 11 of them in ICUs and 8 in wards. Of 19 patients with HAIs, 7 (37%) had BSI, 4 (21%) UTI, 3 (16%) SSI, 3 (16%) SSTI and 2 (11%) VAP. The overall HIR was 5.3%. The HIR in ICUs was 57.8%.

The overall HIR in 2013 declined as 0.8% in comparison to 2011. Pneumonia prevalence decreased as 58%, SSI prevalence decreased as 37%. However, the prevalence of SSTI, BSI and UTI increased as 40%, 40% and 10%, respectively. The number of surgical operations in our hospital in the first half of 2011 was 16.222, the same number in the first half of 2013 reached 22.955 by increasing as 42%. Although the number of surgical operations and complicated cases increased, SSI prevalence decreased as 37%. The number of ICU beds was 31 in 2011, the same number in 2013 became 41 by increasing as 32%. The number of patients admitted to ICUs in the first half of 2011 was 938, inpatient-days were 8977. The same number in the first half of 2013 was 928, inpatient-days were 9820. Although the number of patients admitted to ICUs decreased in 2013 compared with 2011, inpatient-days increased.

Conclusion: The HIR in ICUs increased compared with the results of previous survey because of increased number of inpatient-days. Although the number of surgical operations increased, SSI prevalence decreased, so this finding suggests that effective control measures had been taken. The results of these point-prevalence studies provide a baseline for infection control studies. We need further control measures, such as education and implementations of bundles, to prevent SSTI, BSI and UTI.

Keywords: Point-prevalence, hospital-acquired infections

PS-051

Retrospective Evaluation of Exposures to Probable Infected Materials in Our Hospital

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Introduction: Healthcare workers (HCWs) who have possibility of sharp object injury, such as needlestick injury, and exposure to blood and body fluids are at high risk for blood-borne infections.

Aim: The aim of this study was to evaluate the exposures of HCWs in our hospital to probable infected materials.

Materials and Methods: Our hospital is a general hospital with a capacity of 706 beds and 2557 workers, of which 578 are doctors, 600 nurses, 410 cleaning workers and 969 other workers. Two hundred and seventy five workers admitted to the Infection Control Committee (ICC) with the complaint of sharp object injury and exposure to blood and body fluids of patients between January 2012 and June 2013. Data about the cause and the place of the exposure, the usage of protective equipment (gloves, gown, mask, glasses) during exposure, the serological test results for HBV, HCV and HIV of the worker and the patient were collected in a special form. Descriptive analysis of these data was performed.

Results: Of the total 275 HCWs who admitted to the ICC, 85 (31%) were nurses, 83 (30%) students, 51 (19%) cleaning workers, 42 (15%) doctors and 14 (5%) other HCWs. Of exposure events, 145 (53%) were in several wards, 37 (14%) in operating rooms, 34 (12%) in emergency department, 34 (12%) in blood collection unit and 25 (9%) in intensive care units (ICUs). Of exposures, 227 (83%) were needlestick injury, 24 (9%) blood and body fluid splash, 24 (9%) other injuries. Injuries occurred while trying to close the cap of the injector needle at the beginning of this period. However, this kind of injuries declined after intensive training and instead of that, injuries with needle or lancet during administering subcutaneous drugs or blood-collection from the tip of the fingers increased. Exposures to blood and body fluids increased because of decreasing usage of protective equipment. Of HCWs, 248 (90%) were wearing latex gloves, 30 (11%) gowns, 19 (7%) mask and one was wearing glasses during exposure. Of workers, 250 (91%) were immune against hepatitis B virus, 21 (8%) were not vaccinated before exposure. Of index patients, 28 (10%) were HBsAg-positive, 10 (4%) HCV-positive, one (0.4%) HIV-positive. Three (0.3%) of 28 HCWs exposed to infected materials of HBsAg-positive patients had negative anti-HBs. These 3 HCWs and one exposed to blood of patient with HIV received post-exposure prophylaxis. Index patients were not known in 57 (21%) of exposure events. Any infections were not determined during follow up of HCWs after exposure.

Conclusion: The most common HCWs exposed to probable infected materials are nurses, followed by students. Most of the invasive procedures such as blood-collection are performed by nurses. Period of training has the highest risk of exposures. Because of that, students were allowed to begin training only after education about prevention of exposures. Another important finding of this study is that 8% of HCWs were not immune against HBV. All hospitals should have their own politics to minimize exposures and to take measures and these measures should be inspected regularly.

Keywords: Sharp object injury, needlestick injury, blood-borne infections

PS-052

Evaluating Knowledge Levels of the Health Personnel on the Topic of the Management of Hazardous Chemical

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Introduction: The health personnel studied in the hospitals, have met hazardous chemicals in wide variety and on various levels. Hazardous chemicals have also caused to come about environment, health and security risks. In order to be the risk perceptions of all workers are in equal level, it is necessary to organize an effective training program.

Objective: The aim of this study is to evaluate the knowledge levels of midwives, nurses, and health officers who have studied in the Taksim Training (Education) and Research Hospital on the topic of hazardous chemical management.

Materials and Methods: 141 midwives, nurses and health officers who have studied in Taksim Training and Research Hospital have formed the universe of of the research.

Hazardous chemicals management training program has implemented in case of two groups of 70 persons between the dates 14 March 2001-15 March 2011. Each training session takes approximately 45 minutes. By scanning the literature, by benefiting from hazardous chemicals regulation, test that has 14 multiple questions has put into practice at the beginning and at the end of the training. Percentage and chi-square tests have been used for assessment.

Results:

The sociodemographic properties of participants

Educational status n= 141

Lycee n= 46 32.6%

Two-year degree n= 46 32.6%

Bachelor's degree n= 49 34.7%

Working duration n=

0-5 Years n= 55 39%

6-10 Years n= 26 18.4%

11-15 Years n= 16 11.3%

Greater than 16 Years n= 44 31.2%

In general, before the training,while the success rate of the questions that are associated with hazardous chemicals management is 52.8%, it has rised to 80.7% after the training.

Before the training, while the success rate of the questions that are associated with hazardous chemicals is 51.5%, it has rised to 81.3% after the training.

Before the training, while the success rate of the questions that are associated with chemotherapeutic agents is 47.2%, it has rised to 78.5% after the training.

Before the training, while the success rate of the questions that are associated with harmful gases and vapors is 65%, it has rised to 82.2% after the training. Before the training, while the success rate of the questions that are associated with medical wastes and infectious wastes is 56%, it has rised to 72.3% after the training.

Conclusion: It has been found that the given education oriented to hazardous chemical management has caused increasing in the level of knowledge level. Regular studies that have been done, will help to efforts of forming sufficient knowledge level and on the topic of hazardous chemicals management that is associated with this, will help to efforts of creating sensitive and a knowledgeable society.

Keywords: Hazardous, management, knowledge

PS-053

The Needlestick/Sharp Objects Injuries in Healthcare Workers in a State Hospital, Samsun, Turkey

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Objective: This research aims to inspect the demographic and injuriy features and hepatitis B immunization situtations of the healthcare workers appeal to infection control commity after the needlestick/sharp object injuries.

Materials and Methods: In this research, the records of the personnel appealed to the infection control commity after the needlestick/sharp object injury between January 2011 and June 2013 are examined retrospectively.

Results: It has been found that 105 heath care personnel have been injured by or touched to the needlestick/sharp objects. 80% (%76) of the personnel was women. 103 of personnel (98%) were vaccinated againist the Hepatitis B and 2 of the personnel were not vaccinated. The vaccinated personnel were monitored for the immunization situations and the personnel who were considered necessary were put into the vaccination program. Hepatitis B immunoglobulinis has been provided for the unvaccinated 2 personnels. On the monitorization process after the injury, blood-borne infection was not found. 90 (85.7%) of the injuries were occured by pinprick (79 injector, 5 branule, 6 lancet), 4 of the injuries were occured by (2.85%) blood lipping to the mucosal surfaces and 11 (11.4%) of the injuries were occured by other sharp objects (bistoury, ampoule, lame etc.). The most common injury occurred while collecting rubbish (%24).

Conclusion: Accidental injuries caused by needlestick/sharp objects present a high risk for healthcare workers. The hepatitis B vaccine prevented the disease, especially in order to avoid a hiring personel should be vaccinated during the first start.

Keywords: Needlestick/sharp, injury, hepatitis B

PS-054

Main Sterilization Service Centers Noise Measurement

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Objective: With this study, it is intended to improve the working conditions of the staff made the sound measurements in the Units of sterilization of Secretary General of the Association of Public Hospitals Adana public hospitals in the city center.

Materials and Methods: The stuy was conducted in Adana, in August 2013 in 3 hospitals: Adana Education and Research Hospital, Ankara State Hospital, and Dr. Love Tufekci State Hospital. Sound Detector SD-200 with 3M ™ Optime ™ Alert System Linkage was used for sound measurements. The noise levels were compared by measuring device. The level of knowledge of Main Sterilization Unit employees about the safety was measured by the face-to-face interview method applied to a survey and twenty multiple-choice questions and health screenings were checked. The survey results were obtained after analysis of the data with SPSS 17.0 software. 75% of the questions and correct answers on the survey results be considered "adequate" has been considered.

Results: In the hospitals central sterilization units audio measurement were done seperately in units: clean, dirty and sterile and all of the sterilisers' measurements by starting to work in particular has been recorded. The sound measurements in unclean area was even higher than gun noise.

Conclusion: Adana union secretary-general public hospitals in the city Adana city at 3 in hospital, it is observed that sound measurements in unclean area and the clean area sound measurements made at around 88 dp. A study health care regular odio measurements is necessary for healthcare workers safety.

Keywords: Main sterilization service, noise measurement, Adana

Table. Main sterilization service

Hospital	Dirty	Clean	Steriliand	Rest area
ANEAH	65-96db	64-96db	59-69db	58-75db
ÇATDH	75-95db	56-88db	56-71db	62-69db
ADH	65-95db	66-80db	55-68db	54-76db
AKDH	65-88db	65-76db	51-67db	55-64db

PS-055

The Effect of Applications Aimed at Sharps and Needlestick Injuries in Nurses Upon Injuries and Notices

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Introduction: Healthcare professionals comprise a high- risk group in that, they are vulnerable to being infected by occupational communicable diseases. It is indicated that these infections occur mostly as results of sharps and needlestick injuries.

Objective: The aim of the study was to investigate the rate of sharps and needlestick injuries among the nurses, to determine the frequency in which these infections are reported, and finally, to decrease the rate of sharp object injuries by means of different applications.

Materials and Methods: This semi-experimental study was conducted in only one group in the protest-posttest order at Harran University Research and Application Hospital between February-September 2013. The study population consisted of 144 nurses who agreed to participate in the study working at Hospital. The data for the study were collected through an incident report form that tracks the rate of sharps and needlestick injuries. The form contains questions pertaining to the nurses' socio-economic status, sharps and needlestick injuries they were exposed to, and the protective measures that they received after the incidents. A pretest was performed by researchers first on the nurses working in the clinic. And then a voluntary group was included in the study who received training about training nurses. The nurses who participated in the study were trained by the voluntary group, following which relevant banners prepared by researchers were hung on the clinics. Posttests were filled 3 months after the training. The data were evaluated in the SPSS 11.5 packaged software.

Results: Regarding the nurses; the average age was 30.5 ± 6.3 years and 42.4% were female. It was indicated that injuries generally occur while closing the injector cover, during urgent interventions and at times when the nurses were working for 17 hours and more. The factors increasing the injuries are respectively; insufficiency of personnel, long working hours and patient intensity. The rate of the nurses, who indicated that sharps and needlestick injuries were the responsibility of the infection unit, was 32.6% before the intervention, however, it increased to 81.9% after the intervention. In the last six months, 30.6% of nurses indicated that they were exposed to sharps and needlestick injuries before the intervention and 23.6% after the intervention, and the difference between them was found statistically significant ($p< 0.001$). Regarding the protective measures, 3.5% of nurses (n= 44) indicated that they used both gloves and sharp object boxes before the intervention and 14.6% (n= 34) after the intervention and additionally, 75.7% were vaccinated before the intervention and 84.0% after the intervention. The rate of those who reported after the injury was 31.8% before the intervention and 88.2% after the intervention, and the difference between them was found statistically significant ($p< 0.001$).

Conclusion: As a result of findings, it was established that interventions were effective upon injuries and their regular notification. Thus, is recommended that more studies are to be conducted where interventions aimed at decreasing the sharps and needlestick injuries and increasing their notifications which could be implemented on a larger sample through regular follow-ups and repeat the in-service trainings at intervals.

Keywords: Sharps and needlestick injuries, notice, nursing

PS-056

The Effect of Opening-Closing Frequency of Doors in Surgery Rooms of the Hospitals on Surgical Site Infection

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Introduction: The frequent opening-closing of doors in surgery rooms poses a risk in term of the surgical site infections. The frequency of opening and closing of the door and the entrance and exit traffic risk for surgical site infection although the density of airborne bacteria formed is proportional to the number of people moving in the room. Reduced this risk is expected to be made prior to surgical intervention with the planning. In this context the research was aimed to determine the effect of the number of opening-closing of the doors in surgery rooms on surgical site infections.

Materials and Methods: The study population consisted of patients who underwent surgery operating room of of the state hospital with 400-beds. The sample of 01 January 31 December 2012 between the surgery and the study group consisted of patients who agreed to participate in 2353. Operating room has six doors. Operating room ventilation system is provided a circular hall has been designed to allow the doors opened inward and outward. The research data were collected in four sections. In the first chapter was applied to patient safety are used in operation room. The second part examined medical records of patients who underwent surgery. The third section, the name of the operation, the patient's gender, age, existing chronic disease, the presence of infectious disease, case duration, ASA score with information gathered through the implementation of a form. In the fourth chapter examined if the name and dose of antibiotics in the operation, appropriate and inappropriate use of antibiotics, antibiotics, time, classification of surgery, the surgical site was made with shaving and method of aseptic technique and sterile surgical team to act in accordance non-steril status, number of entry and exit in the hall other data used for the entire team.

Results and Conclusion: The patients included in the study, 56% of women and 44% of the men. For surgical prophylaxis in 2012 cholecystectomy, appendectomy, hernia operations and cesarean section were followed. 23.9% of the correct antibiotic prophylaxis in cholecystectomy surgery, appendectomy was 76.9% for; hernia operations was found to be 96.5% and 98.6% for caesarean section. 41.78% of the cases thirds elective, 58.22% percent of the non-elective. Average case; time 1 hour, 6 number of people in the room and, temperature and humidity of 30% at 25°C was determined. The number of opening and closing of the door of the operating room was 56.

Keywords: Surgery rooms

Table 1. The entrance to the operation causes the outputs

Entry and exit into the room because operation	n	%
Unnecessary entrance-exit	-	28%
Consumable materials and supply the missing	-	32%
Material supplied sterile and lacking	-	24%
Having more than of people in the hall	-	6%
Preparation device	-	4%
Cases of prolonged	-	6%
Total	2353	100%

PS-057

Evaluation of Sharps Injuries and Other Blood and Body Fluid Exposures Among Health Care Workers

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Objective: Health care workers are at risk for infection from blood-borne pathogens as a result of percutaneous injuries from sharps and also from mucous membrane and skin exposures to contaminated blood or body fluids. Occupational exposure to bloodborne pathogens, particularly hepatitis B, HCV, or HIV, can result in debilitating or fatal disease, and even when postexposure prophylaxis is timely and effective, treatments have serious health and economic consequences. In this study, we evaluated retrospectively sharps injuries and other blood and body fluid exposures among the our hospital health care workers who referred to the Infection Control Committee.

Materials and Methods: The type of instruments, and personnel involved in each sharps injury were determined retrospectively by reviewing the Infection Control Incident Report forms between December 2012-August 2013. We learned status of immunisation against hepatitis B. Only two of 8 staff had no immunization againt hepatitis B. After the injury, HBsAg, anti-HBs, anti-HCV, anti-HIV test was done at 0th day, 3rd month, 6th months.

Results: Of the 4 (50%) sharp injuries and other blood/body fluid exposure among nurses, of the 2 (25%) among helpful staff, of the 1 (12.5%) among emergency medical technician, of the 1 (12.5%) among radiology technician. When we examined the nature of the injuries, 2 (25%) catheter needle, 2 (25%) needle tip, 1 (12.5%) lancet, other 3 (37.5%) is the blood or body fluid spills with the eye injuries were detected. In addition, only 1 worker was using personal protective equipment. Except two workers, others were vaccinated against to hepatitis B. Hepatitis B vaccination was started to these two workers after injuries. No blood borne diseases has been demonstrated in the follow-up after injury.

Conclusion: Although the number of injuries appears at a low rate in our hospital in 1 year period, we thought that non reporting of exposures were high. When health care workers are exposed to such injuries, the incident should be reported to the department responsible for managing such exposures (Infection Control). Low rate of protective equipment use was documented. Preventive strategies to lower sharps injuries and other blood and body fluid exposures in hospitals should include effective goal oriented education, training and the use of safety enhanced devices in clinical settings. We suggest also that, units must be established in hospitals to guide health care workers make record of incidents.

Keywords: Sharps, injuries, health care workers

Table 1. Distribution of professional groups

Professional groups	Number	Frequency (%)
Nurse	4	50
Helpful staff	2	25
Radiology technician	1	12.5
Emergency medical technician	1	12.5

Table 2. Types of sharp tools and fluids (blood/body fluid)

Sharp tools and fluids	Number	Frequency (%)
Catheter needle	2	25
Needle tips	2	25
Lancet	1	12.5
Nasogastric content	1	12.5
Blood	1	12.5
Aspiration fluid	1	12.5

Table 3. Distribution of sharps according to professionals

Professional groups	Sharp tools, fluids
Radiology technician	Catheter needle
Emergency medical technician	Catheter needle
Helpful staff	Needle tips
Nurse	Lancet
Nurse	Nasogastric content
Nurse	Blood
Nurse	Aspiration fluid

PS-058

Training and Warning Messages May Result in Increase to Hand Hygiene Compliance of Health Personnel Other than Doctors

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Aim: Handwashing is the most practical, most important and inexpensive method in preventing hospital infections. The aim of this study is to show the impact of education for the hand washing compliance.

Materials and Methods: Hand hygiene compliance monitoring was made by two infection control nurses in Sakarya University Training and Research Hospital between 01.01-30.04 2012 and 01.01-30.04 2013.

Which indications

- Before contact to the patient
- Before aseptic procedure
- After contact with body fluids
- After contact with patients and their surroundings hand washing is observed.

Doctors, nurses and auxiliary health-care workers were included the study. After the first observation, training was given to all three groups. After training with continuous electronic warning messages sent to the hospital's information processing system. After this training second observations for the four months were made. Statistics were evaluated with the Epi Info version 6 program. $p< 0.05$ was considered significant

Results: While the first observation of hand hygiene compliance was 39.83%, after the training the second observation was 52.46% ($p< 0.05$). Significant increase was seen among nurses and allied health personnel, although the rate of increase was not significant among physicians. Education participation rate of physicians, nurses, and auxiliary health personnel was 16.5%, 89% and 45.2%, respectively. Results were summerized in Table 1.

Conclusion: Warning messages and training improves hand hygiene compliance to nurses and auxiliary health personnel ($p< 0.05$). However, in spite of the warning messages and training was not increased hand hygiene compliance among doctors. We think that this condition was related to the perception and interest of the doctors to the subject. Other practices (camera, personal incompatibility messages, etc.) to increase hand hygiene is required for the doctors.

Keywords: Hand hygiene, training, warning messages

Table 1. Hand hygiene compliance of health-care workers

	1 January-30 April 2012		1 January-30 April 2013		
Personnel	**Number of monitored behavior (n)**	**Compliance (%)**	**Number of monitored behavior (n)**	**Compliance (%)**	**p**
Doctors	143	46 (32.16)	233	82 (35.19)	0.75
Nurses	444	191 (43.01)	721	414 (57.42)	0.0076
Auxiliary health-care workers	141	53 (37.58)	224	122 (54.46)	0.0014
Total	728	290	1178	618 (52.46)	0.0014

PS-059

The Frequency of Surgical Site Infection Related to the Health Services of Karaman State Hospital in 2012

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Objective: In this study, surgical site infections (SSI) was investigated after operation performed in our hospital between 01.01.2012-31.12.2012 without differentiating elective and emergency surgery in all surgical units. SSI was observed to be associated with health services. To know the risk factors that cause SSI, the implementation of appropriate surveillance methods, surgical site infection incidence dance can be reduced by taking the necessary precautions emphasized.

Materials and Methods: In this study, all patients having surgical site infection screened retrospectively. In Karaman State Hospital, the frequency of surgical site infections was investigated in 2012. SSI diagnoses for Disease Control and Prevention Center (Center for Disease Control and Prevention (CDC) criteria was based. It is calculated using the formula of SSI speed = (a specific type of surgery, the number of SSI / number of operations of the same type) x 100. Patients has been followed with patient-based and laboratory-based surveillance method (active prospective?).

Results: In 2012, in our hospital, surgical site infections were in fourth place amongst healthcare-associated infections, with a rate of 0.8% after pneumonia, sepsis, urinary tract infection. The higher ratios were observed after total abdominal hysterectomy with bilateral salfingooferektomi (BSO), and appendectomy operations (5.4% and 1.9%, respectively) (Table 1). According to the distribution of infections by services, General Surgery and Obstetrics took the first places with 39.1% and 39.1%, respectively, in the first two seem to be SSI has created a significant problem from past to present, then it will continue to be a problem.

Conclusion: After the formation of SSIs is difficult to treat. The patient, surgeon, surgical and hospital staff should be aware of conditions can influence the risk of SSI. Although it is not possible to fix all the factors of the patient, the operative risk factors can be improved on the process of characteristics. When the data of Karaman State Hospital compared with the national rates, it was observed that SSI ratio had higher rates in surgeries of TAH-BSO, appendectomy, inguinal hernia operations. To be known all risk factors that causes SSI, surgical site infection incidence can be reduced by taking the necessary measures and the implementation of appropriate surveillance methods.

Keywords: Surgical site, infection

Table 1. The distribution of surgical site infections according to surgeries

Distribution by surgery	CAI (n)	Number of surgical procedures	%
Appendectomy	6	325	1.9
Inguinal hernia	3	463	0.7
Cholecystectomy	0	390	0
TAH-BSO	7	130	5.4
C/S	2	1045	0.2
Total	18	2353	0.8

Table 2. The distribution of surgical site infections according to services

Distribution by service	CAI (n)	%
Gynaecology	9	39.1
General surgery	9	39.1
Brain surgery	1	4.4
Orthopedy	3	13.0
Cardiovascular surgery	1	4.4
Total	23	100

Table 3. The number of surgeries in Karaman State Hospital in 2012

Surgical procedure	Number of surgical procedures
Appendectomy	325
Cholecystectomy	390
Inguinal hernia	463
C/S	1045
TAH-BSO	130
Total	2353

PS-060

Hospital Infections Detected in a Country State Hospital

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Introduction: Hospital infections are infections that prolong the duration of hospitalization and hospital costs and cause a gradually increased mortality and morbidity. In past this kind of infections had attracted more attention in tertiary hospitals than secondary hospitals. However recently they are enrolled among the infections that gradually increase importance in secondary hospitals also.

Aim: The aim of our study is to investigate hospital infections that develop in patients who are hospitalized in various units of our country hospital which is a secondary hospital and to contribute the actions to be taken.

Materials and Methods: 22.413 patients hospitalized in our hospital between January 2011 and June 2013 were included the study. During this time period, by using active and laboratory based surveillance system, clinical distribution and other risk factors of 32 patients diagnosed as hospital infection according to CDC criteria were investigated.

Results: During a period of 1992 hospitalization days, 22.413 patients were followed up every day by a nurse from infectious diseases. Out of these patients, the number of patients that developed hospital infection was 32 (0.14%). 16 (50%) of the patients were female, 16 (50%) of them were male and the mean age was 65 (25-96), mean duration of hospitalization was 22 days (5-68). The rate of hospital infection was found as 0.56%, and the intensity of hospital infection was found as 2.0. When the rate of infection was considered in terms of units; it was found as 0.147% for the surgical branches, as 0.069% for the internal branches and as 1.475% for the intensive care unit. The distribution of types of infections was surgical field infections at a rate of 36.3%, urinary tract infections at a rate of 36.3%, and pneumonia at a rate of 18.75%. In 22 patients out of 32 patients, the bacterial agent could be defined. The most common microorganisms were *Acinetobacter* spp. (27.2%), *Pseudomonas* spp. (18.1%), *Escherichia coli* (18.1%), *Candida* spp. (13.6%), coagulase negative staphylococci (13.6%), *Staphylococcus aureus* (9%) in order of frequency. 4 (100%) of the *Escherichia coli* were ESBL positive. When the risk factors for hospital infection were evaluated, peripheral venous catheter was detected in 62.5%, urinary catheter was detected in 40.6%, surgical drainage catheter was detected in 21.8%, nasogastric tube was detected in 15.6%, mechanical ventilation was found in 12.5% and central venous catheter use was found in 12.5%.

Conclusion: Although the rate of infection in our hospital was found to be lower than that was mentioned in other hospitals, it was seen that gram negative bacteria were isolated more. We think that these studies should be performed in order to decrease long duration of hospitalization and invasive interventions, to take necessary precautions for correct manipulation of antibiotic use and to take necessary step after evaluation of the situation in secondary hospitals. It is important to closely monitor the hospital infections in order to take the necessary precautions at the proper time.

Keywords: Hospital infections, risk factors

PS-061

Hand Hygiene Behavior of Intensive Care Unit Personnel: An Observational Research

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Introduction: Nosocomial infections is an important medical issue in our country as it is in the whole world. Studies indicate that the hands of the medical staff play an improtant role in the transmission and spread of infection effecting microorganisms. Hand hygine is aquality indicator for patient safety. Rate of hospital-acquired infections can be reduced with proper and effective hand hygiene.

Aim: To identify the compliance with hand hygiene in intensive care workers.

Materials and Methods: It is a cross sectional, observational type research. 40 nurses, 10 doctors and 10 auxiliary staff (n= 60) working in Ministry of Health Training and Research Hospital Anesthesia Intensive Care Unit participated in the research in April 30 and May 30, 2011. In the intensive care unit, 960 minutes of observation was made for a month: 2 days a week, 2 hours in each day. The data was collected with the "Form of Indications About Hand Hygiene Compliance" prepared by World Health Organization (2007) World Patient Safety Association. The form consisted of 5 steps involving the observation of hand hygiene behaviors: before the intensive care unit personnel's contact with the patient, before the aseptic processes, after the contamination risk of body fluids, after the contact with the patient and after the contact with the patient environment. For the research to be applied, written permission from Chief Physician of the hospital and verbal permission from the participants was taken. Statistical analysis of the data was made in the program SPSS 16.0.

Results: A total of 200 situations requiring hand hygiene are determined for the intensive care unit. The number situations requiring hand hygiene is determined as 134 (67%) for nurses, 35 (18%) for doctors, and 31 (15%) for auxiliary staff. Average hand hygiene practice is determined for nurses (42%), doctors (44%), and auxiliary staff (34%). Hand hygiene compliance rate of all intensive care unit personnel was 35%.

Conclusion: Hand hygiene practice in the intensive care unit is in the moderate level. It is possible to reduce the infections related to health services, with the application of well structured infection control programs and information updates. Intensive care unit personnel are recommended to work in compliance with the "5 Indications for Hand Hygiene" standards (Figure 1).

Keywords: Hand hygiene, intensive care, observational research

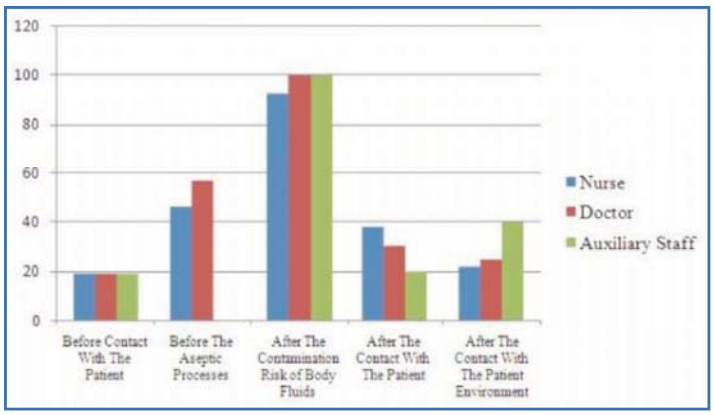

Figure 1. Rate of 5 indications for hand hygiene

PS-062

Antimicrobial Susceptibilities of *Acinetobacter baumannii* and *Pseudomonas aeruginosa* Strains Isolated from Intensive Care Unit of a Training Hospital

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Introduction: *Pseudomonas aeruginosa* and *Acinetobacter baumannii* are non-fermentative gram-negative bacteria that have minimal nutritional requirements and can survive on a wide variety of surfaces and in aqueous environments. Infections with *P. aeruginosa* or *A. baumannii* are of greatest concern for hospitalized patients, particularly those in intensive-care units (ICUs). Patients with cystic fibrosis, neutropenia, iatrogenic immunosuppression, or disrupted anatomical barriers that normally prevent bacterial invasion (e.g., skin) are at risk of infection with *P. aeruginosa* or *A. baumannii*. The spectrum of human infections caused by *P. aeruginosa* ranges from superficial skin infections to fulminant sepsis. *P. aeruginosa* and *A. baumannii* are resistant to antimicrobials from several different structural classes. In this study we aimed to evaluate the antimicrobial susceptibility of *A. baumannii* and *P. aeruginosa* strains that isolated from clinical specimens of intensive care unit patients.

Materials and Methods: In this study, clinical specimens of intensive care unit patients in Kecioren Training and Research Hospital between September 2012 and September 2013 were examined retrospectively. The identification and antimicrobial susceptibility tests were performed in Vitek 2 (Biomerux, France) automated system. The results were evaluated according to the recommendations of CLSI.

Results: Total of 58 *P. aeruginosa* and 51 *A. baumannii* strains were isolated in one year period. Out of 58 *P. aeruginosa*, 29 isolates were from respiratory tract specimens, 13 isolates from urine, 9 isolates from blood, 4 isolates from wound, 3 isolates from nasal specimens. And as similar to *P. aeruginosa* isolates out of 51 *A. baumannii* isolates, 30 isolates were from respiratory tract specimens. The other specimens that *A. baumannii* isolated were; urine (n= 9), blood (n= 9) and wound (n= 3) specimens. Antimicrobial resistance of *P. aeruginosa* strains were determined as follows; imipenem 24.2%, meropenem 24.1%, ceftazidime 32.7%, piperacillin tazobactam 22.4%. The resistance of *A. baumannii* strains were; ampicillin sulbactam 90.2%, imipenem 92.2%, meropenem 92.2%, ceftazidim 92.2%. colistin resistance was not detected.

Conclusion: Monitoring of antimicrobial resistance in *A. baumannii* and *P. aeruginosa* is important especially in intensive care unit patients for empiric therapy. Our results showed that piperacillin-tazobactam and carbapenems were the most effective agents for *P. aeruginosa*. Colistin is the most effective agent to the *A. baumannii* isolates but resistance rates were higher for carbapenems. Further more health care facilitities can make their appropriate antibiotic policies against these bacteria according to their local datas.

Keywords: *A. baumannii*, intensive care unit, *P. aeruginosa*

PS-063

Distribution of Microorganisms Isolated from Wound Specimens

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Introduction: Wound infections are one of the main poblems for nosocomial infections. In this study we aimed to investigate the distribution of microorganisms and their antimicrobial susceptibility that were isolated from wound specimens.

Materials and Methods: Wound specimens that sent from various clinics to the laboratory between September 2012 and September 2013 were cultured onto the routine culture media and incubated under proper conditions. After incubation conventional methods and Vitek 2 automated system for identification and antimicrobial susceptibility testing of the organisms. The results were evaluated according to the CLSI recommendations.

Results: A total of 320 strains were isolated in one year period. Out of 320 isolates 88 were sent from Plastic and Reconstructive Surgery clinic. This clinic was followed by Surgery (n= 51) and Orthopedic (n= 47) clinics (Table 1). Methicillin susceptibile *Staphylococcus aureus* (MSSA) was the most frequently isolated microorganism (n= 61) and followed by *Escherichia coli* (n= 45) and methicillin resistance coagulase-negative staphylococci (MRCoNS) (n= 40). The distribution of the microorganisms were listed in Table 2. Methicillin resistance was 18% in *S. aureus* isolates and 60% in coagulase negative staphylococci. Carbapenem resistance was detected in 1.9% of the *Enterobacteriaceae*. Colistin resistance was not detected in *Acinetobacter* spp. strains but carbapenem resistance was high as 63.1%. In *Pseudomonas* spp. strains carbapenem, piperacillin tazobactam and ceftazidim resistance were determined as 9%, 15.1% and 15% respectively.

Conclusion: Evaluation of culture and antibiogram in the treatment of wound infections, increase the success of treatment and thought to be high impact in reducing the total cost of medical spending.

Keywords: Resistance, wound infections

Table 1. Distribution of the clinics

Clinics	n (%)	Clinics	n (%)
Plastic and reconstrictive surgery	88 (27.5)	Pediatrics	10 (3.2)
Surgery	51 (15.9)	Urology	10 (3.2)
Orthopedics	47 (14.7)	Otolaryngology	10 (3.2)
Intensive care unit	34 (10.6)	Cardiology	6 (1.8)
Infectious diseases	18 (5.7)	Gynecology and obstetrics	4 (1.2)
Internal medicine	15 (4.7)	Emergency	2 (0.6)
Dermatology	12 (3.7)	Neurochirurgie	1 (0.3)
Neonatal intensive care unit	12 (3.7)		

Table 2. Distribution of the microorganisms

Microorganism	n (%)	Microorganism	n (%)
S. aureus	61 (19)	*Klebsiella* spp.	17 (5.3)
E. coli	45 (14)	*Candida* spp.	14 (4.5)
CoNS	40 (12.5)	Alpha hemolytic streptococci	14 (4.5)
Pseudomonas spp.	33 (10.3)	*Enterobacter* spp.	10 (3.1)
Enterococcus spp.	24 (7.5)	*S. marcencens*	9 (2.8)
Acinetobacter spp.	19 (5.9)	Other*	16 (5)
Proteus spp.	18 (5.6)		

* *A. denitrificans, C. koseri, Kocuria* spp., *M. morganii, S. pyogenes, S. agalactiae, S. maltophilia*

PS-064

Vacation Months Have More Risk for Sharp Instruments Injuries

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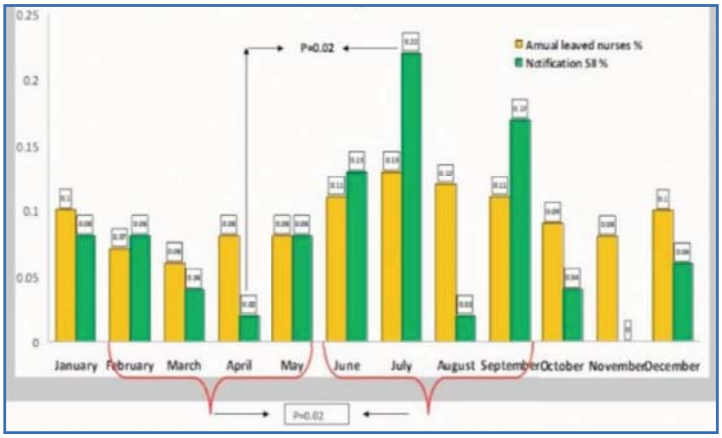
Aim: At least 20 different infectious agent such as hepatitis B virus (HBV), hepatitis C virus (HCV) and human immunodeficiency virus (HIV) can be transmitted with blood, blood products and body fluids to the health-care workers because of occupational reasons. This study was conducted to determine the epidemiology of sharp instrument injuries (SII) which occured Sakarya University education and research hospital (SUER), Yenikent state hospital (YSH), Sakarya Gynecology, Obstetrics and Child Hospital (SGOCH) and Toyota-SA first aid hospital (TFAH) in 2012.

Materials and Methods: Forms previously recorded from four hospitals (SUER,YSH,SGOCH,TFAH) were evaluated retrospectively during the study period (01.01.2013-31.12.2013). Some important informations such as occupational groups, invasive device usage, personal injury situations were examined months by months. In addition, the hospital personnel were examined for their annual leave situation. Maximum employees vacation months were compared to minimum vacation months for SII. Data were analyzed with epi info programs (ver 6.0 CDC, Atlanta), and the chi-square, number, percentage calculations were evaluated.

Results: The frequency of notification after SII is 101 (0.27%) for total 37257 personnel. When occupation groups are considered; 45/101 (0.58%) nurses, 31/101 (0.48%) the student nurse, 17/101 (0.21%) the cleaning staff, 6/101 (0.12%) other health-care workers, 5/101 (0.03%) doctors, and 1/101 (0.004%) were technicians (in Table 1). SII was found highest between June and September that in vacation period of the staff, and found to be significantly higher than the period between February and May (p= 0.02). When the injury status of invasive instruments were evaluated, the highest rate was injury from the needlestick by 59.40% (60/101) percent, and 30.69% (31/101) percent occurred with other tools and instruments.

Conclusion: As a result; number of SII increased in the vacation months the number of employees decreased. The most SII occurred with needlestick, and nurses were found the most risk group. We think that more attention and more education needed in vacation months to prevent SII.

Keywords: Sharp instruments injury, vacation months



Notification SII by months and annual leaved nurses

Table 1. Exposure SII by occupational groups

Occupation	% (n)
Doctor	0.03 (5/101)
Nurse	0.58 (45/101)
Cleaning personel	0.21 (17/101)
Student nurse	0.48 (31/101)
Technician	0.004 (1/101)
Other health-care workers	0.12 (6/101)

PS-065

Evaluation of Antibiotic Susceptibility Profile of *Pseudomonas* and *Acinetobacter* Strains Cultured in Variety of Clinical Samples from Patients Presented to the Outpatient Clinics of a District State Hospital

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Objective: The *Pseudomonas* and *Acinetobacter* bacteria strains possess the highest level of resistance to antibiotics. The aim of the present study was to evaluate susceptibility profile of *Pseudomonas* and *Acinetobacter* strains isolated from variety of clinical samples of patients presenting to the outpatient clinics.

Materials and Methods: We retrospectively reviewed 10.730 culture samples (urine, sputum, exudate, ear fluid) sent from various outpatient clinics to the Microbiology Laboratory of Erbaa State Hospital from July 2010 to July 2013. 10.730 culture samples (urine, sputum, exudate, ear fluid) were evaluated; 33 showed *Pseudomonas* growth and 41 showed *Acinetobacter* growth. The samples were cultured in eosin-methylene blue and 5% sheep blood agar. Sputum samples were also cultured using chocolate agar. After identification of the microorganism using conventional methods (Gram staining, oxidase test, glucose, lactose fermentation, urea test, indole test, citrate test, motion characteristics.), antibiotic susceptibility of the strains were determined using Kirby-Bauer disc diffusion method in accordance with the principles of Clinical and Laboratory Standards Institute (CLSI).

Results: Antibiotic resistance profile of 41 *Acinetobacter* strains was as follows: cefotaksime (46%), ciprofloxacin (34%), gentamicin (24%), ceftazidime (22%), cefepime (17%), levofloxacin (15%) piperacillin-tazobactam (10%). Antibiotic resistance profile of 33 *Pseudomonas* strains was as follows: ciprofloxacin (40%), cefotaksime (40%), ceftazidime (18%), levofloxacin (15%), gentamicin (15%), piperacillin-tazobactam (8%), cefepime (15%).

Conclusion: Although *Pseudomonas* and *Acinetobacter* strains are generally associated to nosocomial infections, recently these strains are being isolated in a considerable number of specimens collected from the community. Our results suggested increasing resistance to antibiotics, particularly to cefotaxime and quinolons, but no resistance to carbapenems was determined. Increasing antibiotic resistance is implicated in treatment complications and increasing health care costs. Therefore similar studies must be conducted in state hospitals, and every hospital should identify the antibiotic susceptibility profiles of its own prevailing strains, and their own antibiotic policies should be developed.

Keywords: Infection, antibiotic resistance

PS-066

Evaluation of the Prevalence and Antibiotic Susceptibility of ESBL-Positive *E. coli* Strains Isolated from Urine Samples of Patients of Outpatient Clinics of A District State Hospital

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Objective: The aim of the present study was to evaluate the prevalence of antibiotic susceptibility of ESBL-positive *E. coli* strains isolated from urine samples of patients of outpatient clinics.

Materials and Methods: We retrospectively reviewed 9840 mid-stream urine samples sent from various outpatient clinics with the suspicion of Urinary Tract Infections to the Microbiology Laboratory of Erbaa State Hospital from January 2011 to July 2013. Of 8940 urine samples, 452 were positive for *E. coli* and 64 were confirmed to be ESBL-positive *E. coli.* A total of 516 *E. coli* strains were included in the study. The samples were cultured in Eosin-Methylene Blue and 5% sheep's blood agar. After identification of the microorganism using conventional methods (Gram staining, oxidase test, glucose, lactose fermentation, urea test, indole test, citrate test, etc.), antibiotic susceptibility of the strains was determined using the Kirby-Bauer disc diffusion method in accordance with the principles of the Clinical and Laboratory Standards Institute (CLSI). ESBL production was studied using the combined disc method according to CLSI standards.

Results: The antibiotic susceptibility profile of ESBL-negative *E. coli* strains was as follows; moderately sensitive to: ampicillin-sulbactam (6%), cefalotin (5.8%), trimetoprim-sulfametoxazol (2%), amoxicillin-clavulanic acid (1.3%), levofloxacin (1.3%), nitrofurantoin (0.9%), gentamycin (0.9%), piperacillin-tazobactam (0.7%), aztreonam (0.7%), cefuroxime (0.4%), cefoperazone-sulbactam (0.2%), cefepime (0.2%), tetracycline (0.2%), ceftazidime (0.2%), ampicillin (0.2%), cefoxitin (0.2%), cefotaxime (0.2%), ceftriaxone (0.2%), fosfomycin (0.2%) and resistant to: ampicillin (54%), ciprofloxacin (25%), tetracycline (24.3%), trimetoprim-sulfametoxazol (20.6%), ampicillin-sulbactam (18.4%), cefalotin (15.7%), amoxicillin-clavulanic acid (5.5%), levofloxacin (5.5%), gentamycin (4.4%), cefuroxime (4.2%), cefotaxime (3.5%), ceftriaxone (3.5%), cefoxitin (2.9%), cefoperazone-sulbactam (0.9%), cefepime (0.7%), aztreonam (0.7%), ceftazidime (0.7%), nitrofurantoin (0.4%), fosfomycin (0.2%). The prevalance of ESBL-producing strains was 12.4% (n= 64). Antibiotic susceptibility of the ESBL-producing strains was as follows; moderately sensitive to: cefoperazone-sulbactam (10.9%), piperacillin-tazobactam (6.3%), cefepime (9.4%), nitrofurantoin (6.3%), aztreonam (4.7%), ceftazidime (4.7%), tetracycline (1.6%) and resistant to: ampicillin (100%), cefalotin (100%), cefuroxime (100%), cefotaxime (100%), ceftriaxone (100%), aztreonam (95.3%), ceftazidime (95.3%), ciprofloxacin (59%), ampicillin-sulbactam (54.7%), trimetoprim-sulfametoxazol (53.1%), tetracycline (51.6%), cefepime (43.8%), amoxicillin-clavulanic acid (42.2%), levofloxacin (38%), gentamycin (21.9%), fosfomycin (9.4%), cefoperazone-sulbactam (7.8%), piperacillin-tazobactam (6.3%), nitrofurantoin (4.7%).

Conclusion: Although the prevalence and resistance rate ESBL-positive *E. coli* strains was lower at our hospital, the resistance rate among ESBL-positive *E. coli* strains was higher than ESBL-negative strains. While we found increasing quinolon resistance, we were gratified that no resistance to carbapenems has been observed. Considering previous studies conducted in our hospital indicating ESBL-positive *E. coli* strains as the causative agent of nosocomial infections, it is of particular importance to have effective Committees on Rational Drug and Antibiotic Use in order to maintain control over increasing antibiotic resistance.

Keywords: Infections, antibiotic susceptibility, ESBL

PS-067

Evaluation of *Acinetobacter baumannii* Strains Isolated from the Intensive Care Unit

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Introduction: *Acinetobacter* species play an important role in nosocomial infections leading to serious outbreaks especially in intensive care units. The viability of this pathogen in limited nutritional conditions and on dry surfaces helps to spread by being alive in natural and medical environments. *A. baumannii* has ability to live on medical devices, beds/mattresses and pillows, gloves, electrical equipment and abiotic surfaces such as medical clothing for days or even weeks. This condition may lead to long term colonization of bacteria in hospital device/equipments and causes emergence of epidemics.

Aim: In this study, the distrubition of *Acinetobacter* strains according to culture samples which isolated from intensive care unit and the diagnosis of nosocomial infections and prevention methods were evaluated.

Materials and Methods: This retrospective study was performed from 2012 to 2013 at the intensive care unit of Suleyman Demirel University. The patients who were diagnosed according to the criteria of CDC (Centers for Disease Control and Prevention) and who were followed by an active and prospective surveillance methods are investigated.

Results: *A. baumannii* was isolated from various clinical samples of 45 patients. 32% of patients were female and 68% were male. The distrubution of infections evalutated according to systems. The most prevalent infections were determined as respiratory tract, urinary tract and blood circulation infections. 69% of patients were diagnosed with ventilator-associated pneumonia, 22% of patients were diagnosed with bloodstream infections associated with central venous catheter, 6% of patients were diagnosed with catheter associated urinary tract infections and 2% of patients were diagnosed with deep incisional surgical site infections. Improper aspiration process and hand washing detected between resident doctors in observations made by the infection control committee. In all clinical samples, resistant to carbapenem is 100%, resistant to trimethoprim-sulfamethoxazole is 54% while resistance were detected in all other groups of antibiotics (cephalosporins, aminoglycosides, quinolones, beta-lactamase inhibitor combinations).

Conclusion: Among the risk factors for *A. baumannii* infections, especially in intensive care environment, or be contaminated with microorganisms previously used materials (equipment, water baths, catheters, ventilators), the most important reason for survival stubborn bacteria in the hospital environment. Improper use of this equipment by health care workers are thought to be primary importance reason for the spread of infections. For the control measures, taking of surveillance cultures more than one body region (perirectal, oropharyngeal, endotracheal, inguinal wound), monitoring compliance with contact isolation, cohort application (patients, nurses and doctors), control of disinfection-sterilization applications and antibiotic use are prime steps.

Keywords: *Acinetobacter baumannii*, medical devices

PS-068

Infections Caused by Vancomycin Resistant Enterococcus and Measures Taken in Research and Practice Hospital of Suleyman Demirel University Medical School

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Introduction: Vancomycin-resistant enterococci (VRE) has become a major problem for inpatient care. VRE infections are usually developed after the colonization of gastrointestinal infections. Although accepted as endogenous infections, VRE can be shown also ways that exogenous. The medical equipment and surfaces located inside the rooms of patients who colonized and / or infected VRE, that often becomes contaminated with this microorganism and creates a important reservoir of VRE in the hospital. VRE directly transferred from patient to patient or transferred indirectly by way of contaminated hands, contaminated surfaces or medical instruments. In order to prevent VRE infection control measures and training of hospital staff should be effectively implemented.

Aim: VRE infections that occurring in our hospital the first time and control measures were evaluated in this study.

Materials and Methods: As a result of the surveillance conducted by Infection Control Committee (ICC) between March 2013-August 2013, VRE colonization were increased. A total of 23 cases were identified. After the first index cases rectal swab samples were taken for determination of colonization. The isolation precautions which recommended by the Hospital Infection Control Practices Advisory Committee (HICPAC) were performed. Nurses, staff who responsible for patient care and cleaning, laboratory staff, consultant-assistant doctors and students enrolled in the continuous training program about principles to prevent spread of VRE.

Results: In our hospital, a total 23 cases (13 female, 10 male) were identified. Seven of them infected patients, 16 of them were colonized. Distribution of patients according to the clinics, respectively 5 patients in the hematology, 4 patients in the gastroenterology, 2 patients in the nephrology, 1 patients in the endocrine section and for a total 15 cases identified in the Department of Internal Medicine. Although 1 patients in the neurology intensive care section, 3 patients in anesthesia intensive care section, 2 patients in gynecology department of and 1 patient in the infectious diseases and clinical microbiology were identified. The most VRE were isolated from urine (4) samples. 18 of them were detected as *E. faecium* and 5 of them were detected as *E. faecalis*.

Conclusion: VRE colonization and infection rates were higher in immunocompromised individuals. Culture swab should be taken with certain intervals from the complicated patients, especially including hematology and intensive care unit. New cases are likely to occur from the first index cases until the present day. Therefore, applications of prevent and control measures must be applied with thoroughness for prevent the spread of VRE infection.

Keywords: Vancomycin resistant enterococcus, conrtol measures

PS-069

Effects of Operating Room and Sterilization Unit on Surgical Side Infections

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Introduction: The incidence of surgical site infections are in second place within all nosocomial infections. Operating theaters and sterilization units contribute to presentation of the health care without risking the patient safety.

Aim: To investigate the effect of works about the creation and maintenance of the sterile field on surgical side infections (SSI) speed.

Materials and Methods: The data were obtained from knowledge of surveillance associated with SSI speed made by Suleyman Demirel University infection committee between 2011-2012. Rate of SSI: A certain number of SSI after surgical intervention/The number of surgical interventions in this category X100 is calculated by this formula.

Results: In this study 173 craniotomy, 19 gastric surgery, 42 hip replacement, 6 knee replacement and 37 renal surgery were followed in 2011. 183 gastric surgery, 89 craniotomy, 41 hip replacement, 73 knee replacement, 42 renal surgery has been followed in 2012. Rates of SSI indicated in the Table 1.

Conclusion: It detected that rate of SSI increased at the operations except of renal operations. This reason may be associated with the operating room instructions and applications do not sufficiently performed due to performance system. This result may be altered by increased audits of the Infection Control Committee.

Keywords: SSI, operation room

Table 1. Rates of surgical side infections

	2011	2012
Craniotomy	1.73%	3.37%
Gastric surgery	0	2.19%
Hip replacement	4.76%	4.88%
Knee replacement	0	1.37%
Renal surgery	5.41%	2.38%

PS-070

Evaluation of Attitudes and Practices of Hand Hygiene Among Employees at Maternity and Children's Hospital in Samsun

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Introduction: Health care worker's hands are the most common tools for the transmission of microorganisms from one patient to another, from the part of the body to another part of the same patient and from a contaminated environment to the patients. Moreover, a range of potential pathogenic microorganisms have been involved in the hand and body flora of health care workers during patient care as time passses. In the absence of hand hygiene practices, contamination level of hands is increasing as the duration of patient care increases.

Aim: In our study, it is aimed to determine the hand hygiene compliance of our hospital's health care workers and to evaluate the different practices such as hand hygiene before contact with patient, before the aseptic process, after exposure to body fluids, after contact with patient and after contact with patient environments.

Materials and Methods: Between October and December 2012, doctors, nurses, midwives, medical X-ray technicians and auxiliary staff for a total number of 1060 employees who work in 17 different units of Samsun Maternity and Children's Hospital have been included in the study. "Hand Hygiene Observation Form" has been used to obtain data. Statistical analysis of the data obtained has been done on the computer by using "Statistical Package For Social Sciences (SPSS) 17.0 package program.

Results: Those who were included in the study 131 (12.4%) were male and 929 (87.6%) were female. According to the occupational groups of the participants, it had been determined that 437 (41.2%) of them were nurses, 254 (24%) were midwives and 208 (19.6%) of them were doctors. This research which has been done to understand the hand hygiene behaviors of health care workers shows that 39.7% of the participants wash their hands before contact with patients whereas 30.4% of them have not performed any hand hygiene practices. On the other hand, 55.2% of the participants wash their hands after contact with patients whilst 13.5% of them have not performed any hygiene practices. Handrubbing practice rate of nurses has been found significantly higher than other professions when the hand hygiene practice situations compared according to the occupations of the participants ($p< 0.001$).

Conclusion: The absolute high level of hand hygiene practice rate is desired. However, low status of hand hygiene practice after contact with patient gives rise to thought that health professionals keep their health in the forefront rather than the health of their patients. Yet we are of the opinion that health care professionals should be supported with in-service training and supervised on regular intervals about their hand hygiene practice and their applications in accordance with the rules to prevent nosocomial infections, to not risk their health as well as health of their patients, to protect patients against microorganisms which may cause adverse affects on their health, to avoid contact of microorganisms which may transmitted from patients' bodies to their own bodies and by thinking a step ahead, to protect health environment against microorganisms cause nosocomial infection.

PS-071

Klebsiella pneumoniae from Neonatal Intensive Care Units: Genomic-Based Approach by Using 16Sr DNA Sequencing and Pulsed-Field Gel Electrophoresis

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Klebsiella spp. have been prominent among the gram-negative bacilli causing nosocomial infections. Twelve *Klebsiella pneumoniae* were recovered from blood, stool and cerebrospinal fluid samples of ten patients at the epidemic in neonatal intensive care unit of Sakarya Training and Research Hospital, Sakarya University. The study was aimed to determine the clonal relation between the twelve *K. pneumoniae* isolates.

To figure out the relationship between the isolates, genomic based approaches as partial nucleotide sequences of the 16S rDNA and pulse field gel electrophoresis (PFGE) methods were employed. Although from twelve *K. pneumoniae* strains were obtained from neonates, only ten of them were used for the genetic analyses, two *K. pneumoniae* strains were excluded. Firstly to identify the bacteria, conventional bacterial methods and VITEK 2 automated system (Biomerieux inc.) were used and then were cultivated again to start the molecular microbiological methods. After harvesting the *K. pneumoniae* stains from cultured media, to extract the DNA of the bacteria QIAamp® DNA Mini Kit was used. For the partial nucleotide sequences of 16S rDNA method, ABI PRISM® 3100 Genetic Analyzer was used. The Genetic Analyses is based on automated capillary electrophoresis system that can separate, detect, and analyze the fluorescently labeled DNA fragments. Blast analyses of the data of the partial nucleotide sequences obtained from genetic analyzer were managed by using NCBI web page. *K. pneumoniae* strain AUH-BG208 was the reference strain in the analyses of neighbor joining. Genomic DNA was analyzed by PFGE after digestion with XbaI, using the contour-clamped homogeneous electric field (CHEF) technique. DNA fragments were separated by electrophoresis in 1% agarose in 0.53 TBE buffer (45 mM Tris, 45 mM boric acid, 1 mM EDTA, pH= 8.0) with CHEF apparatus (CHEF MAPPER XA; Bio-Rad®) at 14°C and 6 V/cm and with alternating pulses at a 120° angle in a 2-40 s pulse time gradient for 22.5 h.

Results of neighbor joining of the partial 16S rDNA sequences and the PFGE were as following figures respectively. The results of the PFGE clearly showed that samples of 4, 7, and 9 clonally different than the others. The samples numbered 1, 2, 3, 5, and 8 closely clonally related. Meantime sample 10, however closely related except with 1 band. The results of nucleotide sequences were revealed the clonally unrelated strain only from sample 9. However samples 4 and 7 also evaluated as clonally unrelated, genetic diversity was not more as sample 9.

Discrepancies between the results from both methods were obvious. Partial nucleotides sequence of 16S rDNA provided limited clonal relation between *K. pneumoniae* strains when compared with the PFGE results. To a certain extent, however, representative nucleotides in 16S rDNA genome ensured an epidemiological concern, because the PFGE evaluated whole genome of the bacteria, results of it more precious for clonal relationship.

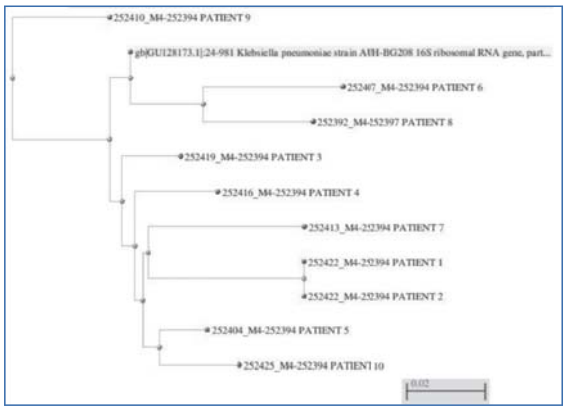

Figure 1. Neighbor joining of the *K. pneumoniae* strains

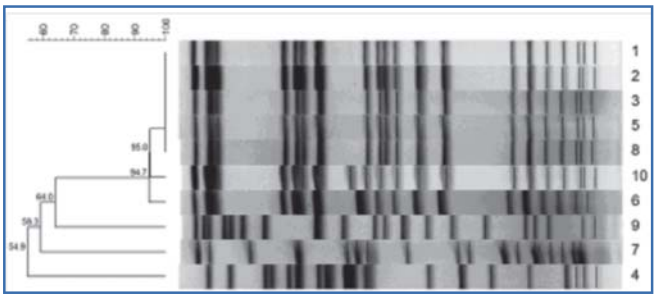

Figure 2. The image of the pulsed-field gel electrophoresis the bacteria

PS-072

Injuries Inmedipol Mega Hospital Between 2012-2013

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Abstract: Occupational health professionals encounter many risks and danger. These risks are most in important, infections, and penetrating injuries.

Background: This study was made between 2012-2013 to evaluate stabbing and cutting injuries Mega Medipol Hospital. It was aimed to determine the distribution in the hospital according to work and to see the reasons for stab wounds, and to to develop strategies to prevent.

Materials and Methods: In total 87 cases were evaluated retrospectively in this descriptive and crosssectional study. Cutting and Drilling Assessment Form was used with the approval of injury. This form was prepared by the Infection Control Nurse Accurate Estimating by Ebru Dogru. Results were collected from forms filled out by health professionals by Infection Control Nurse.

Results:

• In 2012, both in general as well as in 2012-2013 are analyzed by month in 2013 vary, but are usually increased by months and years.

• Stab injuries examined by occupational groups in 2013, 2012 compared to a 19% increase. As a group, these groups look occupation nurses, cleaning staff, auxiliary staff was seen as.

• The distribution of penetrating injuries were found to have the highest number of injuries ın 2012-2013, according to the department analysis of operating theater, outpatient, emergency department, intensive care unit and 6 of the general floor, dental section and NICU departments.

• Stab injuries were mostly seen over the tip of the needle, syringe, scalpel and sutures.

• If the causes of penetrating injury, negligence, care occupancy rate and false pulse came to the fore.

• Stab injury is most commonly seen due to carelessness in units, mostly in operating rooms, and intensive care units.

As a precaution, in order to reduce injuries and stab improvement works planned;

- Treatment rooms to the bench and sharp boxes additional trays kept ready on the bench.

- Injury prevention training was repeated to all staff,

- Personnel was trained for waste management,

- The number of sharp box were increased in the hospital.

As a result, health workers face every moment of stab wounds need to be extremely conscious of and knowledgeable. Most of the standard of health workers information on the implementation of the necessary procedures , as well as post-exposure measures are insufficient.

Health care workers need to inform and routine inspection and post-exposure treatment and follow up of these units all the necessary procedures to deal with the establishment and coordination of the units cost effective and efficient manner of execution path will be entered.

PS-073

Reuse of the Single Use Materials Overview

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Objective: The use of the single use materials after the operation by sterilizing them is a subject occupying the world agenda with different applications. The general approach is to bound this usage to certain rules, even prevent it in countries like Turkey. With this study, it has been aimed to show the general situation in the country by asking questions about this subject to volunteer participants.

Materials and Methods: Eighty two hospitals 10 of which are university, 14 are private and 58 are public hospitals have answered the survey questions via internet.

Results: 18% of the participant hospitals have 50-100, 48.8% of them have 100-500, 20.7% of them have 500-1000 and 8.5% of them have 1000 bed capacity. 86.6% of them have a Central Sterilization Unit (CSU). When the education level of the CSU employees have been evaluated, it has been determined that 47.6% of them are high school, 9.8% of them are primary school, 11% of them are middle school, 7.3% of them are health school, 17.1% of them are university graduates, 7.2% of them are graduated from all level schools. When the education situation about the sterilization, disinfection process of the CSU employees have been evaluated it has been determined that 31.7% of them haven't received any education, 29.3% of them have received DAS education seminar, 18.3 of them have received DAS school education, 11.6% of them have received seminars, congress and in service trainings. The question "Did you do reuse?" has been answered as, 89% yes, 11% no. In 46% of the participant hospitals cardiovascular surgery, in 36% of them angio, 71% of them eye intervention is being done. 90.2% of the participants had information about the reuse of the single use materials memorandum (2011/7). The question about resterilization number has been answered as 1-3 of 43.9%, many times of 18.3% and until it is wasted away of 29.3% and not followed of 8.5%. The decontamination of the materials were being done at CSU (74.4%) and in the unit where the material is being used (25.6%). 90.2% of the reuse material packaging was done in CSU and 9.8% of the packaging was done in the unit where the material is being used. As the reuse method, 59.8% ethylene oxide, 28% hydrogen peroxide, 7.4% ethylene oxide and hydrogen peroxide, 4.9% formaldehyde was used. The "we have got" answer was given by 61% of the participants to the reuse cost information, it has been seen that 64.5% of the participants have the real price information of the material. The reuse application was done 51.2% with the cost effectiveness information. It has been seen that the patient approval wasn't taken for the reuse material usage (85.4%), and the patients weren't monitored (58.5%). The question "Why do you use reuse material?" was answered as material stock inadequacy 40.2%, cheaper 30.5%, SSI payment inadequacy 25.6%, all reasons 5.6%. The reuse decision was given by the infection control committee 57.3%, more than one committee 36.6%, quality unit 3.7%, head physician 1.2%, unit chef of materials 1.2%.

Conclusion: It has been seen that to a large extent reuse preference is being applied. The material stock inadequacy was the first reason of reuse preferences. Problems like, sterilization method, not following the material's corrosion situation, not making cost analysis is standing out. The reuse operation is a problem which has to be discussed by the management body of the country, applicators and applicants. And it has to be made out to applicable results as soon as possible.

PS-074

Shelf Life's Tests: A Contribution to Efficient Practices

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Introduction: Currently, because of a lack of scientific data, expiry dates in CSSD are determined empirically. The context of the launch of a new packaging material, ULTRA® reel by AMCOR, was an opportunity for CSSD of Lille's University Hospital to ask the manufacturer for shelf life's test.

Aim: The aim of the study is to determine an expiry date for ULTRA packaging based on scientific data and relying on Health Care Facilities's conditions of use.

Materials and Methods: ULTRA is composed of two sides: side A = polyolefin /polypropylen and side B = plastic film. It can be used in single layer (ULTRA®), two layers (ULTRA® + ULTRA®) or two layers (ULTRA® + paper). Validation of the packaging material ULTRA® (sterile barrier properties) has been carried out by a third part (ISEGA, Germany) before the launch. Four tests are realized to demonstrate ULTRA' sterile barrier properties efficiency mentioned in ISO 11607:

- Germ proofness under humidity (DIN 58593-6 § 3),
- Germ proofness with air permeance (DIN 58593-6§3-4),
- Resistance of the plastic film to the passage of air (ISO 5636-5),
- Impermeability of the heat sealed joint (ASTM F 1929).

Then, in HCF, batches with the three kind of packaging are tested in regular conditions of use (sterilization in a steam sterilizer 134°C during 18 minutes, handling weekly) and germ proofness with air permeance tests are realized at three different times (3, 6, 12 months).

Results: Before use, all tests are conforms according to references. After sterilization process and 3, 6 and 12 months storage, the tests are still conform (i.e.: < 5 UFC/sample and < 15 UFC/10 samples).

Conclusion: For a matter of saving, only one test is realized in HCF. Germ proofness with air permeance is chosen because it's the most representative of the regular conditions. Our results can be applied in all HCF using the same packaging items: our sterilization process is a "worst case", however transportation and storage are common. Now, according to ISO 11607 requirements, 12 months expiry dates policy with ULTRA packaging is based on scientific and relevant data.

Keywords: Packaging, expiry date, shelf life

PS-075

The Cost Analysis of Packaging Materials and Indicators Used for Steam Sterilizers in Marmara University Hospital Central Sterilization Unit

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Aim: Central Sterilization Units (CSU) are vital dynamic centers in a hospital, which have a great responsibility in ensuring the security of sterilization and preventing the spread of infection; collect dirty materials to be processed from various areas of the hospital and deliver to the end users again; operate 365 days 24 hours. CSU is a complicated process which needs to be monitored closely to assure that the hi-tech hardware, sufficient space and qualified personnel who are trained periodically are provided. The work load of the unit must be planned/estimated and in order to avoid unnecessary costs, CSU equipment and (medical) consumable needs must be determined.

Materials and Methods: We determined the amount of consumables for steam sterilizers (4 sterilizers, 3 of them have 800 lt, 1 of them has 500 lt capacity) and the cost of this material in our CSU that serves to 20 operation theatre. Approximately 1500 surgical intervention is done in a monthly basis in our hospital. We assumed that 18 packages is opened per procedure as indicated in Table 1.

Results and Conclusion: The amount of daily consumables is given in Table 2. The chemical indicators (n= 540.000), biological indicators (n= 2000) and Bowie Dick indicator (n= 1500) cost 35.000 euro per year. We used two different packaging materials for the materials given in Table 2. Different sizes of sterilization pouches are used to wrap separate items and closed by heat after packaging. The amount of pouches is given in Table 3. The cost of sterilization pouches for separate items is 11.500 euro per year. Sterilization wraps are used to package surgical sets and counting bowls. Three different sizes (75 x 75 cm, 100 x 100 cm, 120 x 120 cm) crepe papers are used to package 60.000 surgical sets per year. We preferred double wrappping with crepe papers and we used 120.000 pieces crepe papers which cost 34.300 euro.

As summary, the cost of consumables for steam sterilizers is 81.300 euro unit yearly. The steam sterilization cost per surgical set is 0.6 euro and 0.4 euro per separately packaged items.

Keywords: Steam sterilizer, indicator, packaging material

Table 1. The package material per operation

Package material	Package number (n)
Small sponge (n= 10)	3
Large sponge (n= 10)	2
Sponge for abdomen (n= 5)	2
Staining material	1
Counting bowl	1
Separate instrument	6
Surgical set	2
Pad (n= 2)	1
Total	18

Table 2. The package material and number in a yearly basis

Package material	Package number (n/day)	Package number (n/year)
Small sponge	300	90.000
Large sponge	200	60.000
Pad for abdomen	200	60.000
Staining kit	100	30.000
Separate instrument	600	180.000
Surgical set	200	60.000
Pad	100	30.000
Counting bowl	100	30.000
Total	1800	540.000

Calculation is done for 100 operation per day for 300 working days in a year.

*Table 3. The amount of sterilization pouches per year**

Dimensions	Small sponge	Large sponge	Pad for abdomen	Staining kit	Separate instrument	Pad	Total (n)
10 cm x 200 m					670 pck		90
15 cm x 200 m	1340 pck				670 pck	1340 pck	224
20 cm x 200 m	800 pck				670 pck		165
25 cm x 200 m				500 pck			60
30 cm x 200 m			570 pck				105
35 cm x 200 m							12

* Packages per roll

PS-076

The Cost Analysis of Consumables Used for Plasma Sterilizer in Marmara University Hospital Central Sterilization Unit

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Aim: Hydrogen peroxide sterilization is one of the low-temperature sterilization technologies. In this system, the sterilization chamber is evacuated and hydrogen peroxide solution is injected from a cassette and is vapourized in the chamber and initiates the inactivation of microorganisms. The by-products of the cycle are non-toxic and eliminate the need for aeration. Thus, the sterilized material can be handled safely, either for immediate use or storage.We aimed to calculate the cost for consumables for plasma sterilizer in our unit.

Materials and Methods: We determined the amount of consumables for plasma sterilizer (STERRAD 100, ASP) and the cost of this material in our CSU that serves to 20 operation theatres. Approximately 1500 surgical intervention is done in a monthly basis in our hospital.

Results and Conclusion: We calculated the amount of consumables for 300 working days. One biological indicator is used per day (300 per year). We packaged 150 items per day and 450.000 chemical indicators are used per year. One system cassette is used for 5 cycle and 120 cassettes are used per year. Different sizes of packaging materials (Tyvek® pouches and rolls) are used and according to the size and number of packages we operated the system 2-3 times in a day (Figure 1). The rolls are 10-15-20-30-35 cm x 7000 cm in diameters and the median lenght of a package is 30 cm.

As summary, the cost of consumables for plasma sterilizer is 61.200 Euro yearly. The plasma sterilization cost per item is 1.4 Euro.

Keywords: Plasma sterilizer, indicator, packaging material

Figure 1. Loading of the chamber

PS-077

Indicator Evaluation in the Surgical Box at the Patient Safety: Experience Report

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Introduction: Historically the Sterilized Material Central has been undergoing changes towards professional, structural, modern equipment, work methods, quality control, nurses updated and therefore nurses with significant degree of knowledge and autonomy. Based on the decision-making power that nurses won the Estate Hospital Sumaré - Brazil forward to planning for the safe handling, nurses SMC created a document to evaluate surgical complications in the boxes on the quality of the instrumental.

Objective: To report our experience of deploying a document which was called Indicator Assessment of Surgical Box in order to improve communication between hospital units and quality of surgical instruments.

Materials and Methods: The type of study is an experience report of the implementation of an instrument for data collection on the use of surgical boxes and quality control of instrumentals.

Results: Given the difficulty of maintaining a dialogue with the teams, we decided to prepare a document that became available in the operating rooms or before the occurrence found in instrumental. The document should be filled with the name of the patient, surgeon, surgery date, circulating room and pointed out the problem encountered with the instrumental. From the beginning, the chips are now in monthly consolidated and obtained a ratio of 80% immediate resolution and 20% of chips pending, awaiting repair or purchase of instruments.

Conclusion: We concluded that the indicator used is innovative and best resolving problems in the surgical boxes.

Keywords: Quality indicators of assistance health, role of nurses, communication

PS-078

Logistics of Intermunicipal Transport that Surgical Materials in the Sterilized Material Central: the Patient Safety

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Introduction: The State Hospital Sumaré is a public hospital of the São Paulo State Government and administered by State University of Campinas (Unicamp), and is in the top of three hospitals in the country with the classification of the National Organisation Accreditation (ONA) level three, the highest standard in certification. At the end of 2008 was inaugurated Medical Specialties Ambulatory in Santa Barbara D'Oeste, city there are approximately 40 miles away. The administration of this unit is responsability of government.

Objective: Report the experience implementation of intermunicipal transportation service to Specialties Ambulatory by distributing surgical materials prepared in the Sterilizaed Material Central.

Materials and Methods: There were some meetings to discuss the most appropriate form of transport. Concomitantly, meetings were held between SMC and HICC (Hospital Infection Commission Control) to define the cleaning of the car and a transport flowchart.

Results: There is a Directive-RDC nº15, of March 15, 2012, to verify that the intermunicipal transportation of processed products for health are appropriate and cleaned materials are transported in sealed containers, resistant to the actions of puncture and tear, guaranteeing identification and package integrity, and these materials are putted in plastic boxes, sealed, printed and arranged in such a way that allows for easy viewing of the patient's name, type of surgery, surgical instruments names, layettes and name the SHS official responsible for assembling the materials. It's held conference these materials and hygienization these boxes; the responsible for the transport are trained in relation to cleaning hands and use of Personal Protective Equipament. Following dirty car use, it undergoes higienization as recommended HICC. During the deployment of transport was performed by nurse the SMC, monitoring of clean and dirty materials, in order to trace as feasible complications and adopt the appropriate behavior when necessary.

Conclusion: We conclude that existing standards must be followed even if that will require continuous improvement, comunication and teamwork. The experience presented in this report has brought greater security in intermunicipal transportation of surgical materials prepared in a Sterilized Material Central.

Keywords: Hospital distribution systems, materials management, transportation

PS-079

Study on the Reliability of Pouch with a Side Gusset Type of Sealing Quality

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Objective: In the result of previous study on one thousand of used pouches to test the unpeeled sealing opposite to the opened, 148 had leaked channels. One hundred and eight of them were the gusset type of pouches. So this time the sealing assurance of sterilizing pouch after heat sealing is experimentally studied.

Materials and Methods: Three kinds of test methods have been employed to check the leak channel in the sealing which are as follows:

1. Blue ink test, before and after steam sterilization.

2. Peel test of the part of the gusset sealing by tensiometer (Strograph®, Toyoseiki).

3. Powder penetration test through sealing part (Possibility of bacterial contamination). The size of powder is 0.2 μm in average.

Results:

1. In the result of blue ink test, the pouches heat sealed with lower temperature (180 and 190°C) revealed failure of sealing as shown in Table 1.

2. In the results of peel test, some leak channels were shown in the gusset parts.

3. In the results of powder tests, powder leakages were demonstrated by negative pressure through artificially made channels in the heat sealed parts by surgical suture.

Conclusion: No less than 200°C should be necessary for heat sealing of sterilization pouches. The gusset part apt to leave the failed leak channel when heat sealed without special attention. The leak channels after sealing can be revealed by fine powder tests. Heat sealing methods should be reevaluated to obtain the sealing assurances of sterilization pouches.

Keywords: Sealing, pouch, gusset

Table 1. Comparison of sealing temperature: No. of failed/Total tested

Conventional type sealer			
Temperature	Pouch width	Sterilization	
		Before	After
180°C	15 cm	10/10	10/10
190°C	15 cm	0/10	10/10
200°C	15 cm	0/10	0/10
180°C	30 cm	10/10	10/10
190°C	30 cm	4/10	8/10
200°C	30 cm	0/10	5/10

Sealer conditions/Pressure time: 3 stop time: 3 (1≈1.7 sec)

PS-080

Can Textiles be a Safe Packaging Material for Sterilization?

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Introduction: Under suitable conditions of moisture and temperature, medical textiles are an excellent basis for the development of bacteria and fungi, which increases the possibility of hospital infections spreading in operating theatres. Textile materials act as a barrier, which is important in preventing hospital infections and protecting the patients and medical staff against the negative influence of microorganisms in their environment, where cellulose fibers are the most susceptible to the influence of fungi, while protein fibers are more sensitive to bacteria. Sterile barrier can be defined as a material located between the sterile and contaminated area, with the purpose of preventing the microorganism penetrating through the material. These kinds of barriers include textile materials used in packaging material for sterilization, surgical gowns, covers and masks. These barriers are widely used; however, generally accepted criteria for their efficiency hardly exist. The goal of the research was to determine the properties of the microbe barrier, develop and suggest a method for testing in dry conditions, intended for multiple use textiles used in packaging for sterilization.

Materials and Methods: The development of new methods for testing the microbe barrier and its durability in multiple use medical textiles was approached. Changes and influence of washing and sterilization to the permeability of the microbe barrier was examined. Test samples underwent steam sterilization at 135°C (275°F). The washing process was implemented in a specialized washing room. Testing was performed after 1, 10, 20 and 30 washing and sterilization cycles. Aerobe bacterial endospores *Geobacillus stearothermophilus* (105) and *Bacillus atrophaeus* (106) were used. Durability of the microbe barrier of medical textiles after a period of 30, 60 and 90 days was tested in a controlled warehouse.

Results: With the goal of solving the problem of testing barrier properties of medical textiles, a new method was developed, and the designed and produced device is shown in Figure 1.

The tested properties of the microbe barrier, implemented according to new methods, showed satisfying results in Table 1 and Table 2. The examinations continued after the 50th washing process and 50th sterilization process.

Conclusion: Testing results of the new method showed that when medical textiles are examined, a certain degree of bacterial permeability occurs in case of contamination with extreme quantity of aerobe bacteria endospores *G. stearothermophilus* (105) and *B. atrophaeus* (106).

The tested medical textiles in real hospital conditions have the property of a microbe barrier after the washing and sterilization procedure. The obtained results of the tested durability of the microbe barrier, after a period of 30, 60 and 90 days and in a controlled warehouse, showed that the used medical textiles can be utilized as an efficient microbe barrier for packaging in sterilization.

Keywords: Sterilization, medical textile, microbe barriers

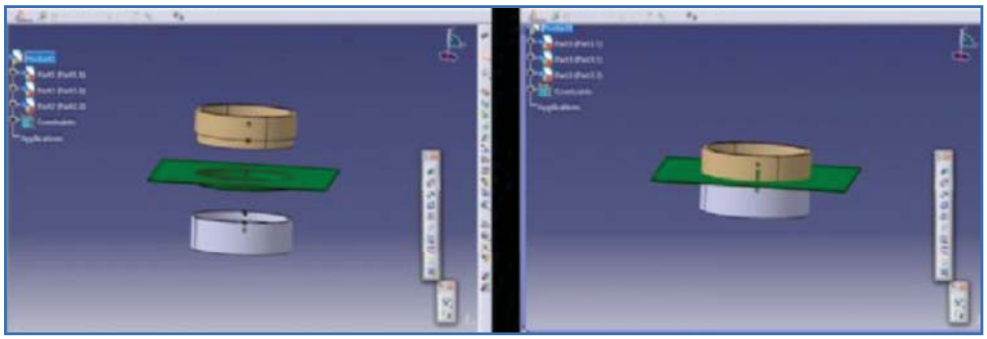

Figure 1. Designed and produced devices for testing permeability of the microbe barrier in dry condition

Table 1. Permeability of the microbe barrier after extreme contamination with bacteria endospores Geobacillus stearothermophilus and Bacillus atrophaeus

Samples	No. Washing and sterilization processes	CFU on the front of the textile	CFU on the back of the textile	CFU ratio
Samples I cotton/PES	1W + 1S	356	11	32:1
Samples I cotton/PES	10W + 10S	275	14	20:1
Samples I cotton/PES	20W + 20S	318	9	35:1
Samples I cotton/PES	30W + 30S	286	7	41:1
Samples II 100% tencel	1W + 1S	419	7	60:1
Samples II 100% tencel	10W + 10S	359	8	45:1
Samples II 100% tencel	20W + 20S	294	2	147:1
Samples II 100% tencel	30W + 30S	182	3	61:1
Samples III OP Laminat	1W + 1S	155	0	-
Samples III OP Laminat	10W + 10S	167	0	-
Samples III OP Laminat	20W + 20S	175	0	-
Samples III OP Laminat	30W + 30S	132	0	-

Table 2. Durability of the microbe barrier in controlled

Samples	No. Washing and sterilization processes	30 days	60 days	90 days
Samples I cotton/PES	1W + 1S	No microorganism growth	No microorganism growth	No microorganism growth
Samples I cotton/PES	10W + 10S	No microorganism growth	No microorganism growth	No microorganism growth
Samples I cotton/PES	20W + 20S	No microorganism growth	No microorganism growth	No microorganism growth
Samples I cotton/PES	30W + 30S	No microorganism growth	No microorganism growth	No microorganism growth
Samples II 100% tencel	1W + 1S	No microorganism growth	No microorganism growth	No microorganism growth
Samples II 100% tencel	10W + 10S	No microorganism growth	No microorganism growth	No microorganism growth
Samples II 100% tencel	20W + 20S	No microorganism growth	No microorganism growth	No microorganism growth
Samples II 100% tencel	30W + 30S	No microorganism growth	No microorganism growth	No microorganism growth
Samples III OP Laminat	1W + 1S	No microorganism growth	No microorganism growth	No microorganism growth
Samples III OP Laminat	10W + 10S	No microorganism growth	No microorganism growth	No microorganism growth
Samples III OP Laminat	20W + 20S	No microorganism growth	No microorganism growth	No microorganism growth
Samples III OP Laminat	30W + 30S	No microorganism growth	No microorganism growth	No microorganism growth

PS-081

Sterile Supply Service Revolution Through Hospital Accreditation in Hong Kong

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Introduction: In Hong Kong, Australian Council on Healthcare Standards had conducted hospital accreditation exercise in Government hospitals since 2010. Gaps in Sterile Supply Service (SSS) of Tuen Mun Hospital (TMH) were identified. Management recognized there was an urgent need for upgrading SSS. With the service support from Pok Oi Hospital, CSSD TMH was evacuated for modernization in April 2011 and commissionned in May 2012.

Aim: To re-engineer SSS meeting with international standard of practice.

Materials and Methods:

- Installation of advanced decontamination machines with regular validation based on appropriate ISO
- Training & development fostering staff competency.
- Replacement of linen drapes and dressing items by disposable ones.
- Re-engineering SSS to focus on value-added service.
- Quality Management System, complying with ISO 13485, for governing CSSD operation.
- Development of tracking system for surgical instrument surveillance throughout reprocessing and usage cycle.
- Establishment of Governance Committee for governance and guidance.

Results:

- CSSD TMH had successfully undergone extensive renovation within one year without affecting clinical services.
- The SSS was complying with international standard of practice and fulfills hospital accreditation requirements.
- Reprocessing of surgical instruments and medical devices were centralized within one CSSD.
- Use of flash sterilization has been banned.
- The IAP room met with ISO 14644 class 8 clean room standard.
- The patient safety could be assured with quality SSS.

Conclusion: Hospital accreditation provided positive drive to enhance SSS. With the success of sterilization enhancement project in TMH, CSSD TMH acts as a model for SSS improvement of other CSSDs in order to advance the standard of decontamination practice.

Keywords: Sterilization project, quality management, hospital accreditation

PS-082

Specialized or Multi-Skilled CSD Staffing Model? Using Competency Training and Assessment in Transition

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Introduction: A CSD staff model with specialized staff appears to have proficient individuals, however, as a functional department, there are serious gaps such as coverage during absences, skill mix on shifts and equal work distribution. The Central Services Department at Sick Kids changed from such a model to close those gaps.

Aim: A two year plan was implemented to cross train all staff to gain overall efficiencies in reprocessing, reduce patient care risks and become a dynamic department. The Competency Training involved both Classroom learning and hands on Training based on the Competency Training Objectives. Staff took their Certification Testing (Written and Observational Assessments) once it had been determined by management that the candidate was properly prepared.

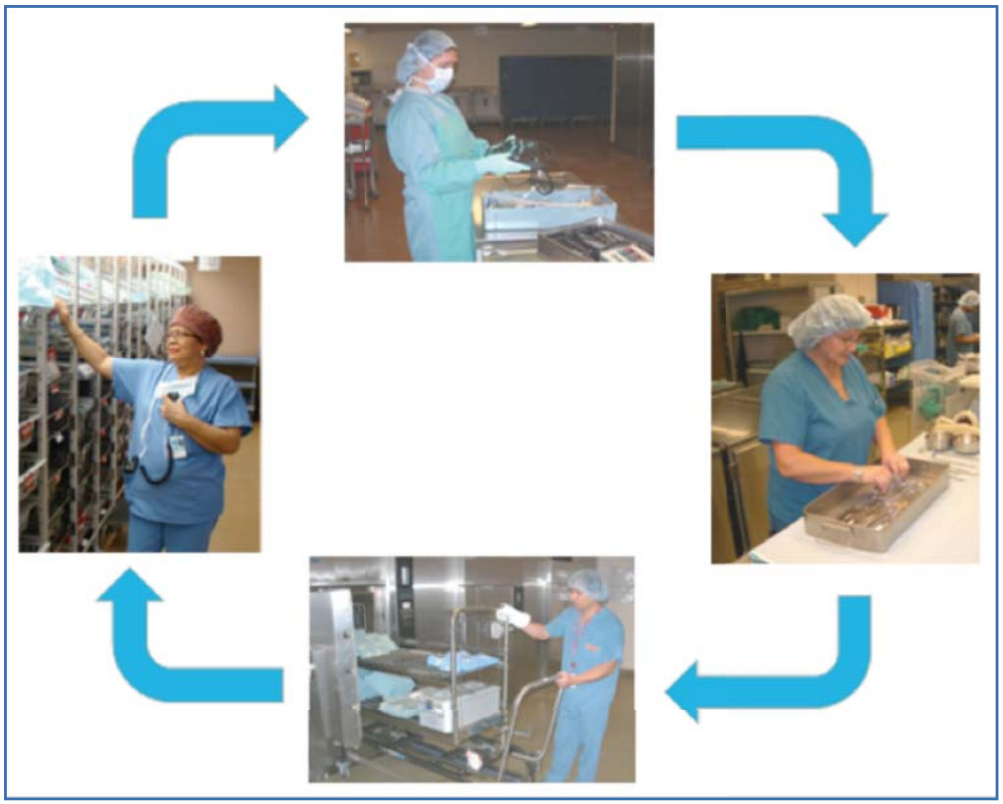
Materials and Methods: The original department staffing model had 45 staff (30 full-time and 15 part-time) with 3 different job titles, 10 different start times, fixed shifts and fixed permanent assignments. The plan involved changing to a single job title, a new single job description, only 4 start times and two week rotating assignments. Staff received a clear list of training objectives, a 5 module classroom training program, hands-on training and were assessed both by written and observational methods to show competency. The initiative was supported by Program Director, CSD Manager, Educator and Supervisors. The Medical Device Reprocessing Training and Assessment initiative tested each candidate's knowledge to ensure the candidate possessed the knowledge and skills required of the MDR to complete all departmental work activities at a high level.

Results: The new single job class involved monetary increase for staff, yielding incentive to be successful. Staff viewed this as a new challenge, resulting in motivation and job performance satisfaction. They became more marketable being multi functional. Team building and sharing of skills broke down many walls. Balancing work quality and quantity was initially a challenge, but the long run result was a well rounded staff better able to complete the day's work. With today's reality of budget constraints and limited resources, this was critical. Sick and vacation coverage could better be managed with the new model. Most importantly, risk to patient care was minimized by always having the required skill mix.

Conclusion: A cross-trained staff model is the best approach in today's large teaching hospital CSD. The benefits far outweigh those of any alternative model. With ongoing education, training and assessments, a dynamic and efficient CSD department can be developed. The journey Sick Kids Hospital chose was unique as it involved large scale training of 45 staff over a fixed period of time, while still performing daily activities. The outlook for the future is one of a dynamic, multi skilled group able to work as a team in providing a high level of medical device reprocessing for the hospital. The Intensive Cross Training Program is currently being scaled down to an i-Learn online program that staff can access. This system can allow for training and assessments to be administered electronically for purposes such as baseline and annual competency assessments.

Keywords: Competency, assessment, training

Celebrating our success



CSD reprocessing workflow

	12-Jun	26-Jun	10-Jul	24-Jul	0
FULL TIME STAFF					
ABAD, EMERITO (J.R.)	OR Instruments	OR Instruments	Decontam	Sterilization	S
BREVEGLIERI, ROBERT	OR Instruments	Sterilization	OR Instruments	OR Instruments	D
CARRUCO, DIEGO	Eyes & Scopes	OR Instruments	Eyes & Scopes	Eyes & Scopes	
DA SILVA, JEFF	Decontam	Flexible Scopes	Decontam	Decontam	
DEMARIA, JASON	OR Instruments	OR Instruments	OR Instruments	Sterilization	In
DI MARTINO, SAM	Casecarts	Sterilization	Sterilization	OR Instruments	C
DICKSON, SHEILA	OR Instruments	Sterilization	OR Instruments	OR Instruments	C
DIDENKO, NATALIA	Basins	OR Instruments	OR Instruments	OR Instruments	C
FIGUEREIDO, LUIS	OR Instruments	Casecarts	Casecarts	Casecarts	S
Francisco, Grace	Casecarts	Decontam	Casecarts	Decontam	In
GOLLOSHI, MIRANDA	OR Instruments	Casecarts	OR Instruments	OR Instruments	
Gouthro, Jo-anna	I.V. Pumps	Basins	Basins	Casecarts	In
KELLESIS, EILEEN	OR Instruments	OR Instruments	OR Instruments	OR Instruments	In
KHAN, BRIDGETTE	Casecarts	Casecarts	Sterilization	Casecarts	C

Page 1

Training schedule

PS-083

An Application Example for Improving the Quality Standards in Healthcare by Taking the Site Decontamination Procedures from Patient Clinics to the Central Sterilization Unit

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Aim: In healthcare facilities, Central Sterilization Unit (CSU) provides the most essential step in infection control and prevention. It is recommended to undertake the site decontamination procedures, which take place in different areas of the hospitals, by CSUs to meet the criteria for standardization and validity of this process. In this study, it was aimed to present an implementation of an application process by taking the peripheral decontamination procedures from patient clinics to CSU and also to assess this process according to the infection control guidelines and criteria for quality standards in healthcare.

Materials and Methods: In our study, the units of our hospital where decontamination procedures have been routinely performed and the list of materials to be disinfected (i.e. ambu, laryngoscope blades, bipap air flow sensors, oxygen flowmeters, suction devices, surgical continuous aspirators, etc.) were identified and recorded. In site decontamination procedures, intermediate/low and high level disinfection were performed through preparing chlorine solution and hydrogen peroxide-colloidal silver based disinfectant in appropriate dilutions and periods, respectively. Assessment was made in accordance with the procedures of precleaning, cleaning, enzymatic and disinfectant usage and the rules of employee safety. Site decontamination procedures in hospital units were also assessed whether they meet the standards necessary for appropriate infection control purposes or not. After determining the need for infrastructure and personnel to make these procedures in CSU, all the procedures were done in a single center since 01.01.2013 to date. Initially, all of the materials in the units were disinfected totally in CSU and afterwards disinfection process for materials used per patient was carried continuously. CSU instructions were applied for precleaning, cleaning, decontamination procedures and thermal disinfection procedure was performed by using a fully automated washer-disinfector device.

Results: In decontamination procedures carried out in patient clinics, application errors and also differences from one personnel to another in procedures of precleaning, preparation of solutions, usage of enzymatic and disinfectants (i.e. selection of appropriate material and disinfectant, concentration, application period, rinsing, storage before and after the application procedure, waste management), incompatibility in usage of protective equipments and irregularity in periodic health checkups were encountered. In units, infrastructural insufficiencies such as; ventilation, deionized water supply, separate decontamination area were determined. On the other hand, in CSU application, standardization of decontamination procedures, a decrease in errors due to employees were achieved and the process was recorded more precisely. Additionally, as the procedures were done by trained personnel and the protective equipment usage was followed by the responsible nurse of CSU, a better way of employee safety was provided.

Conclusion: It was concluded that centralizing the site decontamination procedures in the patient clinics in the CSU is beneficial with regards to standardization, cost-effectivity, labor intensity in clinics, and decrease in infection rates and also improves the standards regarding the patient and employee safety.

Keywords: Site decontamination, Central sterilization unit, quality standards

PS-084

Use of Lean Six Sigma in order to Reduce Costs with Replacement of Surgical Instruments

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Introduction: One of the major problems encountered in materials processing units is related to the high amount spent on the purchase of surgical instruments for replacement of broken damage. The Lean system is an initiative that seeks to eliminate waste by focusing on activities that add value to customers. The Six Sigma program's basic principle is based on the structured application of tools and statistical methods to increase the quality of service.

Aim: The experimental study was designed following each phase described by the Six Sigma tool aiming to reduce 50% of the amount spent on replacement surgical instrument for breaks and faults.

Materials and Methods: An increasing trend of spending on replacement surgical instrument for breakages and damages was identified in a large private institution, located in São Paulo, Brazil, based on the analysis of annual data from August 2011 to August 2012, where the value for replacement detached exceeded the amount spent for investment. This opportunity was assessed by the Department of Continuous Process Improvement of the institution that addressed the methodology of Lean and Six Sigma for its optimization. A multidisciplinary team was designated responsible for the project that was conducted with a schedule detailing all the tools to be addressed, and evaluated the key requirements of internal and external customers and the possible potential risks that could affect the results of this investigation. In the measurement phase, the process' flow was detailed mapped, from the use of instruments in the operating room until the complete reprocessing and reuse to identify potential causes that could influence display design. The Ishikawa diagram was applied for better visualization and clustering of potential causes. After this, the impact of each cause was rated and the effort to solve each cause was defined. A collection plan was created for the evaluation of the data and subsequent collection expenditures replacement surgical instrument by specialty, by category and unit cost. In the analysis phase, the focus was defined on instruments with higher added value. Several root causes were identified by using the tool "5 Whys" (dealt mainly with the use, handling and packaging of instruments and drew up an action plan covering all the opportunities for improvement identified and a contingency plan to avoid the lack of instrumental essential for surgical procedures in order to avoid loss of revenue for the institution In the implementation phase, set up deadlines and responsible for the proposed actions and optimization of the process.

Results: With the implementation of the actions there was a reduction of 58%.

Conclusion: Of the amount spent on replacement for breaks and this amount was intended for investment of new materials and technologies, increasing the inventory of the institution.

Keywords: Central Sterile Supply Department, Lean Six Sigma, reduce costs

PS-085

Validation of Sterilization Process in Central Sterilization Unit of Marmara University Hospital

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Introduction: Sterilization is an integral part of producing sterile medical devices in hospitals and can be measured indirectly with indicators (chemical or biological) or physically. The validation is the documented procedure for obtaining, recording, and interpreting the data required to establish that a process will consistently yield a result complying with predetermined specifications. To validate a steam sterilizer, it must be proven that the steam sterilization conditions are met throughout the sterilizer chamber and that the exposure times are realized in an effective and reproducible way.

Aim: In Central Sterilization Unit of Marmara University Hospital, 4 sterilizators (3 of them have 800 lt, 1 of them has 500 lt capacity) have been validated to follow quality criteria.

Materials and Methods: Validation was done consequatively: install qualification, operation qualification, performance qualification. A set of processes is validated containing the combination of the sterilizer, the process,the load, the loading pattern, and the wrapping. The number of sensors positions are chosen to determine of the most extreme temperatures (hottest and coldest positions) as well as the temperatures at the positions of the control sensors. The sensors were inserted into the sterilizer and were placed on pre-assessed positions in the chamber on the load (Figure 1). The sensors for temperature and pressure measurements were connected to a recorder and this was connected to a validation software. Air leakage test, steam penetration test, textile load, mixed load,instrument loads are documented.

Results and Conclusion: Using the EN285 and EN- ISO 17665 criteria, all of the four sterilizators was passed successfully through validation process (Figure 2). In many countries validation of steam sterilization processes is performed with indicators due to their simplicity. Routine control tests to monitor the process on a daily basis is done by using the indicators. However, physical validation yields more insight in the sterilization process and it is essential to assure sterile objects after a sterilization process. Validation provides documented evidence that, a sterile product is obtained with predetermined specifications and quality characteristics is obtained. Each sterilizers should be validated once in a yearly basis.

Acknowledgement: The authors thank to validation engineers of Bertaş Teknik ve Tıbbi Malzeme San. ve Tic. A.Ş.

Keywords: Validation, steam sterilizator

Figure 1. Sensor placement of steam sterilizators

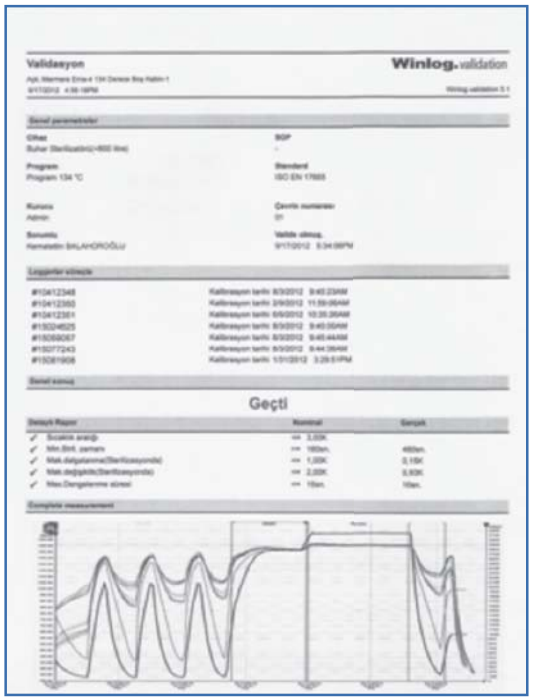

Figure 2. The result sheet of validation

PS-086

An Evaluation Study on the Effectiveness of Training Activities Provided by the Infection Control Committee

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Introduction: One of the main parameters of infection control programms provided by infection control committees is in-service training to hospital staff. Continuity of this training and supervision of practice in hospital control programmes are too important for prevention of nosocomial infection.

Aim: The aim of this study was to evaluate the effectiveness of the in-service training program applied to hospital staff.

Materials and Methods: The study was planned between December 2012 and February 2013. Three education programms included isolation precautions (group 1), medical waste management (group 2), hospital cleaning (group 3) were applied to the study group once a month. The same questionnaire was administered before and after training programms to 66 of 94 hospital staff participated education programms. The questionnaires were evaluated by the infectious disease specialist and infection control nurse. The highes possible score on the questionnaire was 100. The mean scores for the questionnaires applied before and after education programms were determined. For statistical analysis we used Wilcoxon T test.

Results: This study consists of 94 hospital staves, twenty nine of them are classified as Group 1 (30.8%), 21 are classified as group 2 (22.3%) and 44 of them are classified as group 3 (46.8%). Assesment of the knowledge level of participants are performed on 22 people in group 1, 15 people in group 2, 29 people in group 3. The median values of scores before and after education programs are showed in Table 1. There is significant difference in scores between group 1 and 2, before and after education programs, but not in group 3.

Conclusion: In this study, three education programs that were provided by the infection control committee are evaluated. We determined that the programs about isolation precautions and medical waste management were effective but the program about hospital cleaning was not. As a result of this study, the continuity of training programs are very important in terms of their effectivity.

Keywords: Infection control committee, in-service training

Table 1. The median values of scores before and after education programs

	Score before education Median (min-max)	Score after education Median (min-max)	p
Group 1	50.0 (10.0-80.0)	65.0 (50.0-100.0)	0.001
Group 2	80.0 (60.0-100.0)	80.0 (80.0-100.0)	0.007
Group 3	60.0 (0.0-100.0)	60.0 (20.0-100.0)	0.242

PS-087

Accidents with Biological Materials in Professionals at the Sterilized Material Central: Experience Report

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Introduction: Exposure to biological accidents with needlesticks represents a great risk to the health workers exposed in the area of the purge at the Sterilized Material Central, where handling contaminated items are frequently. The use of Personal Protective Equipment is an essential measure to minimize occupational hazards and contribute to safe care. Professionals Sterilized Material Central even making use of Personal Protective Equipment is vulnerable due to incorrect disposal of piercing and cutting inside the boxes surgical. Accordingly, it moved to analyze the instances found within the materials sent to purge.

Objective: Have no perforating cutting accidents in Sterilized Material Central.

Materials and Methods: The professionals were instructed verbally by shifts, in locus, to manipulate carefully the surgical materials, wear Personal Protective Equipment properly. Any nonconformity found in surgical boxes at purge area, the nurse was notified. Established a partnership with Specialized Engineering and Medicine and Nursing Management, so that every time have the perforating cutting accident, the sector would be notified by Sterilized Material Central, detailing up time, type of surgical box, type of perforating cutting. Meetings were held with the sectors involved; partnership with Specialized Engineering and Medicine and monthly monitoring of accident rates in hospital and Sterilized Material Central.

Results: In 2010 were registered in SMC 41 accidents (14.9%); in 2011, 4 accidents (6.06%); in 2012, 2 accidents (4.25%).

Conclusion: We conclude that the partnership with specialized engineering and medicine was satisfactory, however, educational programs must be complemented with the aim of training and professionals awareness, to broadening the discussion about perforating cutting accidents.

Keywords: Nursing, occupational hazards, perforating cutting accidents

PS-088

Empowerment of Nurses in the Management of Central Sterilized Material in Preparation of Surgical Boxes: Warranty of Safety to Patient Care-Report of Experience

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Introduction: Central Sterilization Material is a technical support unit responsible for receiving, cleaning, disinfection, preparation, sterilization, storage, distribution and control of materials. The RDC Directive number 307 of 14 November 2002, emphasizes that the purpose of this unit is aimed at providing health products properly processed, thus providing conditions for direct care and health care. The processing of articles in health care is a complex activity that has as main objective to avoid adverse events related to its use. The Central Sterilization Material nurse managers participating in the planning and development of routines to control the processes of preparation the surgical boxes. Interest in the subject arose from experience in working in the unit as well as the understanding of the role of nurses in preparation surgical boxes, seeking safety and efficiency of this process.

Objective: To report our experience of nurses Central Sterilization Material to preparation of surgical boxes and Identify occurrences relating to the preparation of surgical boxes.

Materials and Methods: This is an experience report, which aims to share the process of managing nurses Central Sterilization Material at the State Hospital Sumaré-Brazil forward to preparing surgical boxes. Describes the practice of actions that aim to mitigate occurrences with this preparation, these unconformity that may compromise safe patient care.

Results: The preparation of surgical instruments is a critical step in ensuring quality and safety in the sterilization process. This practice occurs in clean area separated from the decontamination area. At that stage the instruments are carefully screened for their cleanliness and functionality. Any changes that may compromise its use is thoroughly examined. Much of instruments that are used in surgeries are prepared and packed in boxes surgery. Each surgical box is accompanied by list on, which that include printed name of each instrument. These lists are intended to guide the assembly of the boxes are fixed externally surgical to have knowledge to surgical team of instruments and that together constitute. Complications related to the surgical preparation of the boxes are accounted for in order to generate proposals for improvement regarding the process. The data are used to define subsequent trainings, occurrences are related to more frequent assemblies surgical boxes with missing parts and identifies incorrect. After evaluation these indices was adopted some practices. Were assembled books, which are with pictures of instruments that assist the assembly and preparation of surgical boxes. Trainings and awareness work with the team importance of correct assembly of surgical boxes were also conducted. These trainings happened in order to reinforce safe practices and contextualize the impact of these practice in patient care.

Conclusion: Through the data collected could be established and directed assembly of training books. Actions adopted favored greater security to the employee during the preparation of surgical boxes. It was concluded that the nurse's role is crucial as managing agent and educator, forming opinions, aggregating knowledge to new practices, which are based on principles of quality service with a focus on continuous improvement in safety guided.

Keywords: Surgical boxes, central sterilization material, nursing

PS-089

Management in Preparation at Surgical Kits: Guarantee of Safety in Patient Care

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Introduction: The state government of São Paulo - Brazil started to implement new model of medical care in 2007 in all regions of the State of São Paulo. Inaugurated in late 2008 the Medical Specialties Ambulatory at Santa Bárbara D'Oeste city, that offers the population consultations, surgery and exams with various specialties. The administration was in charge of the State Hospital Sumaré and the Sterilized Material Central responsible for this institution the whole process of cleaning, preparation, sterilization, preparation and transport of surgical kits for Medical Specialties Ambulatory.

Objective: To report the experience of producing and distributing surgical kits for Medical Specialties Ambulatory.

Materials and Methods: The information about surgical procedures at the ambulatory was passed to Sterilized Material Central nurses by phone about the spent, the number of surgeries daily, the amount of surgical boxes and loose items to be sent materials were placed in separate plastic bags by surgical boxes and outfits sterile. Initially, had difficulty separating the materials for each surgery and per day. Faced with this problem was detected the need to find suitable packaging, as well as a document that described the necessary materials.

Results: Nurses in Medical Specialties Ambulatory, along with the medical staff forwarded some types of materials used for certain surgeries. From there, the nurses of Sterilized Material Central developed a spreadsheet that better would meet this process daily work, called map surgical checklist, containing the name of the patient to undergo surgery, specific materials to be used, the name of the employee Sterilized Material Central responsible for the preparation of kits and Medical Specialties Ambulatory professional name that will receive the kits. The surgical kits are mounted in plastic boxes that receive seal, checklist surgical and disposed on side of the box facilitating the visualization of the patient's name and surgery to be performed. The seal is broken by circulating the room in the Medical Specialties Ambulatory. The surgical kits are sent in car clean twice a day.

Conclusion: We conclude this work by it is a innovative iniciative and effective that requires continuous improvement. Experience presented in this report has brought greater security in the preparation of surgical kits, lower rate of occurrences relating to materials and better time optimization.

Keywords: Hospital distribution systems, materials management, sterilization

PS-090

Are the Different Actors and Instrumentation Users Satisfied with the Reassembled Boxes Realised by Sterilization Auxiliary Nurse?

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Introduction: The reassembling of operating trays carried by operating room nurse (IBODE) was transferred on 1st January 2012 to sterilization auxiliary nurses (AS). This service is part of the desire to control the sterilization process at input and output streams.

Aim: The aim is to gather the client's opinion since this activity has been transferred to the sterilization service.

Materials and Methods: A satisfaction survey was conducted using three specific questionnaires to Surgeons, IBODE and AS sterilization.

Results: 6 Surgeons, 7 IBODE, 7 AS of sterilization were questioned.

100% of surgeons are satisfied with the reassembling conformity by sterilization AS and testify of an organisation improvement resulting in better availability of IBODE for the operating theatre.

85% of IBODE are satisfied with the recomposition and availability AS of sterilization.

Saving time is valued for 85% for them.

100% AS sterilization consider varied work better distributed throughout the day, but only 43% are satisfied with the block's availability.

Conclusion: In view of this satisfaction survey, the internalization of the recomposition appears positive for all clients. However, some weak points need improvements such as communication between sterilization and block or the feeling of skill loss by IBODE.

Keywords: Satisfaction survey

PS-091

The Advantages of Using a Software Documentation Programme in Central Sterilization Unit

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Aim: Central Sterilization unit of Marmara University Hospital serves 20 surgical theatres and nearly 1500 surgical procedures are performed in a mounthly basis. The work flow in the unit as follows: equipments are washed in thermal disinfectors (n= 4) and ultrasonic wasching chambers (n= 3), packed in clean area,autoclaved (in 4 autoclaves), are send to sterile store and distributed to the hospital (Figure 1). Eighteen staff are served in the unit and the service lasts 24 hours for all week. Documentation of those steps throughout the whole procedure is essential and is an obliged by Turkish health authorities. We decided to set a computer based documentation system in our unit in order to follow quality criteria more strictly.

Materials and Methods: The system contains a programme terminal, screens, barcode readers and printers. All the surgical equipments are coded by laser matrix and the sets are described as indicated. The work progress is followed by the system and all data is recorded (Figure 2, Figure 3). The administer of the unit can follow the staff work load easily by using the sytem since all the users should register during the day. All the packaged materials are labelled which can be read by barcode readers. A label contains the date of package, the expiry date, the person who does packaging and the unit where the set belongs. Advantages of the systems are:

1. The speed of the process is increased. Assembly and packaging of a surgical set requires expertise and a new beginner can finish this step within 30 minutes, at least. However in this sytem expertise is not essential and a set could be prepared and packaged within minutes.
2. If an instrument is missing it is possible to create an early warning system
3. The staff workload can be followed and a feedback could be given immediately to improve the quality.
4. Expiry dates of the sterile supplies is followed daily by unit manager by using the programme and expired sets are send for resterilization.

Conclusion: As conclusion, we strongly advise to insert a soft-ware based documentation programme in CSU. The programme will speed up the process, is cost effective since it prevents instrument losses, all the steps are recorded and stored for the future to follow up the quality criteria.

Keywords: Documentation programme, quality management

Figure 1. The work flow in Central Sterilization Unit

Figure 2. Coding the surgical instrument

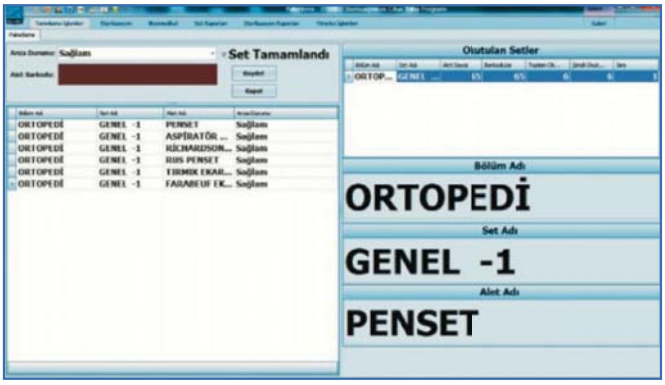

Figure 3. The screen of the software

PS-092

Evaluation of Vocational Education by Cleaning Staff in the State Hospital, Burdur, 2012

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Introduction: The most important element of the quality of health care is well-trained manpower and education is among the important factors that play a role in this quality. A right cleaned hospital gives reliable and regular service away from the risk of infection. Cleaning staff are among the main factors that affect the cleanliness of hospital.

Objective: To evaluate the effect of the trainings which have the aim of teaching the minimum knowledge, skills, attitudes and behaviors to reduce hospital infections and needed in the framework of professional standards given to the cleaning staff working with the purchase of services is aimed in this study.

Materials and Methods: The aim and the method of educational project are explained to 116 cleaning staff working in Burdur State Hospital at the meeting in June 2012 and group of participants consisted of 22 primary school graduated persons who wanted to attend the training on a voluntary basis is created. In this study, in order to determine the effectiveness of the cleaning staff training, control group of 22 people who are also primary school graduates and have not participated in the educational project is created. Written exam consisting of the same questions is performed to groups with and without training and two groups' averages were compared. At the same time, to assess the efficacy of education, the same exam is performed 315 days after the end of training to the people with education. The averages were compared with the non-parametric analysis as the Mann-Whitney U test used for independent samples and Wilcoxon Signed Rank test used for paired samples.

Results: 72.7% were women and 27.3% were male in the study group (n= 44). 62.5% of women and 16.7% of men participated in the training project. Participants in the study were most often in the 36 to 40 age group (31.8%). The mean of age was 38.4 ± 5.7 years and working time was 86.2 ± 50.3 months. There was no significant difference between the participation in the training project and marital status and age ($p > 0.05$).

86.4% of participants (n= 19) who have received training and 68.2% of participants (n= 15) who have not received training were successful in the written examination. There was a statistically significant difference between the exam means of participants with and without training ($p = 0.001$).

The two exams consisting of the same questions have been made 75 and 315 days after the end of the training to the participants who have been received training and the first exam's average was 77.64 ± 12.43 while the second exam's average was 85.81 ± 10.52 respectively. There was a statistically very significant difference between the means of the two exams ($p = 0.000$).

Conclusion: A training to the cleaning staff due to lack of information on the diseases and the infections is recommended prior to work and during service. The findings of this study that we have done also reveals the importance of education. Professionally trained and knowledgeable health staff increase the level of trust, work quality, patient and employee safety.

Keywords: Cleaning staff, vocational education, Burdur

PS-093

Accreditation Experience in Central Sterilization Unit

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Introduction: At the end of 20th century hospitals were very influenced by technological and scientific developments and quality consciousness is increased worldwide. Institutions needed to renew themselves on this way. Quality improvement and development in health care; it is possible by understanding quality culture in the institution and accepting this culture by health care workers. Accreditation studies are the impulsive force in the institutions. Central sterilization unit (CSU) designs, safe equipments use, adequate and educated staffs, composing their workflow, set of control systems are very important in qualitative and safe health care service.

Objective: Anadolu Medical Center, in the content of accreditation and quality improvement studies, arrange CSU processes by evidence based implementations and therefore aim to have a safe patient, equipment and workers relationships.

Materials and Methods: Anadolu Medical Center is accrediated by JCI (Joint Commission International) in 2007 and reaccrediated in 2010 and 2013, therefore updated its sterilization unit processes by these standards.

Implementation of accredidation standards in CSU:

I. Quality improvement and Patient Safety (QPS) studies
- Composing procedures and updating,
- Internal audit and visiting clinical areas,
- Continuous improvement of the processes by proactive studies,

II. Prevention and Control of Infections (PCI) studies
- Planning CSU processes,
- Use of safe equipments,
- Validations of machines,
- Evaluate CSU indicators results in the commitee meetings

III. Facility Management and Safety (FMS) studies
- Preparing strategic plans and budget,
- Preparing for the emergency state and disasters,
- Evaluating risks,
- Disasters drills,
- Safe discard of the wastes,
- Inventory and maintenance of the equipments,

IV. Providing staff Qualifications and Eductions (SQE)
- Job descriptions,
- Orientation programs,
- Evaluations of staffs' competency,
- In-service training programs,

V. Management of Communication and Information (MCI) activity
- Effective communication,
- Recording and documentations,
- Information saftey and confidence

Conclusion: Disinfections and sterilizations of all the equipments used in the institution are processes by the standards in CSU, all are documented and safely transferred to the units. Our staffs are working in an area where cccupational safety is important and they are supported by eductions and self improvements opportunities. Implementions are being continous by adding staffs in quality improvement studies and by this way constructing a culture and job satisfaction come after. By the effective communication and proactive approach, risks are prevented and improvement processes are provided.

Keywords: Accreditation

Sterile storage

Surgical instrument tracking system

PS-094

Reduction of Damages of Flexible Ureteroscopes to Meet Urologic Procedures

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Introduction: Hospitals need to purchase and manage a number of high-tech equipment that meets the demand of procedures properly. A significant challenge faced by hospitals that work with endourologic procedures is to provide flexing ureteroscopes in all procedures. These equipments are extremely fragile, and breaks are most often beyond repair and the broken ureteroscope needs to be replaced by a new one. The replacement of broken ureteroscope not only spent a high amount of money but also may cause the unavailability of the equipment for a scheduled procedure.

Aim: To minimize chances of unavailability of equipment (flexible ureteroscope) in surgical cases that had indicated use and cut spending on replacement ureteroscopes flexible damaged and beyond repair, maintaining excellence in care provided to the patient.

Materials and Methods: This is an exploratory study developed through action research, since the authors report a case study, in which there was participation in implementation. The mapping of the areas involved in the process of using ureteroscopes flexible; diagnosed the main causes of damage to the equipment analyzed, after the analysis of the process involving the use of flexible ureteroscopes and existing problem in this context, has drawn up a plan of action for improvement in each issue raised, the actions implemented in the period of June/2012 to June/2013, evaluated later.

Results: The proposed plan has been implemented and actions are effective. Were diagnosed three main causes of damage to the equipment flexible ureteroscopy (improper use of laser fibers, handling and packaging equipment, and incorrect processing of inadequate cleaning and sterilization). Able to partner with companies supplying ureteroscopes flexible to meet the demand according to the surgical schedule, held theoretical training with practical 100% of employees, establishing the practice in the operating room to check the functionality of the ureteroscope before and just after the procedure by a professional CSSD. With the actions taken there was a reduction of 100% in the number of injuries in ureteroscopes flexible, therefore there were no acquisition expenses ureteroscopes flexible because since the implementation of the action plan there was no need for replacement.

Conclusion: The actions were effective in addressing the problem observed, the change maintained the quality and safety of the service provided to the patient. This study highlights the need for constant review of processes performed within a hospital, focusing on excellence of service quality along with the financial planning of the institution in question.

Keywords: Flexible ureteroscopes, damage, quality

PS-095

Strategy of Continuing Education as a Tool of Quality in CSSD

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Introduction: The continuing education is an important quality tool employed in human resource management of the Central Sterile Services Department (CSSD) due to the specificity and demand of this important department within the hospital context. CSSD's managers require improving their human resources developing technical and scientific skills inherent to the functions performed by the employees. It is required a specific educational support aids to professionals working in this area promoting a productive work environment, high performance, and motivated employees.

Aim: To develop a customized program of continuing education specifically for employees who work in the CSSD.

Materials and Methods: This is a study of reporting experience (from January 2012 to January 2013) in a CSSD of a large private hospital in São Paulo, Brazil, which has 87 employees led by a nurse coordinator. A questionnaire for employees was applied addressing issues of preference, ease of absorption of these issues, suitability for the training and satisfaction in carrying out the activities. After mapping and grouping of activities, results were directed to a nurse that was responsible for monitoring the development of an annual schedule of training. The definition of the training topics were defined by the employees after the survey of most frequent errors occurred during the process and analysis of records of incidents (e.g. instrumental box mounted incomplete; misregistration traceability of the sterilization process; dirt in instrumental already sterilized). The methodology applied for each type of training was defined by behavioral and observational study of employees during the workday and consulting with experts of products and equipment, ranging from training theoretical conceptual, theoretical and practical training and case studies targeted group (workshops). To assess the effectiveness of implemented actions and strategic training division, parameters related to reducing the incidence of errors in the process and to the survey of employee's satisfaction (through a questionnaire) was evaluated.

Results: The plan proposed and implemented actions has been effective. Procedural errors decreased by 70%. As a strategy for training, two annual workshops and three interdisciplinary monthly training were constituted. 95% of sector employees felt valued when they receive training in the workplace, 92.5% had a preference for methods of theoretical and practical training, 56% said that the amount of training offered is sufficient, 92% had no difficulty in assimilating the content taught in training, 94% were happy with the activities involved in the sector, 96% of employees could observe the improvement of their own performance after participating in training.

Conclusion: We were able to meet the need for human resource development of CSSD by observing the real impact on the quality of the service performed. The actions were determining factors for paradigms breaks, and reached the proposed goal. Strategic planning of trainings provided higher quality and process safety, skill development, self-confidence, professional growth and motivational encouragement to employees.

Keywords: Continuing education, central sterile services department, training

PS-096

Do We Wash Our Hands with the Right Method?

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Introduction: The cheapest and most effective method of preventing hospital infections is to provide the habit of hand hygiene for healthcare workers. Adaptation rates are observed periodically according to "Hand Hygiene Indications Rule of 5" in our hospital. During the observations, situations like only hand washing, hand scrubbing or doing neither of the are assessed.

Aim: It is proved that observations according to the "Hand Hygiene Indications Rule of 5"are not enough. Observing the application of hand hygiene practice with a right method is necessary too.

Materials and Methods: Our studies started in January 2012 and continued for one year. During that period 142 nurses, 89 doctors, 62 porter/cleaning staff and 60 other healt care staff a total of 353 people were observed.

Results: In 2012, hand hygiene trainings were provided to nurses (440 mins), doctors (80 mins), to porter/cleaning staff (520 mins) and to other health care staff (240 mins) in 23 period.

At the end of one-year observation period, the adaptation rates of hand hygiene with hand washing and hand rubbing;

- Before patient contact: 78% (79% nurse, 68% doctor, 76% porter/cleaning staff, 87% other health care staff).
- Before aseptic procedures: 87% (95% nurse, 79% doctor).
- After contact to body fluids: 100% (100% nurse, 100% doctor, 100% porter/cleaning staff, 100% other health care staff).
- After patient contact: 86% (89% nurse, 81% doctor, 93% porter/cleaning staff, 82% other health care staff).
- After environment contact: 77% (88% nurse, 68% doctor, 77% porter/cleaning staff, 75% other health care staff).

Results are shown in Table 1.

Accuracy rates of hand hygiene applications as per professional categories; 77% nurse, 65% doctor, 70% porter/cleaning staff, 61% other health care staff and the avarage rate is 61%. It is shown in Table 2.

Conclusion: Hand hygiene application rate of 2012 is 86%, hand hygiene rate with right method is 62%. The number of people who took hand hygiene education with slide/video presentation are 321. The number of people who attended applied hand hygiene trainingin washbasin are 245.

Consequently, compliance rates were observed to increase with applied training. The next trainings are going to focus on applied hand hygiene training. In the past years, it was observed that if "Hand Hygiene Indications Rule of 5" is applied or not, and the accuracy of the application wasn't observed.

At the end of this study, it has been understood that observing application performance is not enough. In addition, The right application performance has to be observed.

Keywords: Hand hygiene, hand wash, observation

Table 1. Hand hygiene compliance rates by occupational category in 2012 (%)

	Prior to contact with the patient			Before aseptic process			After contact with body fluids			After contact with the patient			After contact to the environment		
Occupational category	Rub	Wash	No	Rub	Wash	No	Rub	Wash	No	Rub	Wash	No	Rub	Wash	No
Nurse	46%	33%	21%	25%	70%	5%	2%	98%	0	38%	51%	11%	55%	33%	12%
Doctor	43%	25%	32%	23%	56%	21%	20%	80%	0	42%	39%	19%	47%	21%	32%
Porter staff and cleaning staff	59%	17%	24%	--	--	--	0	100%	0	33%	60%	7%	43%	34%	23%
Other health attendant	47%	40%	13%	--	--	--	0	100%	0	45%	37%	18%	43%	32%	25%
Total	49%	29%	22%	24%	63%	13%	6%	94%	0	39%	47%	14%	47%	30%	23%

Table 2. Hand hygiene practices accuracy rates by occupational category in 2012 (%)

				All Applications Rates			
Occupational category	Slide/video presentation, the number of people trained in	Practical training area number of people	The number of observation	Correct practice number	The correct practice rate	Wrong practice number	Wrong practice rate
Nurse	110	100	142	300	77%	90	23%
Doctor	50	10	89	132	40%	198	60%
Porter staff and cleaning staff	93	88	62	280	70%	118	30%
Other health attendant	68	47	60	200	61%	129	39%
Total	321	245	353	912	62%	535	38%

All application rates.

PS-097

Investigation of the Association Between Hand-Washing Technique with its Duration and Knowingly Performed Hand Hygiene Observations

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Objective: The hospital-acquired infections are leading complications that threaten patient safety. The worldwide studies have shown that hand hygiene is the most important instrument for control and prevention of healthcare-associated infections. Hand hygiene observations should involve not only performing hand-washing but also observing technique and duration. Hand-washing quality of the staff employed in the ICU of the Bagcilar TRH was assessed by observation trials performed unknowingly and consecutively knowingly.

Materials and Methods: This observation was performed regarding the guideline "Multimodal Hand Hygiene Improvement Strategy" issued by World Health Organization in 2007. It was recorded whether healthcare employeee behave in compliance with hand-washing techniques according to the guideline. The situations requiring hand hygiene are identified as following:

1. Prior to contact with patient,
2. Prior to aseptic procedures,
3. After exposure risk to body fluids,
4. After contact with patient,
5. After contact with patient companions.

Hygienic hand-washing technique was accepted as wetting hands with warm water and washing forwards, backwards, areas between fingers and thumbs, palms and wrists using 3-5 mL of preferred soap, rinsing hands well under running warm water and drying with paper towels. Whole procedure duration was specified as 40-60 seconds.

Results: In the study; 28 actions (3 doctors, 21 nurses, 4 cleaning staff) were observed during the unknowingly observation. Of the observed actions; 29% were performed prior to contact with patient. Twenty-nine percent was performed using proper technique and these actions using proper technique were performed by the nurses. Mean hand-washing duration was detected 19 seconds. Of the employees; 43% washed their hands for 15 seconds long. Mean hand-washing durations were found 20, 19 and 18 seconds in the doctors, nurses and cleaning staff, respectively. In the study; 58 actions (10 doctors, 31 nurses, 17 cleaning staff) were observed during the knowingly observation. All observed actions were performed after contact with patient or patient's companions. Mean rate of using proper technique was 60%. Mean hand-washing duration was found 26 seconds during knowingly observation. Forty-five % of the patients washed hands for 30-60 seconds. Using proper hand-washing technique was found in 40%, 74% and 47% of the doctors, nurses and cleaning staff, respectively. Mean hand-washing durations using proper technique were found 37, 37 and 33 seconds in the doctors, nurses and cleaning staff, respectively.

Conclusion: In this study; properness degree of hand hygiene technique and hand-washing durations increased in the informed employees about observation. It has been concluded that employees are familiar with proper technique and duration however they didn't yet internalize this issue and the trials should be focused to create awareness about the fact that effective hospital hygiene can be provided if only proper washing techniques are performed for adequate durations in each washing procedure.

Keywords: Hand hygiene, hand hygiene technique, hand washing duration

PS-098

Risk Assessment and Risk Reduction Efforts in Sterilization Unit of an Educational and Research Hospital

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Introduction and Aim: Risk assessment is a systematic approach to arrange and analyze all kinds of scientific information and knowledge about potentially dangerous substances. Simply, it is the risk analysis containing main concepts such as the problem formulation, hazard assessment, risk identification and analysis of the effects of exposure to dangerous substances. Purpose of this study is to present risk assessment and risk reduction efforts in a educational and research hospital to the employees of sterilization. Sterilization process, which is an important step in the provision of health care services, is one of the top processes that has various risks for both patients and employees.

Materials and Methods: The activities/processes which are taken into account in defining the hazards, are mapped to the boundaries as much as possible and tried to be defined clearly. Activities repeated throughout the process or make up most of these activities (example: electricity usage, manuel removal, care, repair etc.) are defined as general activities.

As much as possible, not to be based on the subjective judgements of risk assessment, available accident/incident statistics and the knowledge and experience of the technical personnel previously engaged in similar work are utilized. Before the start of activities, as much as possible, operating procedure for the work to be done has been prepared. Control activities,taking into account the priority queue, planned for assessed risks. For the planning of foreseen control activities to eliminate or reduce the risks, the following order was used:

- Elimination (elimination of risk causing danger)
- Substitution (replace high-risk materials, machinery, etc. with the less risky ones)
- Reduction (number of employees, working time, number, quantity, etc.).
- Control (design, construction methods, hardware, equipment, work permit, safe working methods, training, workplace layout, safety measures)
- Personal protection (personal protective use)

Results and Conclusion: All the studies and results performed defined as "Hazard Identification and Risk Assessment" were announced to all personnel working in the unit by ISG committe, and their views were collected. The personnel involved, was informed by the responsible parties about the possible risks and control activities in the Monthly meetings. ''Hazard Identification and Risk Assessment form" was prepared and all of this information was announced to all personnel working in the unit.

Keywords: Sterilization process, risk analysis, hazard assessment


TEHLİKE TANIMLAMA VE RİSK DEĞERLENDİRME FORMU

Hazard identification and risk assessment form

PS-099

The Effect of Illustrated Posters in Reducing Sharp Instrument Injuries

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Introduction: Healthcare workers are at high risk for either injury by contaminated sharp instruments or direct contact with infected blood and body fluids during the performance of their duties. Since many of the sharp instruments are disposable, injuries by them are decreased. However, it still remains a significiant problem.

Aim: In this intervention study we aimed to decrease injuries by sharp instruments and to increase knowledge and awareness of healthcare workers.

Materials and Methods: This intervention study was conducted in Sakarya University Faculty of Medicine between August 2011 and August 2013. Illustrated posters about preventing sharp instrument injuries and what to do after penetrating injuries were hanged in all departments and fields where the Infectious Control Commitee deems appropriate in August 2012. One-year period prior to hanging posters was considered as the pre-intervention period and one year after that date were considered as the post-intervention period.

Results: The number of sharp instrument injuries reported to Infection Control Commitee in the pre-intervention period and in the post-intervention period was similar (p= 0.3). While the number of sharp instrument injury notifications was increased in doctors and trainee nurses at the post-intervention period, it was decreased by nurses, and remained the same in auxiliary healthcare personel (Table 1).

Conclusion: Intervention with illustrated posters alone do not reduce sharp instrument exposures. Different intervention combinations such as continuous education and safety syringes are neeed to increase the knowledge, awareness and protection of health care professionals.

Keywords: Intervention, sharp instrument injury, illustrated poster

Table 1. The number of sharp instrument injuries in pre-intervention and post-intervention period among personnel

	Sharp instrument injuries in pre-intervention period n (%)	Sharp instrument injuries in post-intervention period n (%)	p
Doctor	2 (0.7)	5 (1.14)	0.7
Nurse	26 (6.1)	16 (3.6)	0.08
Trainee nurse	9 (5.6)	14 (8.8)	0.2
Auxiliary personnel	10 (5.4)	11 (5.4)	0.8
Total	47 (4.5)	46 (3.6)	0.3

PS-100

The Distribution of Surgical Infections and Causes Identified in Akdeniz University

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Objective: In this work, surgical site infections and factor distributions developing in patients after operations due to various causes in Akdeniz University Hospital between 01.01.2012 and 01.08.2013.

Materials and Methods: Patients were followed by prospective, patient-based, laboratory-based, and procedure specified surveillance of surgical site methods. Several operations were choosen as ventricular shunt, craniotomy, thoracic surgery, coronary artery by-pass surgery, transplantation, open fracture fixation. Patients of Surgical site infection were observed by using standard forms and data were registered into Ministry of Health National Nosocomial Infections Surveillance database. Statistical results were obtained from system after calculations and results were evaluated by data of national and international results.

Results: CAE development was observed in our hospital after 73 operations (3.67%) of overall 1984 between 01.01.2012 and 01.08.2013. In all infections, 3 surface CAE (4.11%), 19 deep incisional CAE (26.03%), and 51 organ space CAE (69.86%) was determined. By the type of surgery, CAE development was observed in 6 of 191 coronary artery by-pass surgery (3.14%), 34 of 441 craniotomies (7.71%), 12 of 136 ventricular shunt surgery (8.82%), 12 of 366 open fracture fixation (3.28%), 8 of 361 thoracic surgery (2.22%), 28 of 462 organ transplantation (6.06%). The distribution of the factors of surgical site infections were the followings; *Acinetobacter* spp. 12 (16.43%), *Escherichia coli* 12 (16.43%), *Enterococcus* spp. 10 (13.63%), *Klebsiella* spp. 9 (12.32%), *Pseudomonas* spp. 8 (10.95%), *Enterobacter* spp. 7 (9.58%). It is observed that the surgical prophylaxis applications were appropriately performed on 210 patients (10.45%) and inappropriately performed on 1774 patients (89.55%). Major cause of inappropriate profaksinin was determined as the continuum use of prophylactic antibiotics in the postoperative period.

Conclusion: In this work, most frequent CAE was determined in organ space. Reasons of rarely observation of Superficial CAE are the ambulatory monitoring of patients and not to apply surveillance after discharge. The most frequent factors are determined as the gram-negative bacilli. It is also observed that the inappropriate applications on surgical prophylaxis and continuum use of prophylactic antibiotics in the postoperative period were the main reasons of infections. Developments of protocols on treatment of patients and inappropriate use of surgical prophylaxis applications should be supported in order to prevent surgical site infections during preoperative, intraoperative and postoperative periods.

Keywords: Surveillance, surgical

PS-101

The Investigation of Social and Psychological Effects of Isolation Applications on Patients and Their Relatives

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Objective: This work is composed to evaluate psychological effects on patients and their relatives of several isolation methods such as multi drug resistive microorganism isolation, contact isolation, respiratory isolation and droplet isolation which are required for propagated and colonized microorganisms detected in samples from patients on treatment at Akdeniz University Hospital between 01.01.2013 and 01.06.2013.

Materials and Methods: In this descriptive study, face to face interview is used to obtain ideas and feelings of patients and relatives about isolation applications. In this work, 150 in-dividuals consisting of 100 patients and 50 companions were attended. Additionally, statisti-cal analysis was performed by PASW Statistics (PASW Statistics 18; IBM, Chicago, Ill) and variable relations were analysed by chi-square testing.

Results: Required isolation precaution types are determined as respiratory isolation in 34 patients (22.8%), droplet isolation in 9 patients (6%), contact isolation in 78 patients (52%), and multi-drug resistive microorganism isolation in 29 patients (19.5%). When the question of "adequacy of disclosure made by health care providers about the rules of isolation" is asked to attendees, 88% (132 individuals) of them answered as it is partially enough or not. When the question of "failing to make changes to the implementation of measures in isolation behaviour of health personnel" is asked to attendees, 48.3% (73 individuals) completely agreed and 36% (55 individuals) partially agreed. Attendees of 40.9% (61 individuals) also stated that the health care were also afraid of possibility of being infected. Attendees of 63.7% (95 individuals) also stated that doctors were the major non-observant by 63.7% (95 individuals) of isolation procedures. When the question of "What are you doing when the health cares do not obey the rules on isolation procedure" is asked to attendees, 14.21% (21 individuals) were forwarded to responsible nurse 21'i (14.21%) and 70.4% (69 individuals) were doing nothing by considering the possibility of treatment interruption. Also, 33.6% (46 individuals) of attendees were stated that number of single room should be increased to apply isolation precautions correctly. It is also determined that behaviour change on health care were mainly observed in multi-drug resistive microorganism isolation type (p= 0.003). Similarly, same isolation type is determined at attendees having idea of treatment interruption (p= 0.0001). Attendees of 62.5% (93 individuals) have stated that their need of psychological support. However, 10% of patients and 8% of companions stated that they got support. It is observed that attendees need psychological support are mainly the ones being applied multi-drug resistive microorganism isolations (p= 0.0001).

Conclusion: In this work, it is observed that physical and emotional preparations of patients before isolations play important role. At initial stage of isolation applications, explanation of procedure, reasons of isolation measures, precautions during visiting of patients, bro chures about isolation rules are determined as the most important factors during whole process. Additionally, education of patients, their relatives, health care, awareness of all and improvement of physical conditions also have major impacts on isolations. Hospital managers should have precision about isolation, consider precautions, and determine long term strategies.

Keywords: Isolation, microorganism, psychology

PS-102

Development of Thermostable Adenylate Kinase (tAK) Indicators for Routine Monitoring of Surgical Instrument and Endoscope Cleaning

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Introduction: Process indicators used to monitor instrument cleaning processes in hospitals can be ambiguous and lack sensitivity and specificity. We have developed a quantifiable indicator device system using thermostable adenylate kinase (tAK) for monitoring cleaning and decontamination efficacy of hospital automatic washer disinfectors (AWDs) and endoscope reprocessors (AERs). These devices, to be marketed under the trade names WASHtAK and LUMENtAK (BIOtAK Ltd), have been tested in a series of laboratory studies and hospital settings [Hesp et al. (2010), Ungurs et al. (2010), Nugent et al. (2013) all Journal of Hospital Infection]. The results of the most recent studies will be presented.

Aim: The study aimed to monitor AWD cleaning efficacy of surgical instruments in multiple facilities in the UK and the Netherlands.

Materials and Methods: Indicators were placed in each wash process alongside normally soiled instruments. STF Load check indicators were included for comparison. The residual tAK activity on each indicator was then measured in a hand held luminometer, providing a quantifiable measure of cleaning efficacy. Data was collected for 5 wash cycles per site.

Results: The indicator devices were able to demonstrate both inter- and intra-process variability within a subset of the hospital sites studied, whereas comparator products showed no difference between processes. AWD processes evaluated varied between approx 3 and 5.7 $\log_{10}$ removal of the test enzyme across different test sites.

Conclusion: tAK indicators give a rapid, robust and sensitive readout and provide a valuable tool for SSD managers to assess the effectiveness of their AWD cycles in routine use.

Keywords: Monitoring, validation, cleaning

PS-103

Checklist: a Tool to Reach a Safe Cleaning Process

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The automated cleaning is an innovative technology that enables the procedures standardization, documentation of the entire process and lower occupational hazard. The efficiency of the automated cleaning procedure depends on the action of water jets associated with detergent, temperature and time. Failures occur due inappropriate rack and/or cycle, devices disconnected, orifices obstruction, and others. As cleanliness is the main phase in the material processing, and there are great difficulties to perform efficiently due to lack of standardization and Brazilian standards for washer disinfection, we created and validated one checklist in the soil area, as the main instrument for ensuring effective automated cleaning process. This study deals with an experience report of a descriptive nature developed at the Hospital do Coração, in the first semester of 2013. We made bibliographical research, rated the equipment manual, performed the checklist and training with the nursing staff to explain how and when use it. After 6 months of the checklist use, we evaluated: Increased commitment, dedication and understanding of the processes and materials by the team; decrease in washer disinfection alarms; increased care with the equipment accessories and cleaning materials and greater control of materials. The checklist implementation is not a single strategy to prevent the failures occurrence. The team's participation and continuous monitoring is critical to the success and continuous improvement of our work process.

Keywords: Checklist, cleaning, safety

PS-104

Is the Particles Counting Only Enough for Evalutation of Operation Room Air Ventilation System?

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Introduction: Since the unity and normal physiological functions of body are distrupted, operation rooms are one of environment that cause hospital infections. The tools and machines in surgery rooms, behaviour of staff and problems of ventilation system have high severe risks in terms of infection. Therefore, sufficient isolation from outside, positive air pressure and the continuous and periodical maintenance of air flow from clean area to impure area, control of staff behaviours and enterance have high importance. Effective air ventilation system should remove the suspneden particles and microorganisms in the air from operation rooms in a short time.

Control of operation room air ventilation system, has been taken account with the article passed by Ministry of Health in 21 October 2006 "Particles in operation rooms and intensive care rooms covered by the Legislation of Private Hospitals, should be counted every year". In Ministry of Health Service Quality Standards issued in 2011; the presence of the air ventilation system to fullfill sterilization requirements which requires hepa filter and similar features to filter and hold microorganisms, periodical maintenance are declared as essential. In addition, related to assesment of ventilation systems; inflow should be minimum 2.400 m^3/h, fresh air flow should be minimum 1.200 m^3/h and particle numbers should be counted periodically.

The air ventilation systems which are established with big budgets and efforts are generally left to their fate without any control. The regulations of the ministry are the positive steps whereas the procedures are not satisfying. It is required to set minimum technical standarts which are approved internationally in this field. To be content with the particle counts instead of periodical control and assessment of performance prevent to reveal real problems.

Aim: We aim to assess the evaluation of air ventilation systems sufficiency with particle counting comparing with ecording to international standarts performance tests on hepa filter leakage test, the speed of filter flow, air quantity, amount of air excahnge, air pressure, air flow direction and decontamination time.

Materials and Methods: The study was conducted between 24.05.2013-30.06.2013, in 29 rooms with Laminar Air Flow (LAF) and 14 rooms with turbulence ventilation system so that in total 43 operation rooms. Under our observation, the performance tests are made by acredited company. The tests are statistically assessed with comparing result of particle counts.

Conclusion: In totally 43 operation rooms, while the number of rooms which are not suitable for any steps of performance tests is 38, the number of rooms which are not suitable for only particle is 8. All rooms (100%) unsuitable for particle counts are defined as unsuitable for performance tests as well. In contrary, in 30 of all unsuitable rooms for performance tests (79%), particle count is detected in satisfied level. In other words, the low quantity of particle count does not mean the high quality of air ventilation system. Therefore, with only particle count, the assesment of ventilation systems is not possible. However, the particle quantities higher than expected values can be used as signal for the problems in the system and show the necessisty of performance tests.

Keywords: Operation room air ventilation system, performance tests, particle counting

Table 1. The results of evaluation of air ventilation system

Ventilation system	The # of rooms	The # of unsuitable rooms to performance test	The # of unsuitable rooms to particle counting
LAF	29	26	7
Turbulence	14	12	1

Table 2. The comparison of performance tests and particle counts

Ventilation system	Suitable for particle count	Unsuitable for particle count
Suitable for performance test	5	0
Unsuitable for performance test	30	8

PS-105

Unraveling the Myth of the Validity of Sterilization

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Introduction: Many conditions such as cleaning, wrapping with microbial barrier package are important to ensure sterility of critical materials used in healthcare, sterilization and maintenance of this condition during transportation and storage. A common practice in many Central Sterile Supply Departments (CSSD) is to establish sterility validity periods for materials based only on the time interval of storage. The theoretical rationale is that packaging with microbial barrier properties together with hermetic sealing maintains the content sterile indefinitely. However, such an approach does not take into account potential packaging damage that can occur during transport and storage. Evidence is needed to support consideration of potential event-related impact on sterility of materials.

Aim: Test the hypothesis that the time duration of packaging sterility has no effect on contamination susceptibility under bacterial exposure.

Materials and Methods (Figure 1): An experimental design was used. To simulate materials used in healthcare, porcelain cylinders were used as recommended by the Association of Official Analytical Chemists. A set of six porcelain cylinders were packed in different types of packaging to reflect those most often used in the clinical practice. These included cotton fabric-sarje T1, crepe paper, SMS-*Spunbond/Meltblown/Spunbond* and paper-plastic pouches. All packages were initially processed in the same sterilization cycle with a pre-vacuum autoclave (134°C/4 minutes). Afterwards, each package was contaminated with *Serratia marcescens* ATCC 14756 (106 CFU/mL) by touching it with contaminated gloved hands. After predetermined storage intervals (7, 14, 28, 90, and 180 days), the packages were opened using aseptic technique under laminar flow hood. Each porcelain cylinder was then seeded in a soybean-casein culture medium to promote the growth of the test microorganism (experimental group). A negative control group was contaminated similar to the experimental group. However, storage time intervals were not used. The efficacy of sterilization cycle was confirmed through culture techniques. A second control (positive control) group was used to ensure bacteria viability samples from the four different packages were stored in sterilized dry tubes. Each week, three samples (triplicate) of each package were seeded in soybean-casein culture medium to monitor survival up to 180 days. To simulate routine practice in the CSSD, all packages were handled weekly. Sample size was calculated to obtain 5% significance and 90% power to detect differences between groups.

Results: No growths of the test microorganisms *S. marcescens* were identified in the experimental group in any of the storage intervals (7, 14, 28, 90, and 180 days). Moreover, no growths of the test microorganisms were found in negative control groups. All tests performed in the positive control group up to a maximum period of 180 days were confirmatory.

Conclusion: Current recommendations suggest that contamination of packaging occurs with events not due to storage time. This study, in vitro, supports these recommendations, contribute to the nursing practice in CSSDs, there may be unnecessary reprocessing of packages which adds to waste, workload and costs.

Keywords: Event-related, sterility validity periods, packaging

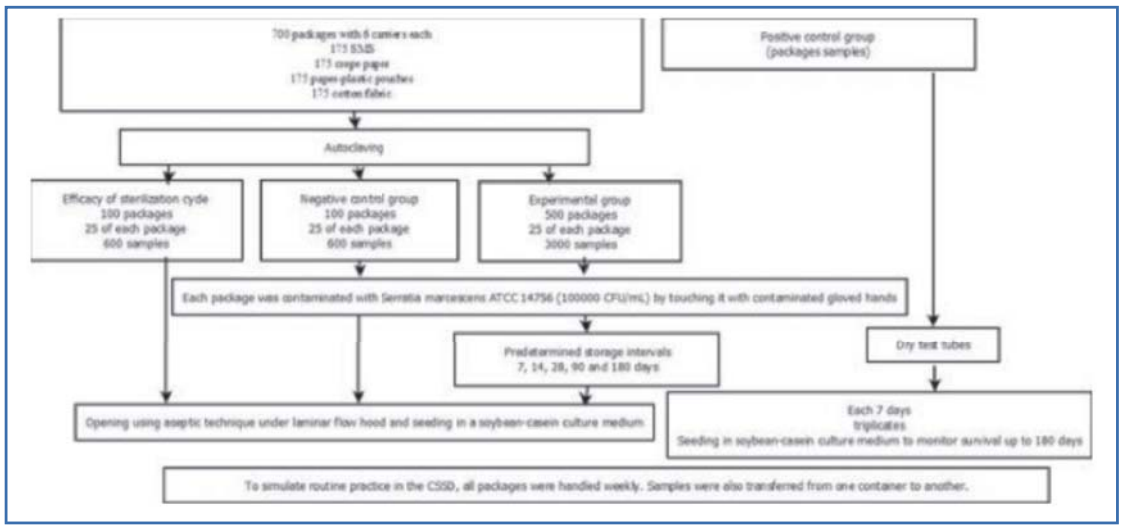

Figure 1. Schematic diagram of the method used

PS-106

Does the Transfer of Reassembling Boxes Activity to Sterilization Auxiliary Nurses Modify the Autoclaves Load?

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Introduction: The reassembling of operating trays carried by operating room nurse (IBODE) was transferred on 1st January 2012 to sterilization auxiliary nurses (AS). This service is part of the desire to control the sterilization process at input and output streams.

Before the transfer, a large number of autoclaves were overloaded and the activity was gathered in specifics hours.

Aim: Evaluate the influence of the internalization of reassembling boxes by AS on autoclaves load

Materials and Methods: Collect data on the workload by load type and on the amount of containers per load during March 2010 and 2013 wit traceability sheets

Results: There are on average 5, 5 loads per day in 2010 versus 4, 85 in 2013. Over these periods 99 and 122 overall loads (MIXED and CONTAINERS) were respectively sterilized with 60% of MIXED loads in 2010 against 95% in 2013. There are on average 7, 65 containers of MIXED loads in 2010 versus 7, 33 in 2013, and 15.03 containers of CONTAINER loads versus 8,2 for the same dates. On the total workload in 2010, 40.4% was overloaded (more than 12 containers) against 6.5% in 2013.

Conclusion: We focused in 2013 on MIXED loads to optimize the use of autoclaves and to avoid overloading or otherwise to let them run empty. A decrease in overloaded autoclaves was observed (83, 67%) after the transfer of the business to AS. The internalization of the activity has optimized the AS working time (reduction of waiting time based on IBODE's availability) as well as in improvement in the autoclaves use in the sterilization unit. It would be now interesting to assess the weight of the containers to refine our study.

Keywords: Autoclaves loads

PS-107

Effluent Disinfection and Neutralization Systems at Medical Laboratories Example of Samsun Gazi State Hospital

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Introduction and Aim: Hospital wastes are the potential sources of the pathogen microorganisms. These wastes should be collected and eliminated properly. Although many hospitals have formed solid waste management plans and put them into effect, we cannot say the same for the effluent management plans. The liters of effluents came throughout the autoanalyzers are directly released to the nature and pose dangers for the community health. The scope of this research is to give information about the effluent disinfection and neutralization systems and to raise awareness.

Materials and Methods: Samsun Gazi State Hospital is a 350-bed hospital. Central laboratory comes up with 600 liters of effluent in a per day. The system settled in our laboratory disinfects and neuralizes the biological medical effluent on the source. The main storage tank collects the whole infected medical waste effluent produced by laboratory devices and effluent washing-stands via the collection channels. On the first phase, the daily-gathered infected effluent is dosed with an acidic chemical and the effluent becomes an acidic material. Thus, a proper and acidic environment is prepared with a standard pH level and disinfection. For this purpose, chlorine and chlorine compounds are widely. On the second phase, disinfection and neuralization is provided by miscellaneous chemicals (NaClO, $NaHCO_3$, H_2SO_4). The consantration of disinfectant to be used and the contact time of these disinfectants shall be configurable and the same contact time shall be provided for the each disinfection operation. On the third phase, the implementations, like UV-rays and hepafilter, are conducted to minimize the the number of microorganisms in the enffluent.

Every laboratory should have their devices analyzed by the accredited laboratories as per the effluent discharge regulation for the chemical effluents. Miscellaneous regulations are in force in USA and the Europe (40 C.F.R.: Appendix A to Part 355-The List of Extremely Hazardous Substances and Their Threshold Planning Quantities and Council Directive 91/271/EEC of 21 May 1991 concerning urban waste-water treatment). "Water Contamination Management Regulation" is avalaible in Turkey. The chemical materials shall be proper as per this regulation (Table 1).

Conclusion: Because the huge quantity of the effluents come out of the laboratory devices, un-proper storage areas and storage difficulties of these huge quantities underlines the necessity of that the effluent should be difinfected, neutralized and treated on-site and transformed to domestic waste. For this reason, definition, scope, on-site elimination issues should be added to the existing regulation as solid wastes. In addition, waste-water outlays of new health care facilities should be seperated as the domestic waste and suspicious effluent will contribute to the solution of the issue.

Keywords: Waste-water, disinfection, neutralization

Table 1. Waste-water standards for the discharge of waste-water to infrastructural facilities

Parameter	Sewage systems on the waste-water facilities with full treatment	Sewage systems on the waste-water facilities with deep-sea discharge
Temperature (°C)	40	40
pH	6.5-10.0	6.0-10.0
Pending solid matter (mg/L)	500	350
Oil and lubricant (mg/L)	250	50
Goudron and goudron based oil (mg/L)	50	10
Chemical oxygen need (CON) (mg/L)	4000	600
Biochemical oxygen need (BON5) (mg/L)	-	400
Sulphat ($SO4^{-2}$) (mg/L)	1700	1700
Total sulphur (S) (mg/L)	2	2
Phenol (mg/L)	20	10
Free chlorine (mg/L)	5	5
Total nitrogen (N) (mg/L)	-	40
Total phosphorus (P) (mg/L)	-	10
Arsenic (As) (mg/L)	3	10
Total ciyanide (Total CN^-) (mg/L)	10	10
Total lead (Pb) (mg/L)	3	3
Total cadmium (Cd) (mg/L)	2	2
Total chrome (Cr) (mg/L)	5	5
Total mercury (Hg) (mg/L)	0.2	0.2
Total copper (Cu) (mg/L)	2	2
Total nickel (Ni) (mg/L)	5	5
Total zinc (Zn) (mg/L)	10	10
Total tin (Sn) (mg/L)	5	5
Total silver (Ag) (mg/L)	5	5
Cl^- (Chloride) (mg/L)	10000	-

PS-108

Validation of the Assembly Process of Terminally Sterilized Medical Devices: Implementation of Standard UNI EN ISO 11607-2

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Introduction: The packaging of a terminally sterilized medical device must maintain its properties as a sterile barrier until usage and guarantee the sterility of the device. Each organization shall define the control procedures of the packaging process by documented monitoring of pre-defined critical parameters in compliance with UNI EN ISO 11607-2.

Aim: Aim of this work is to develop a step-by-step analysis of packaging process control in order to certify sterility maintenance of the tested package type.

Materials and Methods: The key aspects of the analysed process are the following:

- Choice of type of packaging to be tested
- Pre-sterilization test of packaging materials
- Compatibility test of packaging materials with the steam sterilization process
- Post-sterilization test
- Artificial accelerated aging
- Natural aging in the most unfavourable conditions
- Microbial test by certified laboratory

Conclusion: The definition of the expiry date of a sterilized medical device is based on the results of the packaging validation process. This project should be implemented in all hospitals as a quality guarantee of products used on the patients.

Keywords: Packaging validation, stability test

PS-109

Microbiological Evaluation of Steam Sterilization of Assembled Laparoscopic Instruments

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Introduction: Classic recommendations stipulate that surgical instruments should be opened, disassembled and that surfaces be free for sterilization, including laparoscopic ones. Some other documents do not emphasize this cautionary step.

Objective: This investigation aimed to assess the microbiological safety of high-pressure, saturated steam sterilization of assembled laparoscopic instruments.

Materials and Methods: This was characterized as an experimental laboratory study. The sample consisted of 5-mm laparoscopic forceps 1 and trocars 2, assembled with contamination challenge of *Geobacillus stearothermophilus* ATCC 7953 spores, with microbial population of 10^6 CFU, removed with aseptic technique of biological indicator (AttestTM 1262), commercially available. It was decided to use biological indicators as they are routinely used at the Material and Sterilization Center (MSC) to monitor the autoclave, providing a consistent evaluation of steam sterilization conditions.

Three paper holder units impregnated with the spores were placed inside each laparoscopic instrument at the time of assembling, individually packed in surgical paper and submitted to sterilization in an autoclave (CISA® model 6412HF) with high-pressure saturated steam, thermally qualified for heat cycles of 134°C for 5 minutes. A total of 380 laparoscopic instruments were analyzed, of which 190 were forceps and 190 trocars, cultures from three filter paper holders per instrumental were performed, totaling 1140 samples.

Sample size had 95% power and the probability of the assembled laparoscopic instrument showing spores after sterilization was at least 8%. Under laminar flow hood, using aseptic technique, the instrument was disassembled and each paper holder from the biological indicator was seeded in Tryptic Soy Broth (TSB) culture medium and incubated at 56°C for 21 days. As no growth was observed after this period, the tubes were submitted to heat shock at 80°C for 20 minutes with reincubation for 72 hours at 56°C for final reading.

Results: As positive control, 30 non-sterilized filter paper holders were inoculated, seeded directly in TSB at 56°C for 48 hours. As negative control, 3 paper holders introduced in 5 laparoscopic forceps and 5 trocars, sterilized and disassembled, were inoculated and submitted to the same incubation procedures in the experimental group.

There was no microbial growth in samples from the Experimental group. The results of control groups were satisfactory. The Positive control confirmed the challenge used in the experiments and the Negative control showed the expected growth absence results.

Conclusion: The present study showed successful high-pressure saturated steam sterilization of assembled laparoscopic instruments, demonstrating the microbiological safety of this practice. We used the recommended parameters for steam sterilization, associated with contamination challenge using *G. stearothermophilus* ATCC 7953 spores, sterility testing through direct inoculation method and a sample size that allows result generalization. Our results provide strong scientific evidence to support the decision-making regarding the microbiological safety of steam sterilization of assembled laparoscopic instruments, contrarily to the classic recommendations that all material should be disassembled prior to autoclaving, particularly laparoscopic instruments.

Keywords: Sterilization, laparoscopy, evidence-based nursing

PS-110

Problems Encountered in Autoclaving in Our Central Sterilization Unit

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Introduction and Aim: Most medical and surgical devices used in healthcare facilities are made of materials that are heat stable and therefore undergo heat, primarily steam sterilization. For a good sterilization process, the steam sterilizers should be worked according to the standards, the records should be kept orderly and completely. So we aimed to share the causes and solutions of problems, encountered for the steam sterilization in our unit.

Materials and Methods: After the central sterilization unit (CSU) of our hospital was established, workings of the autoclaves in our sterilization unit were recorded with monitoring system and steam autoclave form during 2011. In our CSU, there are pressure steam sterilizers. For controlling sterilization process, the Leak test, ETS, chemical integrator, biological indicator and bar-code labeling system was studied.

Results: Four autoclaves were tested at 840, 892, 868, 876 cycles,respectively. A positive signal at biological indicator was detected at 6 cycles. It was determined that 18 packages were found as wet. And also there were visual yellow spots on the surface of 12 packaged materials. As a result of monitoring system and the records it was understood that the reason of positive signal at biological indicator was depended on to the users who wasn't sure about the completing all phases of the sterilization cycle. The reason of wet package was determined as the defect of the drying phase of autoclaves. The reason of the visual yellow spots was determined as the trouble at water softening system.

Conclusion: As a result of bar-coding system, monitoring system of the sterilization, ETS and biological indicators, we should provide a safe and proper sterilization.We should determine errors, due to user or sterilizers, early with help of these mechanic controls. And also we should say that, to provide high quality steam is due to high quality water.

Keywords: Autoclaving, monitoring system, sterilization

PS-111

Are We Choosing a Safe, Quick, and Environmentally Friendly Sterilization Method?

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Introduction: Hospital Italiano de Buenos Aires (HIBA) is a high-complexity surgical hospital. The Hospital's facilities comprise 2 hospitals with 750 inpatient beds. It´s equipped with 32 operating rooms. This paper compare the sterilization processes and number of medical devices sterilized during the first semester of 2011 and 2012 at the old Central Service Sterilization of the HIBA with the first semester of 2013, when the new Central Service/Sterile Processing Department (CS/SPD) started to operate. New equipment was acquired for the (CS/SPD), including 5 steam, 1 dry heat, 2 ethylene oxide, 2 hydrogen peroxide gas plasma sterilizers. The formaldehyde gas sterilizer was the sole piece of equipment to be moved from the old to the new (CS/SPD).

Aim:

- To compare the sterilization methodologies and the number of sterilization processes performed at the old and new Central Service/Sterile Processing Department (CS/SPD) of Hospital Italiano de Buenos Aires.
- To compare the number of medical devices sterilized with the different sterilization methodologies at the old and new Central Service/Sterile Processing Department (CS/SPD).
- To evaluate the percentage of use of all sterilization methodologies, especially low temperature methodologies, as employed by the different customers.
- To identify the trends in the use of environmentally friendly sterilization methods.

Materials and Methods: Manual statistics and the traceability system of the (CS/SPD) were used to draw comparisons.

Results: The different technologies and MDs were evaluated. We implemented changes and migrated MDs to the different sterilizers, according to their use and urgency. The order of use was: steam, plasma H_2O_2, EO, LTSF, and dry heat (Figure 1-3, Table 1,2).

Conclusion: The CS/SPD processes approximately 700.000 medical devices each year, using different sterilization processes. Since 2013 a bar code is attached to each medical device, which tracks its history through the different areas, i.e. Reception, Decontamination, Conditioning, Sterilization, and Delivery.

In this paper, we applied comparative statistics to prove the migration in the use of sterilization processes aimed at improving delivery times, as well as the rates of use of medical devices processed with faster, safer and more environmentally friendly methods. Ranking of the use of the different sterilization methods:

First: Steam Sterilization (70%)

Second: Plasma low-temperature hydrogen peroxide gas plasma sterilization (20%)

Third: Ethylene Oxide and Formaldehyde LTSF (5%)

Fourth: Dry Heat (0%)

Ranking of the use of low-temperature sterilization processes by Surgical Units (Central OR, Orthopedics OR, UCA, Delivery Room):

First: low-temperature hydrogen peroxide gas plasma sterilization (37%)

Second: Ethylene Oxide (24%)

Third: Formaldehyde LTSF (5%)

Low-temperature hydrogen peroxide gas plasma sterilization is a valid alternative to the rest of sterilizers, on the ground that it uses less electricity, does not have toxic waste, and does not need water, thus supporting the preference of our Hospital to use environmentally friendly equipment, and to satisfy the urgent needs of ORs by promoting the rapid return of MDs.The intention of this paper is to contribute to the optimization of the different technologies we use in the CS/SPD to ensure the quality of our processes and satisfy our customers.

Keywords: Low-temperature methodologies, types of medical devices, environmentally friendly sterilization method

Figure 1. Central Service Sterilization Processing Department

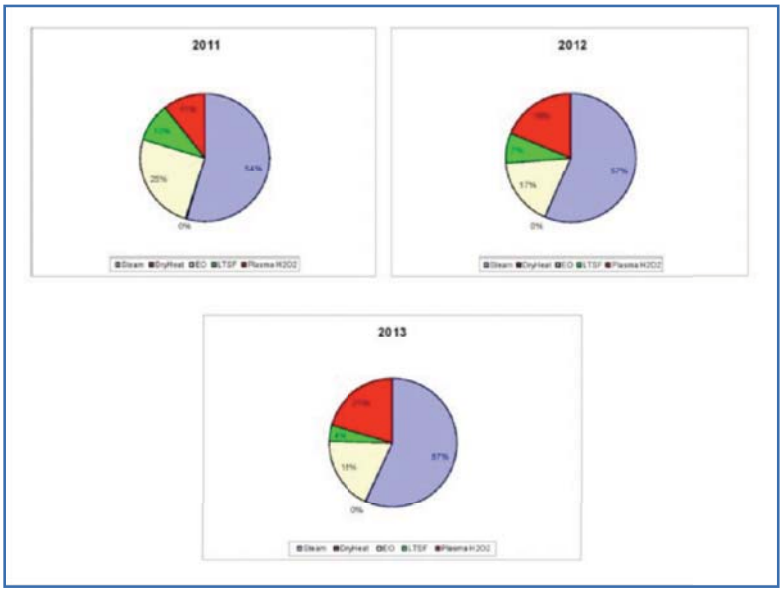

Figure 2. Number of medical devices sterilized 1st semester

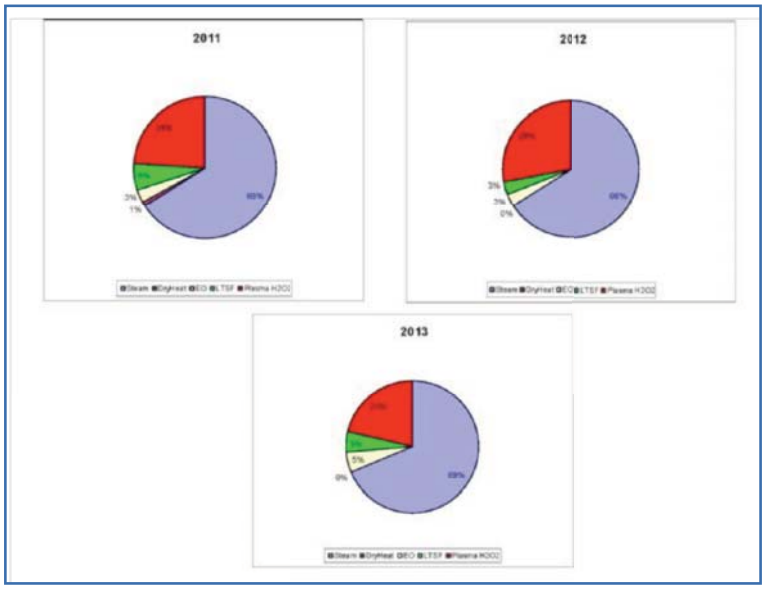

Figure 3. Number of sterilization processes 1st semester

Table 1. Number of medical devices sterilized 1st semester

Year	Steam	%	Dry heat	%	EO	%	LTSF	%	Gas plasma H_2O_2	%	Total
2011	126301	54.54	707	0.31	57565	24.86	22274	9.62	24714	10.67	231561
2012	160469	56.46	236	0.08	49208	17.31	21094	7.42	53234	18.73	284241
2013	212039	56.81	364	0.10	69158	18.53	14913	4	76757	20.57	373231

EO: Ethylene oxide, LTSF: Low temperature sterilization formaldehyde 2%.

Table 2. Number of sterilization processes 1st semester

Year	Steam	%	Dry heat	%	EO	%	LTSF	%	Gas plasma H_2O_2	%	Total
2011	4859	66	90	1	216	3	467	6	1691	24	7323
2012	4654	66	17	0	185	3	239	3	1955	28	7050
2013	5733	69	18	0	441	5	406	5	1804	21	8402

EO: Ethylene oxide, LTSF: Low temperature sterilization formaldehyde 2%.

PS-112

Production of a Sterilization Department of Southern Brazilian Hospital

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Introduction: The autoclaves charging depends on the kind of medical devices loads.

Aim: To describe the production of a sterilization department of medical/surgical supplies and equipment as the amount and content of charges placed in an autoclave.

Materials and Methods: A quantitative retrospective study, from the 2012 database on the production of a sterilization department of medical/surgical supplies and equipment in a 1150 beds southern Brazilian hospital. The department has seven steam autoclaves to sterilize products for health: three 600 liters autoclaves, two 520 liters autoclaves and two 365 liters. All autoclaves operating parameters to sterilization are 134°C for 5 minutes. A nurse and a technician of clinical engineering compiled a database with the accounting of the number of packages and equipment loads, beyond recording the downtime of each.

Results: In the analyzed period were sterilized 2.673.150 packets. From these, 2.278.270 (85%) were instrumental and 394.880 (15%) were clothes and linen. The month average was 222.000 packets. Each autoclave is cleaned at least weekly. It is needed to stop using each autoclave for six hours to cleaning. The time for preventive maintenance of all equipment, plus cleaning time thereof, totaled 30 days with stops autoclaves. The corrective maintenance, however, occur on a daily basis according to the needs presented. The idle time of each device was 15 days, waiting solutions to unexpected problems. The autoclaves efficacy is tested constantly, according to the national norms. All equipment was also qualified and can be loaded with all types of cargo, differing only in the amount of charge in their respective chambers. During the study period, the smaller chambers equipments had greater use, which probably occurred due to ease of filling loads in less time, so you can fill other equipment with better streamlining, avoiding its underutilization. The criteria for selection of equipment are urgent load, the number and dimensions of the available packs. The bigger autoclaves are used in larger loads of clothes packages, containers and implants and prostheses sets. These kinds of devices have larger dimensions and volume, necessitating a larger space, adjusting the filling of the internal space of 80% suggested avoiding waste.

Conclusion: The production of sterile products was approximately six times greater than for instrumental clothes. The use of larger equipment was proportional to the packets sizes and kind of devices. We suggest planning loads of equipment as standard, as well as continuing the study for subsequent comparisons.

Keywords: Sterilization, nursing

PS-113

The Influence of Low Temperature Sterilisation on Plastic Surface

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Introduction: The results of our previous studies (Yoshida & Kobayashi, 2013) revealed various problems concerning to hydrogen peroxide (HP) gas sterilisation, such as problems of environmental exposure of higher concentration, residual HP on sterilised items, deterioration of the items, false reaction of the chemical indicator (CI), and residual hydrogen peroxide on plastic materials after sterilisation. In addition to these problems, this time the suspected structural influence of low temperature sterilisations are studied.

Objective: To examine plastic surfaces after low temperature sterilisation.

Materials and Methods: The influence of two kinds of hydrogen peroxide sterilisations, ethylene oxide gas sterilisation and low temperature steam formaldehyde sterilisation on the surface of 11 kinds of plastic panels was evaluated by scanning electron microscope (SEM). The plastic panels tested were polyetherimide, polyethylene, polytetrafluoroethylene, nylon 6, nylon 66, polyethyleneterephthalate, polyetheretherketone, thermoplastic polyurethane, polymethylmethacrylate, polypropylene and polycarbonate.

Results: HP gas sterilisations induced crack, crackle, or bumpy, rugged or lumpy change on the most of plastic surfaces, though no changes were found on the surfaces before sterilisation procedures.

Conclusion: Both HP sterilisations induced the structural changes of the surfaces of plastic materials. However, the cause has not been identified yet. A further study is required to identify the cause.

Keywords: Low temperature sterilisation, plastic surface, scanning electron microscope

PS-114

Evaluation of In-Service Training Program in Central Sterilization Unit

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Introduction: Comparison of written exams, which are done before and after attending a training program, of 26 staff members in the central sterilization department of a research and training hospital, consisting of 14 female 12 male and 9 experienced, 17 unexperienced employees.

Aim: In-service training is an inevitable necessity for increasing work discipline and knowledge level. Providing a systematic in-service training program for the sterilization department staff will lead them to be well equipped and sufficient for each condition needed for a well planned and executed sterilization process, which is the one of the most important services in a hospital for preventing and controlling infections. The exams during the training program aim to measure the success of the training.

Materials and Methods: Primarily, a survey has been conducted for the staff asking in which subjects they would like to be trained. 6 out of each 10 participants have requested to be trained in the subject of general processes of a sterilization department, 3 out of 10 have requested to be trained for sharp object injuries and 1out of 10 have requested to be trained for the other training subjects asked on the survey. Training documents for Central Sterilization Unit Workflow, personal protective equipments and usage, hand hygiene, sharp object injuries ve associated risks have been prepared with an exam of 18 questions. Participants have been divided into two groups of 13 persons and the 3 hour training program of the first group was started with a pre-training exam and followed by three 1 hour sessions within the same day. The training process was accomplished a post-training final exam. The second group of 13 persons were taken into the same procedure as the first group including a pre-training exam,training sessions and post-training final exam in the afternoon on the same day. During the training program, sterilization monitoring indicators, sterile barrier systems, disinfectant solutions, recording and documentation forms, electronic test systems (ETS) were used as training tools with practical sessions when necessary.

Results: It is observed that all the attendees were interested in training subjects and asked many questions frequently to understand the lecture, which has increased the trainers' motivation and encouraged them for preparing further trainings. Each question in the exam was evaluated as 5.5 points and results have been divided into 3 categories as 0-50 points, 50-80 points and 80-100 points.

Conclusion: As a consequence even after a single training program the ratio of high graded attendees increased from 7.6% to 34.6%. Besides, it is obvious that the increased knowledge level of the staff leads them to cope with the problems more efficiently.

Keywords: Education, sterilization, evaluation

PS-115

Health Screening and Measurement of Knowledge of Cukurova University Balcali Hospital Central Sterilization Unit Personnel Regarding Health and Safety

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Introduction and Aim: Central Sterilization Units (CSU) are dynamic units serving for all other units of the hospitals. They have big responsibility for sustaining sterilization safety and prevention of infection risks. CSU is the unit where cleaning, decontamination, disinfection, drying, maintenance, packing, sterilization, storing and distribution activities being done. Therefore, considering the scope of work, CSU is an area with high risk in terms of personnel health. Potential risks for the personnel in CSU can be categorized into three main groups; physical risks (personnel injuries happen while cleaning or maintenance of tools and equipment, burns happen during vapor autoclave loading and unloading, injuries due to wrong waste management etc.), biological risks (risks occur due to contact with the bacterial culture inside the biological indicator) chemical risks: (Risks due to some chemicals used in CSU). Moreover teratogenic dangers, dermatological dangers and stress can be included in the risks that CSU personnel are exposed to.

This study contains health screening of the CPU personnel and measurement of their knowledge of the above mentioned risks and aims to minimize these risks.

Materials and Methods: "Working risk awareness" survey has been performed between the 18 personnel working in CSU of Cukurova University Balcali Hospital within 10 days. Results have been evaluated with SPSS 11.5 software.

Results: 15 (83.3%) of the personnel are male and average age is found as 38.50 ± 5.6 (28-49). 8 (44.4%) of the personnel are working for less than 5 years and 7 (38.9%) of them are high school graduates. 7 (38.9%) of the personnel have passed through health screening before start working in CSU and 5 (27.8%) of them have done this with their own will. 16 (88.9%) of the personnel have passed through health screening while they are working in CSU, and 17 (94.4%) of them think that health screening is necessary. 9 (50%) of the personnel mentioned that health screening between the CSU personnel shall be done once a year. 8 of the personnel have mentioned that they had been injured with a sharp contaminated tool and 6 of them have added that they had cleaned the area with antiseptic solution. All personnel are vaccinated against contagious diseases; 16 (88.9%) of them have hepatitis B, 7 (38.9%) tetanus, 2 (11.1%) influenza, 1 (5.6%) hepatitis A and 6 (33.3%) of them have measles, mumps and rubella vaccines. All personnel have responded as HIV, when being asked against which disease they cannot be protected with vaccination.

Conclusion: At the end of the study health screening have been conducted between the CSU personnel. Examination of hepatitis, HIV, TORCH, EIA have been done and hearing tests have been performed. As a result of the questionnaire; personnel awareness level of the potential risks is found satisfactory. Furthermore all the personnel have been vaccinated against hepatitis B and rubella, measles, mumps.

Keywords: Central sterilization unit, health screening, personnel health and safety

PS-116

Detection and Identification of Physical Parameters Leading to Failed Steam Penetration Test Results

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Introduction: Steam Penetration Test which is also commonly known as Bowie & Dick Test is a standardised equipment control test for steam sterilizers. The requirements for the Bowie & Dick Steam Penetration Test were established with the international and European standart document, EN-ISO 11140-4. 3M Electronic Test System (ETS) is an EN ISO 11140-4 compliant alternative to the conventional Bowie & Dick test packs. ETS evaluates the steam sterilizer's performance and gives a clear PASS/FAIL as the Bowie & Dick test result and at the same time detects and records all the crucial physical parameters of the sterilizer.

Aim: The aim of this study was to evaluate the performance of ETS for identifying the problems of the defective steam sterilizers.

Materials and Methods: In this study 5 steam sterilizers manufactured by Trans Medical Devices (Turkey) and 3M ETS (USA) which are actively working in the Central Sterilization Department of Katip Celebi University Ataturk Research and Training Hospital were used. The ETS Bowie & Dick test results of the 5 steam sterilizers were evaluated in order to identify the physical parameters related to equipment failures for 10 months between August 2012 and June 2013 retrospectively. The recorded physical parameters for the FAIL results were compared with the PASS results before and after repairs by the technical service for 10 months retrospectively.

Results and Conclusion: There were seven individual cases of equipment failure resulting with a FAIL Bowie & Dick result during the scope of the study. In all the cases the root causes were identified with the analysis of the ETS records as 2 cases of poor water quality due to water purification system failure, 2 cases of bad vacuum, 1 case of insufficient level of steam injection, 1 case of inadequate temperature and 1 case of software problem in the sterilizers. It is observed that the ETS detected the start of the failure approximately a week before the actual problem and warned the user with EARLY WARNING messages in two cases. As a conclusion of our study, we have found the ETS is an efficient equipment test system which can replace the conventional Bowie & Dick tests with an advantage of the ease in the detection and identification of root causes of the equipment failures.

Keywords: ETS, sterilization, Bowie-Dick

PS-117

Education Strategies for Monitoring Steam Sterilization in a Vacuum

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Introduction: Sterilization of materials is used for the destruction of all forms of microbial life, making them safe for use in procedures. The security and efficiency of the process are achieved by monitoring critical parameters, using the results of specific physical, chemical and biological.

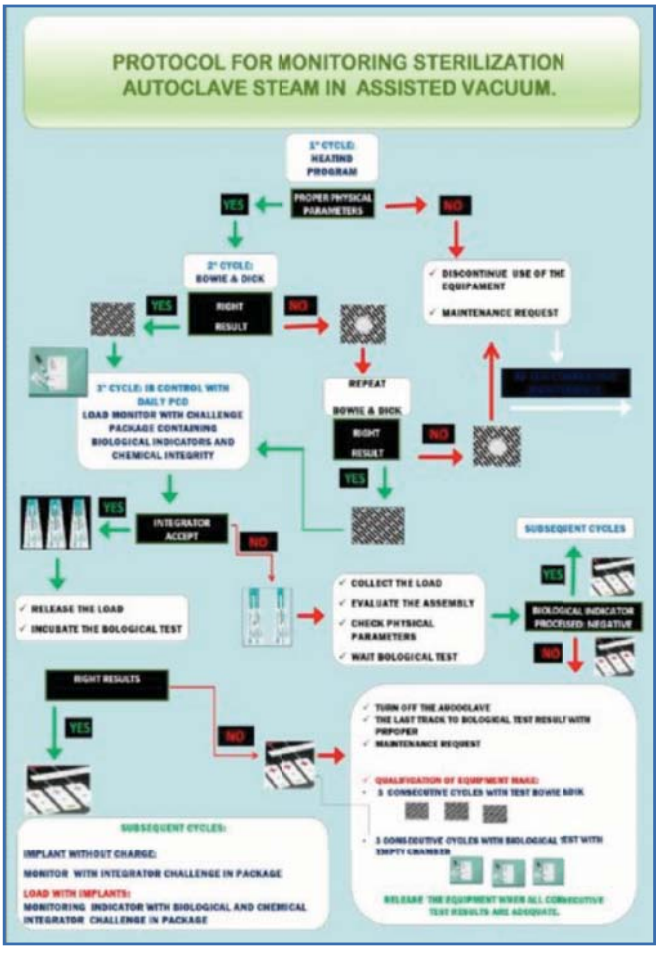
Aim: The study aimed to ensure the quality of materials processed at the Central Sterile Supply Department (CSSD) in a private medium, located in Fortaleza, Ceará, Brazil, facilitating the understanding of the protocol for monitoring steam sterilization, by nursing staff, and improve the knowledge of the team to perform this activity.

Materials and Methods: This is an experience report on the implementation of educational strategies for understanding the flow of decision in the monitoring of steam sterilization in autoclaves vacuum. CSSD is the routine rotation of staff in different sectors, so it saw the need to enable them to undertake this activity. The training was conducted during a week of January 2011, in three shifts to cover the entire team.

Results: There was active participation of all and in the end, demonstrated skills and knowledge for the proposed activity. Was made a banner that contains the flow chart of the daily routine monitoring of steam sterilization, with decisions guided according to the results of the indicators, being exposed on CSSD to assist in decisions regarding the sterilization process.

Conclusion: This activity provides safety in use throughout the hospital, the processed materials, as well as the possibility of tracing them.

Keywords: Vacuum, continuing education, sterilization



Vacuum 1

Vacuum 2

Vacuum 3

PS-118

Carrying Heavy Loads in a CSSD is not a Foregone Conclusion. Comparison with Three Automatic Systems: Automatic Guided Vehicle, Automatic Slide System and Automatic Individual Conveyor

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Introduction: In a context of a new CSSD, most of the steps of the sterilization process are automated. For loading and unloading of sterilizer, several systems could be settled. We study three of them: automatic guided vehicle (AGV), automatic slide system (ASS) and automatic individual conveyor (AIC).

Aim: The aim of the study is to compare those three systems, ups and downs, in order to implement the best one in our CSSD.

Materials and Methods: The comparison of these three systems is based on six parameters: safety, saving time, handling, cost, maintenance and unavailability. It's a qualitative evaluation.

Results: AGV is better than the two others for safety, saving time and handling but it's the most expensive. Because of AGV's large use and AIC's ease, both systems are reckoned to be very reliable. On the other hand, ASS needs more maintenance. For the parameter "unavailibilty": during the maintenance, AIC thanks to his self functioning doesn't lock access to others sterilizers unlike ASS. For AGV, it is possible to switch by another one in working order (used for other working area for example).

Conclusion: AGV seems to be the highest performance machine and more adapted for our facilities. However, it requires space, flat floor and specific installation for laser navigation. When building a new plant, those specifications are easy to consider. It is the first case of installation in a CSSD. Currently, AGV can automatically load and unload sterilizers and, thanks to laser landmarks already settled, could be easily spread to others working areas in the future.

Keywords: Automatic, vehicle, load

Automatic guided vehicle

PS-119

Central Sterilization Unit Configuration Studies in a Second Step State Hospital

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Objective: Central Sterilization Units (CSU), have a primary responsibility to sterilization. In this study we intended to identify short comings and restructuring of CSU.

Materials and Methods: This study was performed in 280-bed hospital. Physician of Infection Control Committee (ICC) discovered deficiencies about CSU and reported to administration.

Results: There are 4 operating rooms and the number of operations is 1800-2000 per year. CSU is beside to operating rooms. In CSU the steam sterilization is used, however dry heat sterilization is used in the delivery room. Sterilization disinfection sub-committee established. Deficiencies detected. A nurse from CSU included in ICC.

1. CSU was covered an area of approximately 50 m² consisting of a singleroom. In this room there was no discrimination of the dirty, clean, sterile fields.
2. Check-downs were made from a single portal. Pick-up and delivery of clean and dirty instruments were the same.
3. Both of the two wall was covered with wood cabinets in CSU.
4. There was a sofa which was used the operating room staff beside the other wall of CSU. The materials were packaged on here.
5. In CSU there was a sink counter. This was included tea service mechanism for using all operating room personnel.
6. Contaminated materials and hand washing process was performed one an other sink which was placed on entrances hall.
7. Some of the tools commonly used services were being cleaned and sterilized Pasteur furnaces. However, low-level disinfectants were used for some of the sets.
8. The number of the employee wasn't sufficient.
9. The instrument containers was not enough.
10. There wasn't an air conditioning system.

At the end of the studies;

1. CSU divided T-shaped space all ocated by a thin partition and created threese parateareas. The appropriate structure of interconnecting passages provided between there rooms.
2. Contaminated and sterile area separated by creating a second entrance door.
3. Wooden cabinets were removed, steel cabinets and shelves were acquired. Walls stained with anti-statice poxy paint to prevent colonizing microorganisms.
4. Sofa removed. Unnecessary enterance denied into the CSU. An area was created for the packaging in the dirty area.
5. The sinkal located to the dirty side to use the washing of dirty instruments.
6. Washing the dirty materials on other sinks denied. Ultrasonic washing machine, air and water gun systems was established.
7. The sterilization of dressing sets, circumcision kits, cleaning equipments and all of the surgical instruments that used in hospital was proveded in CSU. Pasteur ovens removed. Thus, regular follow-up and operating security was provided.
8. The number of employee increased in CSU. CSU employee seperated from the operating theater. The training of new employer's completed by theater nurse.
9. The instrument containers bought.
10. Central air-conditioning system could not configured.

Conclusion: Due to financial difficulties and hospital building is not suitable for demolition and repair, a part of our plans postponed. In CSU serious improvements have been made reduce the risk of hospital infection and to give high quality and safe health care.

Keywords: Disinfection, surgical instruments

PS-120

Microbial Contamination of Surfaces and Materials in a Dental Clinic

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Introduction: Infective hazards are present in dental treatment, because many microorganisms can be transmitted by blood or saliva through direct or indirect contact, droplets, aerosols, or contaminated surfaces and materials. The dental treatment is associated with a high risk of infections, both for immunodeficient patients and dental personal.

Aim: The aim of this study was to evaluate the degree of microbial contamination on air-water spray, reflector, tray, touchscreen PC, door handles, soap dispensers and taps before and after dental treatment.

Materials and Methods: Samples were taken before and after dental treatment from ten different air-water spray, reflector, tray, touchscreen PC and six different door handle, soap dispenser tap. Sterile cotton swabs moistened with trypticase soy broth (TSB) sampled 4 square centimeter area of these surfaces and materials by using sterile autoclave paper. These samples were spread on blood agar, sabouraud dextrose agar and eosin-methylene blue agar plates. Plates were incubated at 37°C for 48 hours. The resulting microorganism's colonies were counted and they identified using the gram staining and biochemical tests. Antibiotic sensitivity of microorganisms which are potential pathogens detected in this study determined by Phoenix system. Data were analyzed by the McNemar chi-square test.

Results and Conclusion: The most prevalent microorganisms were coagulase-negative staphylococcus and viridans group streptococus (Table 1). Rates of area from which samples taken according to presence of bacterial growth were determined respectively 19% and 63.8% before and after dental treatment (Table 2). Microbial contamination showed a significant increase between before and after clinical activity both surfaces and materials ($p< 0.001$). We determined antibiotic sensitivity of *Staphylococcus aureus* and *Stenotrophomonas maltophilia* isolates are potential pathogens. *S. aureus* was resistant to penicillin and ampicillin but none was resistant to the other antibiotics (trimetoprim-sulfametoxazol, cefoxitin, erythromycin, clindamycin, linezolid, tetracyclin, gentamicin, chloramphenicol, quinupristin-dalfopristin and vancomycin). *S. maltophilia* was resistant to ticarcillin-clavulanate, intermediate to ceftazidime, susceptible to trimethoprim-sulfamethoxazole and levofloxacin.

The dental treatment may play an important role in the transmission of infectious diseases for immunodeficient dental personnels and patients.Periodic sampling of surfaces and materials for pathogenic microorganism may be a useful adjunct to standard infection control practices in dental health care settings. This study provides data for the establishment of standardized sampling methods, and threshold values for contamination monitoring in dentistry. Furthermore, the study emphasizes the need for research aimed at defining effective managing strategies for dental clinics. Although hand hygiene is key to minimizing this transferal, barrier protection or cleaning and disinfecting of surfaces and materials also protects against health-care-associated infections.

Keywords: Dental clinic, microbial contamination, surfaces

Table 1. Microorganisms isolated from materials and surfaces before and after dental treatment

Microorganisms	Colony counts (cfu/4 cm²) and rate (%)
Coagulase-negative staphylococcus	772 (57.31%)
Viridans group streptococcus	523 (38.82%)
Bacillus spp.	28 (2.07%)
Micrococcus spp.	13 (0.96%)
Diphtheroid bacteria	8 (0.59%)
Alcaligenes faecalis	1 (0.07%)
Stenotrophomonas maltophilia	1 (0.07%)
Staphylococcus aureus	1 (0.07%)

Table 2. Rates of area according to their state of bacterial growth

Sampling time	Positive samples	Negative samples
Before treatment	11 (19%)	47 (81%)
After treatment	37 (63.8%)	21 (36.2%)

PS-121

Is It Correct, Not to Favour Scrubs with Sleeve for Preventing Bacterial Colonization?

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Introduction: Cloth sleeves, rings, bracelets etc. are the surfaces that mostly become polluted and open for bacterial contamination while working at clinics, laboratories or contacting with patients. Since laboratory coats' sleeves can be a suitable growth medium, we assessed and interpreted cultures which were taken from sleeves' surfaces.

Materials and Methods: First; sleeves were moisturised with normal saline and then samples were taken by sterile sticks from contact-surface sides of sleeves (considering right-left hand dominance). Samples were inoculated to EMB (Eosine Methylene Blue) and blood agar culture media. Samples with different colony morphologies were assessed with Gram staining after 24 hours. Gram-positive cocci were further processed with catalase, coagulase (tube and slide), inoculated to Mueller Hinton culture medium by adjustment to 0.5 Macfarland, (FOX) sefoxitine disc placed onto it. Resistant and sensitive bacterias were assessed through CLSI criterias.

Results: We assessed 42 different samples and monitored 4 different types of colonies at 1 sample, 3 different types of colonies at 8 samples, 2 different types of colonies at 16 samples and 1 type of colony at 15 samples. There were no bacterial growth at recently washed and weared 2 laboratory coats' sleeves. Bacterial growths are determined as; 39 MSCNS (Methicilline sensitive coagulase-negative staphylococcus), 5 MSSA (Methicilline sensitive *Staphylococcus aureus*), 9 MRCNS (Methicilline resistant coagulase-negative staphylococcus), 11 *Micrococcus*, 4 *Bacillus* spp., 1 alpha hemolytic streptococcus, 1 gram-negative bacillus and 5 yeast.

Conclusion: Contacting of laboratory coat sleeves with working areas prepares suitable medium for microorganism colonization. 95% bacterial growth at samples and 62% of different types of bacterial colonization support this thesis. We can recommend, not to wear laboratory coats which have sleeves but wear non-sleeved laboratory coats, and as a basic principle, washing hands through elbows can be preventive at hospital infection control.

Keywords: Scrubs, sleeve, bacterial colonization

PS-122

Microbiological Evaluation of Water Used in Dental Procedures

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Introduction: Cross-infection can most likely occurrence during the dental practice because it is the most used areas of water systems. In dentistry, water is used for cooling of high speed aerators, cleaning of working area and rinsing the mount. Water channels in dental units are ideal for bacterial growth and biofilm development. Microorganisms can break off this layer and, they can reach to the patient's mouth and the clinical atmosphere. Centers of Disease Control and Prevention (CDC) reported that water systems in dental units should not have heterotrophic bacteria over 200 cfu/mL. The presence of these bacteria, especially in immunocompromised patients, can increase the risk of infection at the many dental procedures.

Aim: In this study, it have been aimed that to evaluate the bacteria that contaminated the water passage of dental units in dentistry clinics.

Materials and Methods: Water samples were collected from the clinics (Restorative Dentistry, Endodontic, Pediatric Dentistry, Prothetic Dentistry) most common used of air-water spray and aerators. Samples was collected from aerator's tip and air-water spray of 37 dental units to sterile container. Cultivations of bacteria were performed onto blood agar and EMB agar in Infectious Diseases and Clinical Microbiology Laboratory. Identification procedures were provided with conventional systems.

Results: In a public hospital, high rate of *Pseudomonas* spp. (10×10^6 CFU/mL) have propagated at five aerators and one air-water spray of dental units. Any microorganisms have propagated at the samples collected from air-water spray and aerator's tip of these units. Any pathogen was found in the water systems of remaining 31 units.

Conclusion: To prevent the formation of biofilms, it is necessary that piped water reaching the dental units should be disinfection and controlled the samples taken at certain times.

Keywords: Dental units, water

PS-123

Processing Supplies Ventilatory Therapy: A Study of Integrative Review of Scientific Literature Brazilian

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Introduction: The prevention and control of nosocomial infections represent a major challenge to be overcome by all professionals involved in patient care, from those who administer health services to carers care. Concern about the impact of nosocomial infection in the general and recovery to customers, which undermines directly the quality of care provided, as well as costs associated with the increase in length of stay and spending the treatments needed to establish health patients, has guided studies to find solutions to prevent and control infections in hospitals.

Objective: Search for evidence the practice of processing items ventilation therapy in national nursing publications.

Methods and Results: This study of survery of the literature for the purpose of evidencing in the national literature as is the practice of processing of materials of ventilatory support. As much the national literature as the technical manuals published recommend for the articles for ventilatory assistance processing the cleaning accomplishment, followed by the high level disinfection by the humid head on temperatures over 70°C for the period of 30 minutes, the saturated vapor sterilization under pressure for termoresisting articles or the sterilization under low temperature to the termosensible articles.

Conclusion: Given the reduced number of publications about the subject, the collected informations standed us out the need of a better cleaning process and disinfection control, since the available technologies aloud us to reach a relevant index on the processed material quality and safety impact and, when it does not happen, becomes aggravanting in virtue of the infections by pneumonias in UTIs.

Keywords: Infection, disinfection and nebulizers

PS-124

Evaluation of Refectory Personnel's Knowledge on Hygiene, Hand Washing and Kitchen Sanitation in Eskisehir Yunus Emre State Hospital

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Objective: The aim of this study was to evaluate education effectiveness and knowledge of refectory personnel on general hygiene, food hygiene, hand washing, and kitchen sanitation.

Materials and Methods: Eskisehir Yunus Emre State Hospital has 528 beds and total 45 personnel works in the kitchen. An education was given to all kitchen personnel on general hygiene, food hygiene, hand washing, and kitchen sanitation. A pretest before the education and a post-test after the education were performed. The test included 10 questions and statistical analysis was made by SPSS 13.0 software.

Results: The mean age of personnels was 38 years (range, 19-51 years). Of the personnels, 57.8% were male. The duration of working at our hospital was ranged between 1 to 312 months, and the mean duration was 70 months. The education level of our personnels was as follows: 51.1% primary school, 28.9% secondary school, 17.8% high school, and 2.2% university.

The mean rate of correct answers was 73.3 in the pretest before education whereas it was 87.3 in the post-test after education. There was no significant difference in knowledge scores before and after the education (p= 0.380). In the pretest, the highest rate of correct answers (88.9%) was given to the question of cross-contamination. The highest rate of wrong answers (66.7%) was given to the question of foodborne poisoning. Among the questions of general hygiene, hand washing and kitchen sanitation in the pretest, the highest rate of correct answers (91.1%) was given to question of hand washing, whereas the highest rate of wrong answers (53.3%) was given to the question of kitchen workbench sanitation.

In the post-test after the education, among the questions on food hygiene, the highest rate of correct answers (100%) was given to separation of kitchen equipments; the highest rate of wrong answers (44.4%) was given to foodborne poisonings. Among the questions of general hygiene, hand washing and kitchen sanitation in the post-test, the highest rate of correct answers (95.6%) was given to questions of hygiene definition and hand washing, whereas the highest rate of wrong answers (17.8%) was given to the question of kitchen workbench sanitation.

Conclusion: The knowledge of kitchen personnel on general hygiene, food hygiene, hand washing and kitchen sanitation was at a high level before the education. The education reduced the rate of wrong answers. We suggest that periodic educations may increase the level of knowledge and awareness of personnel working in the kitchen.

Keywords: Hygiene, hand washing, kitchen personnel

PS-125

Evaluation of Laundry Personnel's Knowledge Level on Hygiene, Hand Washing and Laundry Sanitation in Eskisehir Yunus Emre State Hospital

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Objective: The aim of this study was to evaluate the effectiveness of education and knowledge level of laundry personnel on general hygiene, hand washing, laundry sanitation, and the use of preventive equipment.

Materials and Methods: Eskisehir Yunus Emre State Hospital has 528 beds and a total of 9 personnels works in the laundry. An education was given to all laundry personnel on general hygiene, hand washing, laundry sanitation, and the use of preventive equipment. A pretest before the education and a post-test after the education were performed. The test included 10 questions and statistical analysis was made by SPSS 13.0 software.

Results: The mean age of participants was 44.8 years (range, 39-51 years). Of the participants, 77.8% were female. The duration of working at our hospital was ranged between 12 to 84 months, and the mean duration was 42.7 months. All participants had a background education at least once. The mean rate of correct answers was 58.8 in the pretest whereas it was 83.3 in the post-test. There was no significant difference in knowledge scores before and after the education (p= 0.285). In the pretest, the highest rate of correct answers (88.9-100%) was given to the questions on hand washing and the question on preventive equipment use was always answered correctly (100%). The highest rate of wrong answers (100%) was given to the question on personal hygiene rules. Among the questions of general hygiene in the pretest, the highest rate of correct answers (88.9%) was given to the question on cleaning laundry floor surface, whereas the highest rate of wrong answers (66.7%) was given to the question on device use and to do washing.

In the post-test after the education, among the questions on general hygiene, the highest rate of correct answers (100%) was given to hand washing and preventive equipment use; the highest rate of wrong answers (77.8%) was given to personal hygiene rules. Among the questions of general hygiene and laundry sanitation in the post-test, the highest rate of correct answers (100%) was given to questions on laundry floor surface cleaning.

Conclusion: The level of knowledge on hand washing, preventive equipment and surface cleaning was high before the education in the personnel of laundry room. In the post-test after the education, the success rates on the questions of device use and hand washing were increased. We suggest that periodic educations may increase the level of knowledge and awareness of personnel working in the laundry room.

Keywords: Hand washing, laundry sanitation, laundry personnel

PS-126

The Evaluation and Follow-Up of Penetrating Device Injuries in Eskisehir Yunus Emre State Hospital

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Objective: The aim of this study was to investigate the frequency of penetrating device injuries in hospital personnels during the 5-year period between January 2008 and December 2012. We also investigated hepatitis B and C, HIV seropositivity and hepatitis B and tetanus prophylaxy after the injury.

Materials and Methods: The study included 105 personnels admitted to Infection Control Committee due to a penetrating injury between January 2008-December 2012. HBsAg, anti-HBs, anti-HCV, anti-HIV test and ALT, AST levels were studied in all patients on the day 0 following the injury. During follow-up period, HBsAg, anti-HBs, anti-HCV, anti-HIV test and ALT, AST were studied at the end of 2nd month, at the 3rd and 6th months.

Results: The number of perforating/cutting device injuries among the personnel in the years 2008, 2009, 2010, 2011 and 2012 were 11, 10, 17, 32, and 35 respectively. The mean duration at work was 9 ± 7.6 (min 1-max 32) years. 104 (99%) personnel had an education before the injury. Of the 105 injured personnel, 34 (32.4%) were working at surgery, 32 (30.5%) were working at internal services, 21 (20%) were operating room personnels, 10 (9.5%) were working at intensive care unit, and 8 (7.6%) were working at emergency room. 66 (62.9%) of personnels were nurses, 3 (2.9%) were doctors, 22 (21%) were trainee nurses, 12 (11.4%) were cleaning personnels, 2 (1.9%) were anesthesia technicians. None of the injured personnels was anti-HCV and anti-HIV positive on the day 0. ALT and AST values were within normal limits (0-40 IU/mL) in 103 (98.1%) personnel on the day 0. Of the injured personnel, 91 (86.7%) were immunized against hepatitis B, and 56 (53.3%) were immunized against tetanus. Of the personnel without immunization to hepatitis B, 14 (13.3%) personnel received vaccination and 3 (2.9%) personnel received hepatitis B immunoglobulin. 27 (25.7%) of the source patients, were hepatitis C positive, and 8 (7.6%) were hepatitis B positive. 36 (34.4%) of the source patients were negative for all tests. The source patient was unknown in 34 (32.4%). The most common devices leading to injury were needle, scalpel and catheter in 90 (85.7%), 12 (11.4%), and 3 (2.9%) cases. The most common injury site was hand in 101 (96.2%) cases, and foot in 4 (3.8%) cases. At the time of injury, 71 (67.6%) of the personnels were using preventive equipment. 86 (81.9) deep and 19 (18.1%) superficial injuries were seen. During the follow-up, none of the personnels were seropositive for hepatitis B, hepatitis C or HIV.

Conclusion: Penetrating device injuries are more common among the nurses and assistant health personnel in our hospital. Admissions to infection committee have been increasing during the past years. This may be explained by an increase in the awareness. Despite the fact that most of the personnel had education on this subject and they use preventive equipment, these injuries may be explained by abundance of emergency interventions and busy work hours.

Keywords: Penetrating injury, seropositivity

PS-127

Evaluation of Personnel's Knowledge About Cleaning and Disinfection of Risk Areas in Our Hospital

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Objective: The aim of this study was to evaluate efficacy of education and knowledge of personnel about cleaning and disinfection of risk areas.

Materials and Methods: Eskisehir Yunus Emre State Hospital has 528 beds and total 219 personnel works for cleaning. An education was given to 71 cleaning personnel (intensive care, operating room, dialysis, infectious disease clinics, emergency room, chemotherapy unit, burn unit and laboratory) on the cleaning and disinfection of risk areas. A pretest before the education and a post-test after the education were performed. The test included 10 questions and statistical analysis was made by SPSS 13.0 software.

Results: The mean age of personnels was 38.3 years (range, 21-54 years). Of the personnels, 54.9% were male. The mean duration of working at our hospital was 39.7 months. All personnels had a education at least once on this subject. The education level was as follows: 1.4% literate, 66.2% primary school, 14.1% secondary school, 16.9% high school, and 1.4% university. The mean rate of correct answers was 68.02 in the pretest before education whereas it was 75.35 in the post-test after education. There was statistically significant difference i n knowledge scores before and after the education (p= 0.02). In the pretest, the highest rate of correct answers (91.5%) was given to the questions on the cleaning of patient blood on the floor and dilution rates of bleach. The highest rate of wrong answers (66.2%) was given to the question on the definition of microorganism. In the post-test after the education, the highest rate of correct answers (94.4%) was given to the question on the cleaning of patient blood spilled on the floor; the highest rate of wrong answers (60.6%) was given to the question on disinfection.

Conclusion: We suggest that periodic educations may increase the level of knowledge and awareness of personnels whom working at risk areas in hospital.

Keywords: Cleaning personnel, disinfection

PS-128

The Evaluation of Compliance to Hand Hygiene Rules in Intensive Care Unit of Eskisehir Yunus Emre State Hospital

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Objective: Increasing compliance to hand hygiene rules is the most effective method for preventing and limiting hospital infections. In our hospital, a regular education on the hand hygiene is given to intensive care personnel. Adherence to hand hygiene is observed during day and night-shift. And the results are participated regularly. In this study our aim was to evaluate the compliance of intensive care personnel to hand hygiene in the first six months of 2013.

Materials and Methods: Between 1 January-30 June 2013, adherence to hand hygiene rules was reported by infection control nurses on dayshifts and by supervisor nurse on nightshifts in 9-bed intensive care unit of our hospital, basic calculation formula and forms of World Health Organization Hand Hygiene Guide were used for the evaluation of compliance to hand hygiene (Appendix: 34). Statistical analysis was made by SPSS version 13.0.

Results: Total 1088 actions of 10 doctors, 24 nurses and 9 cleaning personnel in the intensive care unit were evaluated. These actions included behaviors before and after a contact to a patient, preparation to an aseptic intervention, after a risk of contact to bodily fluids, and contact to a patient's environment. Of the observed actions, 3.7%, 72.9% and 23.4% were performed by doctors, nurses, and cleaning staff, respectively. Adherence to hand hygiene rules was 50%, 77.4% and 75.5% among the doctors, nurses and cleaning staff, respectively. The rate of performing hand hygiene was 66.9% before a contact to a patient, 69.9% before an aseptic intervention, 81.2% after a risk of contact to body fluids, 86.8% after a contact to a patient, and 71% after a contact to the environment of a patient. Of the 265 actions observed before a contact to a patient, 20% were hand washing, 46.8% were application of hand antiseptics, and 33.2% failure to compliance to hand hygiene. Of the 348 actions observed after a contact to a patient, 50.3% were hand washing, 36.5% were hand antiseptic use, and 13.2% failure to compliance to hand hygiene. Of the 200 actions observed after a contact to environment, 36% were hand washing, 35% were hand antiseptic use, and 29% failure to apply hand hygiene. Of the 123 actions observed before an aseptic intervention, 17.9% were hand washing, 52% were hand antiseptic use, 30% were failure to compliance to hand hygiene. Of the 160 actions observed after a contact to body fluids, 55% were hand washing, 26.2% were hand antiseptic use, and 18.8% were failure to apply hand hygiene. During the 6 months of the study, 30 different education on hand hygiene were given to personnels.

Conclusion: Compliance to hand hygiene was highest after a contact to a patient and body fluids. Compliance rate was at lowest in doctors. In order to increase compliance to hand hygiene, education to personnels regularly, continue to observation and results reported back to the personnels are important.

Keywords: Hand hygiene, intensive care

PS-129

Investigation of Akacid Plus Fogging Effectiveness in High Risk Settings

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Introduction: Operating theaters are one of the high risk settings due to contamination risk in disinfection applications. Cleaning and disinfection of operating theaters should be performed more carefully since they may possess risk for surgical site infections.

Aim: In this study, we aimed to evaluate the effectiveness of a novel polymeric guanidine compound, Akacid Plus.

Materials and Methods: Environmental sampling is performed from various places including operation theatre lights, operation theatre tables, mayo tables, surgical instrument cabinets, anesthesia machine, anaesthetic drug cupboard, cautery, air condition and walls. Akacid Plus solution at 0.5% concentration is used for disinfection. A total volume of 1.2 liters Akacid solution is dispensed with an aerosol applicator (Prowi-06, Germany) by fogging in a room of 40 m^3 during 45 minutes. Control environmental sampling is performed after two hours from application. Later on the 15th and 30th days of disinfection, new samples are taken from same areas. HiTouch HexaChrome Flexi Plates are used for cultures. Plates are incubated at 370^{o}C for 24-48 hours in 5% CO_2 atmosphere.

Results: Culture of samples, taken before disinfection, yielded *Aspergillus* spp. *Pseudomonas aeruginosa*, *Klebsiella pneumoniae*, *Escherichia coli*, *Enterococcus faecalis* and *Staphylococcus aureus*. The most common organism was *P. aeruginosa*. There wasn't any growing organism on cultures of samples taken after 2 hours, 15 days and 30 days of disinfection.

Conclusion: A novel polymeric guanidine compound, Akacid Plus was found to be effective at 0.5% concentration by fogging during 45 minutes application. According to its manuel Akacid Plus is effective for at least six months. In our study, last control culture was taken one month after the application and compound was found effective against common hospital environment pathogens in this one month period. In order to decrease surgical site infection rates and prevent patients from hospital infections, detailed cleaning and disinfection of operating theatres are necessary, and disinfectants with prolonged microbicidal effect can help to improve this process.

Keywords: Disinfection, intensive care unit

PS-130

Comparison of the Efficacy of Two Disinfectants; BACOBAN and BAMB

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Introduction: For the recent years hospital acquired infections have been increasing due to various reasons. Nosomial infections have high morbidity and mortality. These infections most frequently are caused by bacterial pathogens like meticillin resistant *Staphylococcus aureus* (MRSA), vancomycin resistant *Enterococcus* spp. (VRE) and *Acinetobacter* spp. Nosocomial pathogens may colonize the hospital environment and equipments and can transmit from patient to patient via these equipments. One of the way to decrease the rate of nosomial infections is to use disinfectants for cleaning the critical surfaces in the hospital.

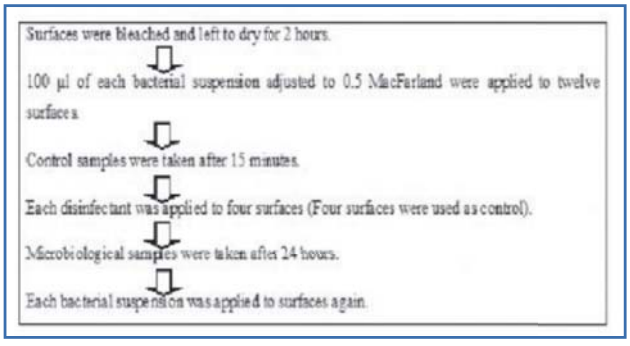
Aim: In this study, it was aimed to compare the efficacy of a newly produced surface disinfectant, Bacoban (Adexano, Germany), with another surface disinfectant BAMB (Gereme-Curtisium-BAMB, Turkey) which is frequently used in disinfection of hospital environment, using the strains most frequently isolated from hospital acquired infections.

Materials and Methods: Before experiment, twelve identical surfaces were used. Of these twelve surfaces, four were used for Bacoban, four were used for BAMB and four were used as control without applying any disinfectant. Bacterial suspensions of spore forming *Bacillus subtilis* ATCC 9372 and clinical isolates of VRE, MRSA and *Acinetobacter* spp. were adjusted to 0.5 MacFarland. 100 µL of each bacterial suspensions were applied to three surfaces seperately (totally twelve surfaces) and control samples were taken from the surfaces after 15 minutes. Bacoban (Adexano, Germany) was diluted with distilled water at the concetration of 1:100. BAMB (Turkey) was ready to use. Each diluted disinfectant was applied to four surfaces (Figure 1). After 24 hours, microbiological samples were taken by sterile swabs which were dipped into triptic soy broth. Swabs were streaked onto 5% sheep blood agar and media were incubated under aerobic conditions for 48 hours. After microbiological samples had been taken, same bacterial suspensions were applied to surfaces again everyday. Samples were taken from surfaces everyday till 11th day. Bacteria grown on media were identified with conventional methods and Vitek 2 system (Biomerieux, France).

Results: Bacteria were grown at comparable quantities from control samples taken from surfaces. *B. subtilis* grew on the media from the sample taken from surface applied with BAMB after 24 hours where as *B. subtilis* did not grow on the media taken from surface applied with Bacoban untill 72 hours. VRE, MRSA and *Acinetobacter* spp. were grown from surfaces applied with BAMB after 72 hours. However, these bacteria did not grow from surfaces applied with Bacoban until 11th day.

Conclusion: As a result of the study, Bacoban seems to be more efficient as a surface disinfectant against frequently isolated hospital acquired bacteria than BAMB. It is important to know the efficacy of the disinfectant before it is used in the hospital since the efficay of different disinfectants can vary.

Keywords: Disinfectant, efficacy



Flowchart of the procedure

The day of growth and the number of the colonies of the microorganism growth for the two disinfectants

	Day of growth (Bacoban)	Number of colonies (Bacoban)	Day of growth (BAMB)	Number of colonies (BAMB)	Day of growth (Control surfaces)	Number of colonies (Control surfaces)
B. subtilis	3rd	100	1st	50	1st	50
VRE	not till 11th	0	3rd	7	1st	40
MRSA	not till 11th	0	3rd	30	1st	50
Acinetobacter spp.	not till 11th	0	3rd	30	1st	40

PS-131

Assessment of Terminal Disinfection Effectiveness with a Hydrogen Peroxide Based Disinfectant in an Intensive Care Unit

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Introduction: Hospital infections are common in intensive care units (ICU's), moreover 25% of all total hospital infections are seen in ICU's. Environmental surface can harbor various pathogen microorganisms in ICU's where moist and organic waste are abundant. Therefore surface can be assumed as potential pathogen source and an effective disinfection policy is always required to avoid indirect contamination from surface to patients.

Aim: In this study we aimed to evaluate the effectiveness of environmental disinfection using a hydrogen peroxide solution by fogging in an internal medicine ICU.

Materials and Methods: Environmental sampling was made from 45 different places in internal medicine ICU, additionally hands and anterior nares of 16 health care workers (HCWs) and two cleaners are sampled simultaneously. After that, patients are transferred to other ICU's temporarily. Mechanical cleaning followed by terminal disinfection with a hydrogen peroxide based disinfectant by fogging were done in empty ICU. Entries to ICU were restricted for three hours according to manufacturers recommendations. After this procedure, control samples were taken from same places.

Results: There wasn't any microbial growth in cultures from HCWs' hands. Methicillin susceptible *Staphylococcus aureus* (MSSA) was isolated from 2 (11.1%) of the nasal cultures. In environmental sample cultures, S*phingomonas paucimobilis* was isolated from 5 (11.1%), Methicillin resistant *S. aureus* and MSSA were isolated from one (2.2%) of the oxygen humidifiers. *Acinetobacter baumannii* was isolated from 5 (11.1%) different places including two monitors, one bedside, one keyboard and dressing troley. *Proteus mirabilis* was isolated from 1 (2.2%) of the refrigerators. *Corynebacterium* spp., *Micrococcus* spp. and methicillin resistant coagulase-negative *Staphylococcus* were isolated from 22 (%48.8) of environmental samples with abundant growth. ICU staff were informed about the culture results, warned about standart precautions and also a detailed training about possible sources of contamination and cross-contamination given to them. There wasn't any growing organism on control environmental cultures taken after terminal disinfection done right after staff training.

Conclusion: Negative culture results of control samples taken after terminal disinfection with a hydrogen peroxide based environment disinfectant, are interpreted in favor of the product effectiveness.

Keywords: Intensive care unit, disinfection, hydrogen peroxide

PS-132

Long Term Effect of Detergent-Disinfectant Bacoban on Microorganism Infected Surfaces

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Introduction: Disinfection is a process,which is useful on inanimate objects, eliminates all microorganisms but the bacterial spores. Disinfection process is effected when liquid chemicals or wet pasteurization is used. Bacoban, produced by nanotechnology, is a disinfectant which is non-destructive for environment and living creatures. It contains ethanol, benzalkonium chloride, isopropanol, sodium pyrithione, polilondanse, methyl ethyl kethon and distilled water.

Objective: To show the effect and the duration of Bacoban on *Pseudomonas aeruginosa*, vancomycin resistant enterococcus, *Candida albicans*, *Escherichia coli*, *Klebsiella pneumoniae* microorganisms.

Materials and Methods: Ten wall tiles were taken and grouped in pairs and each pair contaminated with one of the microorganisms stated above. One of the tiles for each organism was sprayed with Bacoban from 30 cm for five times The other wall tile was reserved for control group. All wall tiles were incubated for 21 days in room temperature,and during this period samples were taken on the 1th, 3rd, 7th, 14th and 21st day. After each sampling the tile were re-contaminated with the same microorganism, without applying any further bacoban on the tiles. All the samples were inoculated on sheep-blood agar for 24 hours and then a colony count was made.

Results: Culture samples taken on the 1st, 3rd, 7th, 14th and 21st days were evaluated. There was no bacterial growth on the tiles that were disinfected with bacoban where as there was bacterial growth on all samples obtained from the control group.

Conclusion: Bacoban's been proven to have a long time disinfectant effect.

Keywords: Bacoban, disinfectant

PS-133

The Hand Hygiene Trainings Contribution to Use of Hand Disinfectant, in Samsun Gazi State Hospital

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Introduction and Aim: The hundreds of studies in the world have shown that, hand hygiene is the most important tool to control and prevention of health care-associated infections. Today in our country, as well as all over the world the importance of hand hygiene is increasing awareness and many studies and activities stressing the importance of the issue are performed. The aim of this study is that to investigate whether we have done hand hygiene trainings in our hospital, present sufficient awareness on health care personnel.

Materials and Methods: Hand hygiene trainings in 2011 and 2012 in our hospital and consumption the two-year of hand disinfectants used in the hospital after these trainings were reviewed.

Results: Thirteen hand hygiene educations are given in regular intervals in 2011 (total number of employees: 1367) and 2012 (total number of employees: 1357) in our hospital, medical staff working in specialist physicians, midwives, nurses, health officers, medical technicians, data element, officers joined these trainings. One hundred and sixty three people participated in these trainings in 2011, the amount of used hand disinfectant in all departments of our hospital, has been 1223 liters. Four hundred and forty two people have been trained in 2012, and the amount of used hand disinfectant has been 2451 liters. The most of consumption (100 liters) has been in intensive care service in 2011. The most of consumption (311 liters) has been in the emergency department in 2012 (Table 1).

Conclusion: Regular hand hygiene educations throughout for two years in our hospital has been significantly contribution to the use of hand disinfectant, an awareness has occurred. We observed that these trainings contribution to the increase in consumption hand disinfectant per patient and per person, reduction in falls from 14.16% to 10.15% hospital-acquired infection rates in 2011 and 2012.

Keywords: Hand disinfectant, training

Table 1. Training and consumption hand disinfectant by year

Year	Total staff	Trained staff	Total consumption (litres)	Per person consumption (litres)	Infection rate (%)	Number of inpatient	Per patient consumption
2011	1367	163	1223	0.895	14.16	23.030	0.053
2012	1357	442	2451	1.806	10.15	15.804	0.155

PS-134

According to Groups and Years, Evaluation of Association Between Hand Hygiene Compatibility and Hand Hygiene Training for Health Staff Who Works for Istanbul Province Anatolia South Puplic Hospital Union Kartal Kosuyolu High Specialization Training and Research Hospital

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Introduction and Aim: Purpose of this study is to examine hand hygiene compliance of healthcare staff working for Kartal Kosuyolu High Specialization Training and Research Hospital.

Materials and Methods: All clinics in this hospital had been seperately examined and datas in all hospital had been considered. Hand antiseptic consumption and hand hygiene training were compared according to 2011 and 2012 year. During searching, hand washing and usage of hand antiseptic were overseen by observer members on all clinics of hospital according to profession groups and these information were recorded to related forms for per 3 months.

Results: It was detected that hand washing rates for 2011 is respectively 58%, 77%, 45%, 70% on pyhsician, nurse, deputy healthcare staff, cleaning staff teams. For 2012, respectively it was detected as 70%, 87%, 79%, 71%. Hand hygiene training that given hospital all staff at least 1 time for each year in 2011 was arranged as 1 time for at least 3 months in 2012. Other than training, through hospital automation system, messages was sent to all users regularly per months with the aim of create awareness for hand hygiene importance. When it was compared for all profession groups for 2011 and 2012, it was observed that hand hygiene compatible was increased proportionally thanks to regular trainings.

Conclusion: It can be understood that increasing hand washing and hand antiseptic usage rates are related with hand hygiene training programmes.

Keywords: Hand hygiene, training, automation

PS-135

Antimicrobial Activity of Gel Used in Ultrasound Probes

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Introduction: Ultrasound gels are materials that can be used in many areas such as ultrasound, ECG electrodes, and epilation procedures. During ultrasonography, it is used to increase the lubricity of transducers on the examined area and to prevent air bubble formation. The optimal level of fluidity, the transparent and odorless nature of gels, and their ability to produce high image resolutions are among the reasons for its preference in use.

Materials and Methods: The current study investigated whether the ultrasound gel (Diagnokim) that was used on USG probes in our hospital were aseptic or not. Samples before and after the procedures were taken from the probes that were used in emergency and service. Swabs that were moisturized with sterile water were used to obtain samples. The swabs were transported to medium containing thioglycolate and they were incubated for 48 hours. The fluids in turbidity tubes were inoculated to chocolate agar, blood agar, and eosin-methylene blue agar. The growing microorganisms were defined by conventional methods. By using the disc diffusion method, an antibiogram of growing microorganisms was conducted. The antimicrobial activity was investigated by treating the gel with different concentrations of various quality control strains of bacteria (Figure 1).

Results: The isolated bacteria in probes before and after use are given in Table 1.

Conclusion: It was discovered that the ultrasound gel that is used in our hospital only lowered growth slightly, but does not inhibited completely. In conclusion, USG probes can play a role in the transmission of bacteria from one patient to another and proper precautions should be taken accordingly.

Keywords: Ultrasound probe, gel, antimicrobial activity

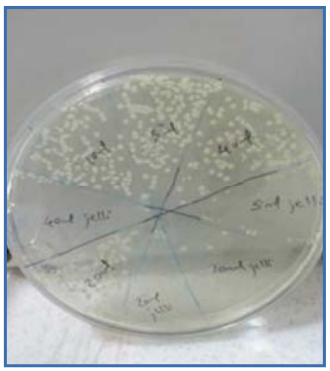

Figure 1. Antimicrobial activity of probe gel

Table 1. The isolated bacteria in probes before and after use

Probes	Growing bacteria before use	Growing bacteria after use
Tip of service probe	MSCNS diphtheroid	MRCNS diphtheroid
Edge of service probe	CNS	No growth
Tip of emergency probe	Enterococci MSSA	*Bacillus* spp. Enterococci spp. *Providencia* spp.
Edge of emergency probe	*Pseudomonas* CNS	*Pseudomonas* Enterococci

The growing bacteria in probes before and after use.

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Disinfection Process in Central Sterilization Unit

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Introduction: Accurate and succesful disinfection process is the primary step for succesful sterilization process. In this article, we evaluated the disinfection procedures within a research and training hospital with 1250 patient beds.

Aim: This study aims to;

- Pointing out the importance of obtaining an appropriate sterilization process and keeping the process up
- Pointing out the prosecutions to be taken for patient and stuff safety
- Extending the usage term of reusable devices and providing a financial support for hospital's budget

Materials and Methods: Disinfection and re-use process of all surgical tools coming from all units of the hospital is an essential step for avoiding and striving hospital acquired infections. Reliable disinfectants, appropriate machine programs, disinfectors should be chosen. In our experience, disinfection steps should cover the following steps;

1. Amount and brand of the rinsing solution should be in accordance with the disinfector machine manufacturer's prescriptions
2. Disinfection process should be made by an expert stuff in this field and in accordance with the manufacturer's instructions
3. Brand new (if not sterile) devices should also undergo a disinfection process
4. Devices should be pre-cleaned after using without spooling them thus possible organic residual formation and corrosion formation caused by pathogens may be avoided
5. Special device cleaning brushes, pressurized water and blowguns should be used for pre-cleaning the devices especially the ones with lumens
6. Solution of the ultrasonic washer should each time be prepared in accordance with the instructions
7. During the solution selection process manufacturer's suggestions should also be considered besides effective,low cost and corrosive free products should be considered
8. Devices made of different metallic alloys should not be washed in an ultrasonic washing device within the same time
9. All devices to be washed within the ultrasonic device should be sinked completely into the solution
10. Vibrations should be avoided while loading the heavy equipments
11. Lam test should be performed for controlling the performance of ultrasonic washer
12. Tight placement of the tools should be avoided if disinfections porcess will be performed within a disinfector
13. All removable parts of the tools should be deattached
14. All articulated tools should be completely opened and placed inside the basket vertically
15. Endoscopic and laparoscopic tools should be placed inside the appropriate parts of the disinfector
16. Performance of the disinfection machines performance is controlled via contamination ratio test

Results and Conclusion: Following the steps mentioned above during the disinfection cycle process in our sterilization unit leads us to protect patients and stuffs, accurate procedures and no significant bacterial growth has been observed as we follow the sterilization standarts and our success depends on being audited regularly ve applying new improvement policies.

Keywords: Disinfection, ultrasonic washer

PS-137

Analysis of Determined Urinary Infections After Endoscopic Process at Urology Department

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Objective: Instruments that are used in hospital should be decontaminated. According to Spaulding procedure, medical devices are divided in to three groups which comprise infection risk; non-critical, semi-critical and critical medical devices. Insufficient sterilization/disinfection of medical devices might cause infection, even epidemics. In this study identification of the source of increasing infections after using flexible endoscope during urological surgery was aimed.

Materials and Methods: In our hospital, active surveillance system based both laboratory and patients are used. During our daily observations, we determined the raise of frequency of infections in urology department with using flexible ureteroscope (URS) and searched the origin of it. According to literal information, cleaning and disinfection process in cleaning area for endoscopes was observed all working days (between 08 am-17 pm). Information about the process was collected and got samples for microscopic analysis. Cleaning and disinfection process of endoscopes follows; pre cleaning, air leakage test, manual cleaning and rinsing, high level disinfection, last rinsing, drying and keeping/storage processes. Samples were taken from distal end of endoscope, aspiration part and air/liquid entering valves, entering of biopsy lids, cleaning-rinsing and drying area of endoscopes, keeping bags, disinfectant solution and disinfectant dishes.

Results: Between January and July in 2013, 136 patients, implemented flexible URS, were examined and after May 2013, infection was determined for 14 patients in 84 implemented flexible URS (17%). 15 types of microorganisms were isolated. These microorganisms were; *P. aeruginosa* (9) 60%, *E. coli* (2) 13%, *K. pneumoniae* (2) 13%, *E. gallinarum* (1) 7%, and *A. baumannii* (1) 7%. In 9 patients, sending period of urine samples for analysis, after contact of flexible URS, was 1-5 days (64%) in 5 patients 10 days and above (36%). Also, on the sinks in cleaning area some microorganisms were found.

Conclusion: Instruments used in contact with mucus membrane or non intact skin are semi critical medical devices. These devices require high level disinfection, all microorganisms should be aimed to kill or destroy besides bacterial spores. For all critical medical devices and instruments which are resistant to heat, steam sterilization could be preferred. For other medical devices which are heat sensitive, ETO sterilization or plasma should be preferred. Flexible URS enters in sterile cavity of patients. So if the same device will be used for another patient, cleaning and disinfection process must be critically important and all steps should be applied without skipping any of them and must be documented.

Keywords: Endoscopic surgery, sterilization and disinfection, the endoscope disinfection

PS-138

A New Generation of High Level Disinfectants (VIRUSOLVE+) Bis (3-Aminopropyl) Dodecylamine, Didecyldimonium Chloride Studies on Effectiveness of Colonoscope Disinfection

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Objective: Medical and surgical devices used in hospitals should be cleaned and disinfected to a certain extend according to their place of use. Dr. E. H. Spaulding divides medical devices into categories based on the risk of infection involved with their use in 3 categories critical, semi critical, non-critical. A device that enters normally sterile tissue or the vascular system or through which blood flows should be sterile. Such devices should be sterilized, A device that comes into contact with intact mucous membranes and does not ordinarily penetrate sterile tissue. These devices must be sterilized or should receive at least high level disinfection (HLD). This study is done to test HLD effectiveness of the "VIRUSOLVE+" disinfectant on colonoscopes in our hospital.

Materials and Methods: A HLD named VIRUSOLVE+ which has main ingredients Bis (3-Aminopropyl) dodecylamine, Didecyldimonium chloride is tested on colonoscopes in Bagcilar Training and Research Hospital. The aim of HLD is defined as the destruction of all vegetative microorganisms, mycobacterium, small or no lipid viruses, medium or lipid viruses, fungal spores, and some bacterial spores. The precondition for disinfection and sterilization is effective cleaning. And an effective cleaning reduces a high percent of biological burden. In some cases if there is no too much bacterial spores on device HLD may be equal to sterilization. The widely accepted decontamination steps of scopes: observation, leak test, manual cleaning and rinsing, high level disinfection and final rinsing, drying and keeping safe. VIRUSOLVE+ RTU High Level Disinfectant poured to disinfection vessel. At day 7 microbiological tests done. Samples from all channels taken into 20-40 mL saline solution, with sterile scope brush samples taken from biopsy channels (1-2 cm is cut from head of brush), with swabs samples taken from aspiration, air and water channels, biopsy channel valves. The brushes incubated in rich culture medium, swabs and saline samples in blood chocolate agar in 37°C for 48 hours and the results analyzed.

Results: The samples (saline samples, brushes, swabs) taken colonoscopes which are disinfected with "VIRUSOLVE+" at 7th day was clean (Table 1).

Conclusion: The medical procedure used to view the digestive tract, and other internal organs, non-surgically called endoscopy and the devices used for this reason called endoscopy. These devices come into contact with intact mucous membranes and do not ordinarily penetrate sterile tissue. These devices must be sterilized or should receive at least high level disinfection (HLD). When selecting a HLD a product that has EN test reports from accredited laboratories, material compatibility accepted by scope manufacturers and a low toxicity to human and environment must be main criteria. With this scope we have tested VIRUSOLVE+ in our hospital colonoscopies and happy to see that it is suitable for our use.

Keywords: High-level disinfection, the endoscope cleaning, the endoscope disinfection

Table 1. Test results of samples taken from colonoscopes

The sample kind and place	Result
Colonoscope liquid samples	No growth
Colonoscope brush samples	No growth
Colonoscope air/water channel	No growth
Colonoscope biopsy channel caps	No growth

PS-139

The Role of Training in Antisepsis to Prevent to Blood Culture Contamination

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Aim: Blood culture is the most sensitive method for detection of bacteremia or fungemia. Blood culture contamination causes longer hospital stays, unnecessary antibiotic use and removal of central lines, redundant laboratory testing and increased hospital costs. In this study, we aimed to give training to health care workers (HCWs) about skin antisepsis and therefore reducing blood culture contamination rates.

Materials and Methods: A team consisted of an infection control physician and an infection control nurse gave training to more than one hundred HCWs that is responsible for obtaining blood for culture about the correct method for obtaining a blood culture specimen, between 01.01.2011-31.12.2011. Blood culture results of the patients admitted to the hospital between the years 2009-2012 were reviewed retrospectively from hospital automation system.

Results: Blood culture specimens were incubated with the BacT/Alert 3D automated blood culture system (BioMérieux, USA), using both aerobic (BPA) and anaerobic (BPN) media. The data including isolated pathogens in blood cultures received from the automation system are given in Table 1. A blood culture was considered to be contaminated if at least one of the following organisms was identified in at least one of a series of blood cultures *Corynebacterium* spp., alpha- or gammahaemolytic streptococci, *Micrococcus* spp., and *Bacillus* spp. and *Propionibacterium* spp. Coagulase-negative staphylococci were considered contaminants if it was not diagnosed as disease agents.

Conclusion: The percentage of contaminated blood cultures were 16.07% in 2009, 12.80% in 2010 and 12.77% in 2011. After training period, during the second half of 2011, the ratio dropped to 8.56 % in 2012. Even though there is a 4% improvement with education, the contamination rate is still higher than 3% which is acceptable limits for bacterial contamination.

Keywords: Blood culture, antisepsis, contamination

Table 1. Contamination rates in blood cultures between 2009-1012

	Year 2009	Year 2010	Year 2011	Year 2012
Contaminant bacteria	440	497	422	448
Total number of bacteria isolated	1075	1247	1192	1213
Total blood culture	2737	3437	3444	5135
Contamination rate	440/2737 (16.07%)	497/3437 (12.80%)	422/3444 (12.77%)	448/5135 (8.56%)

PS-140

Disinfecting Agents which Used in Operating Rooms Effects on Healthcare Personnel Health

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Operating rooms are units with high infection rates and for his reason disinfecting agents are used occasionally. Disinfecting agents are chemical substances that wipes out pathologic microorganisms and ensures disinfection. These chemicals effects with different mechanisms and helps for preventing nosocomial infections. Even though disinfecting agents have beneficial effects, they also have toxic effects on human health. Especially, health personnel who works at operating rooms exposed to these effects frequently. Allergic reactions, asthma, skin and upper respiratory tract irritation, headache and nausea are most common toxic effects of disinfecting agents. Such as, a healthcare personnel who inhalates formaldehyde have respiratory tract irritation; and another one have nausea and hedache. Usage of hydrogene peroxide results with difficulty breathing and nausea, and on another personnel it develops allegic reactions. Gluteraldehyde also has similar toxic effect and respiratory system irritation is the most common effect of this chemical. This study investigates the toxic effects of disinfecting agents on healthcare personnel. Most of the toxic effects takes place with misusage of the disinfecting agents by the healthcare personnel. For this reason; educating the personnel, chosing the right agent, adjusting the time interval for using disinfecting agents are important and during the usage of disinfecting agents; precautions that should be taken by healthcare personnel must issued.

Keywords: Disinfection, disinfection losses, staff health

PS-141

Comparison of Antiseptic Efficacy of Octenidine Hydrochloride, Chlorhexidine Digluconate and Povidone Iodine for the Applications of Central and Peripheral Venous Catheterisation

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Introduction: Central and peripheral venous catheters is often used in patients, especially in intensive care units. The catheter site must be cleaned quickly and efficiently with an antiseptic agent, to prevent infections, nevertheless, most of the time, catheters inserted under emergency conditions, so that fast and effective cleaning of the skin is needed.

Aim: The purpose of this study is to compare the antiseptic efficacy of octenidine hydrochloride, chlorhexidine digluconate and povidone iodine for insertion of intravenous catheter.

Materials and Methods: Ninety patients aged between 18-65 years were included in the study. The patients were randomly divided into three equal groups. Skin disinfection was performed with 0.1% octenidine in the first group, with 10% povidone iodine in the second group, and with 1.5% chlorhexidine gluconate in the third group. Samples were taken for microbiological analysis with the swabs from the skin before and after the skin antisepsis. The samples were applicated first in the liquid medium, and then blood and EMB agar culture media. They were incubated for 24-48 hours at 37°C and colonies were counted after 24 hours.

Results: All groups were similar in terms of the demographic data. Four cases (13.3%) were found to be positive in the OHC group, 5 cases (16.7%) in the PI group, 2 cases (6.7%) in the CHG group. There was no statistically significant difference between groups in terms of antimicrobial effectiveness.

Conclusion: Octenidine hydrochloride, chlorhexidine digluconate, and povidone iodine have similar antiseptic efficacy for the applications of central and peripheral venous catheters.

Keywords: Octenidine hydrochloride, povidone iodine, chlorhexidine gluconate

PS-142

Evaluations of Hand Hygiene Compliance of the Health Care Personnel, Between the Years 2009-2012

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Aim: In the prevention and control of nosocomial infections, hand hygiene practices are of great importance. In this study, we aimed to raise awareness about the importance of hand hygiene and are intended to improve compliance with it for the hospital workers of the Ankara Diskapi Training and Research Hospital.

Materials and Methods: This study was conducted between January 2009 and December 2012. "Informed observations" were implemented only in intensive care units in 2009 and 2010, while since 2011 throughout the hospital. During the study, a total of 1099 hospital workers, including 288 physicians, 550 nurses, 144 staff and 117 cleaning staff were observed directly. Observations for per person made according to five indications recommended by World Health Organization (WHO); before touching a patient, before clean/aseptic procedures, after body fluid exposure risk, after touching a patient, after touching patient surroundings. During the study, the training about the importance of hand hygiene, hand hygiene indications and methods was given to all hospital workers at least once a year.

Results: Analysis of hand hygiene observations performed between the years 2009-2011 were not made according to five indications but overall compliance and differences of occupational groups. Examinations of compliance with hand hygiene by occupational groups during the study period are given in Figure 1. During this period, it was found that compliance with hand hygiene is the highest among nurses. Analysis by five indications has been started from the year 2012. Results for 2012 can be found in Figure 2. It was found that compliance with hand hygiene after body fluid exposure risk is the highest.

Conclusion: Considering the results of the observation, hand hygiene compliance was high during 2009-2010 related to the outbreak of pandemic influenza H1N1 and the campaign of 'danger in your hands'. Despite the continuation of training activities, decrease over the next years was remarkable. It can be said that lack of responsiveness of health professionals on hand hygiene and frequent changes in cleaning staff reduced hand hygiene compliance. Despite the continuation of routine hand hygiene training programs, continuation of decline for compliance followed over the year show that attention should be paid on unit-based training programs.

Keywords: Hand Hygiene, compliance

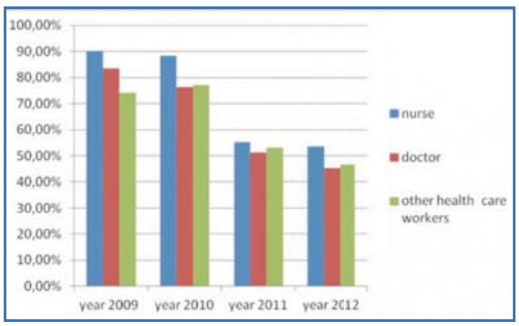

Figure 1. Distribution of hand hygiene compliance by occupational groups 2009-2012

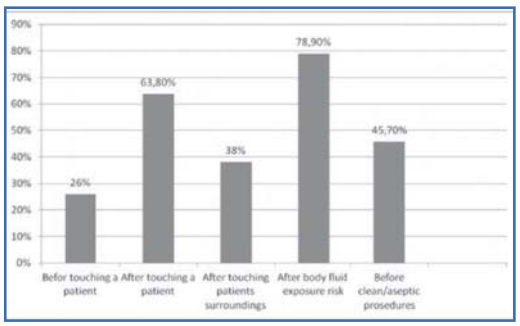

Figure 2. Compliance according to the five indications for hand hygiene in 2012

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Vancomycin Resistant Enterococcus Surveillance, Between the Years 2008-2012

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Aim: Vancomycin resistant enterococcus (VRE) infections is one of the hospital-acquired infections which extend the time of staying at the hospital, enhance the mortality and morbidity, affect the quality of living and has a limited therapeutic choice and the surveillance and control of these organisms have a great importance. The aim of this study is to analyze of VRE surveillance results in Diskapi Yildirim Beyazit Training and Research Hospital, between the years of 2008-2012.

Materials and Methods: VRE colonization surveillance with rectal swab cultures is carried out in intensive care units, hematology and oncology clinics starting from the year of 2008 on a monthly basis and starting from the year of 2011 on a weekly basis by Infection Control Team. VRE isolates, which cause colonization or infection during five-year period were recorded and analyzed by using SPSS 15.0 program.

Results: Between the years of 2008-2012, 4824 rectal swab cultures were obtained from 2772 patients. VRE colonization was determined in 2008, in 18 patients (4.6%) out of 394 patients; in 2009, in 10 patients (2%) out of 509 patients; in 2010, in 36 patients (6.6%) out of 543 patients; in 2011, in 73 patients (13.7%) out of 534 patients and in 2012, in 155 patients (19.6%) out of 792 patients. Five-year period, a total of 292 patients colonized with VRE were identified. During the same period, 290 enterococcal isolates from clinical specimens were diagnosed as disease agents. The distributions of these isolates according to the clinics were 158 in intensive care units, 129 in internal and surgery clinics, and 3 in emergency service. The distribution of clinical specimens, in which enterococcus were isolated, were as follows; 126 (43.4%) urine, 106 (36.5%) blood, 54 (18.6%) wound, 3 (1%) tracheal aspirates and 1 (0.3%) pleural fluid. It is determined that 37 (12.7%) of the 290 enterococcus isolates are resistant to vancomycin,

In the 20 (54%) of the patients on which VRE determined as disease agents, in preinfection period it is identified that microorganism exists with rectal swab culture.

Conclusion: Although VRE surveillance is made with rectal swab cultures, it is determined that approximately in half of the patients it is not possible to show colonization before VRE infection. In addition to sustaining surveillance studies, playing along with standard measures in every patient, improving compliance with cleaning procedure and hand hygiene will contribute to decrease in VRE colonization and infection frequency.

Keywords: Vancomycin resistant enterococcus, surveillance

PS-144

Evaluation of Relation Between Infection Speed in Intensive Cares and Annual Hand Antiseptic Consumption in Istanbul Province Anatolia South Public Hospital Union Kartal Kosuyolu High Specialization Training and Research Hospital in 2011-2012 Years

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Objective: Purpose of this study is to examine relation between hospital infection growing speed and hand antiseptic consumption in 3 seperate intensive care unit in Kartal Koşuyolu High Specialization Training and Research Hospital in 2011 and 2012.

Materials and Methods: Belong to 2011 and 2012 years, staying patient amount, staying day and instensive care hospital infection growing speed were compared to hand antiseptic consumption. 2011 and 2012 data for 3 intensive care units were compared.

Results: For 2011, staying patient amount is respectively 3502, 290, 4289; for 2012 these are respecitvely 3280, 385, 4565. For the same intesive care units, patient staying days are respectively 14007, 1766, 9896; for 2012 these are respectively 12964, 2393, 9937. For 2011 hospital infection speeds are respectively 8.08, 6.55, 1.28; for 2012 these are respectively 4.51, 4.94, 0.66. When 2011 and 2013 datas were compared, it can be seen that staying patient amount and patient days were generally increased in 2012 although it was detected that hospital infection growing speed was decreased. Hand antiseptic consumption was controlled per 3 months and when 2011 and 2012 years were compared, %51, %48, %20 increasing were seen.

Conclusion: Result is clear that inreasing hand antiseptic consumption decreased hospital infection speed in intensive cares.

Keywords: Hospital infection speed, hand antiseptic, intensive care units

PS-145

Assesment of Microorganism Colonization at the Health Professionals' Mobile Phones

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Introduction: Microorganism colonization of hands or touch-screen mobile phones have an important role in the development of hospital infections. Nowadays, mobile phones are one of the most frequently touched devices by health professionals. In this study, we have studied cultures which were taken from touch-screen mobile phones, microorganism colonizations and we have determined pathogenic microorganisms, also assessed whether these microorganisms take a role at the hospital infection development.

Materials and Methods: Samples were inoculated from surfaces of mobile phones to blood agar and EMB (eosine methylene blue) medium by sterile sticks. After 24 hours, microorganisms which have different colony morfologies were assessed by Gram staining. Gram-positive cocci furtherly processed with catalase and coagulase (tubeandslide), inoculated to mueller hinton culture medium by adjustment to 0.5 macfarland, (FOX) sefoxitine disc placed onto it. Resistant and sensitive bacteria were assessed through CLSI criterias.

Results: Bacterial growth was not monitored at 8 samples over 45 samples. There were 3 different types of growth at 5 samples, 2 different types of growth at 15 samples and 1 type of growth at 17 samples. After identification, bacterial types were determined as; 32 MSCNS (Methyciline sensitive coagulase-negative staphylococcus), 13 MSSA (Methyciline sensitive *Staphylococcus aureus*), 5 MRCNS (Methyciline resistant coagulase-negative staphylococcus), 7 *Micrococcus*, 4 *Bacillus* spp. and 1 alpha-hemolytic streptococcus.

Conclusion: Since touching frequently to mobile phones' surfaces, they become suitable media for microorganism colonization. Not to have proper hand hygiene before and after patient contact leads to microorganism transfer from patient or health professional to mobile phone surfaces. In order to break down this chain, hand washing is recommended as a basic principle or cleaning mobile phone with disinfectant tissue can be an alternative solution. Although there were not adequate sample quantity in order to compare there sult sprecisely, the fact that the users of mobile phones with no bacterial growth or only one colony growth belong to the laboratory professional shave show ed that using laboratory gloves and frequently washing hands can have an impact in substantial contribution at preventing hospital infection cycle between patients, health professional sand mobile phone surfaces, and this should be studied in much more large population groups.

Keywords: Microorganism colonization, mobile phone

PS-146

Disinfection of High-Speed Dental Equipment with 70% Ethanol without Previous Cleaning: Assessment of Cross-Infection Risk

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Introduction: In dental clinical practice, decontamination of high-speed dental equipment (HSDE) by direct use of 70% ethanol without previous cleaning, justified by practicality, the short-time available between appointments, together with inadequate supply and provision of HSDE, is a reality.

Objective: To evaluate the disinfection of HSDE with 70% ethanol without previous cleaning, concerning cross-infection risk prevention.

Materials and Methods: The present study was characterized as a pragmatic research in a dental office, of which practices of interest regarding the present study were routinely performed. The experimental group consisted of 100 samples of HSDE used in different treatments after having its outer surface rubbed with alcohol for 90 seconds. To evaluate the results, gauze moistened with saline solution was used as a carrier to obtain microorganisms from the disinfected surfaces. Half of the samples were analyzed by membrane filtration (Method I), with the gauze being immersed in 300 mL of saline solution. Sequentially, the sample was exposed to sonication and agitation. After that, the lavage was filtered in three equal parts for different analyses, through a 0.45-µm porosity membrane and seeded on blood agar culture medium, for recovery of aerobic and anaerobic microorganisms, as well as those specifically found in the human oral microbiota. The other 50 samples were analyzed by direct immersion of the gauze in culture medium (Method II): after rubbing the wet gauze on the outer surface of the HSDE, it was placed directly in Fluid Thioglycollate culture medium. The tube containing the gauze was shaken in a vortex mixer and then incubated at 37°C for 21 days.

Results: Samples analyzed by Method I, showed positive growth in 27/50 (54%) of the samples within the range of 100 to 102 CFU/sample. Of this total, 7 different microorganisms were identified, represented by 37.1% of coagulase-negative staphylococcus, 28.5% of *Bacillus* spp., 17.1% of non-sporulating gram-positive bacillus, 5.7% of *Micrococcus* spp., 5.7% of *Penicillium* spp., 2.8% of *Acinetobacter baumannii* and 2.8% of *Candida* spp. In the group analyzed by Method II, the total number of tubes with positive growth was 12/50 (24%) samples. Of this total, 2 different microorganisms were identified, being 38.4% of non-specific gram-positive bacillus, followed by *Staphylococcus* spp. and *Peptococcus* spp. with the same 30.7% percentage of positivity each. The negative control group, consisting of samples submitted to cleaning and consecutive sterilization showed satisfactory results. The mean growth found in the positive control group was 17.5 CFU/sample, except for one sample that showed uncountable growth.

Conclusion: The results of the present study do not support the practice of decontamination of HSDE with 70% ethanol without previous cleaning, based on the evidence of microorganism survival that did not meet the expected bactericidal and fungicidal action of alcohol as an intermediate level disinfectant. Another aspect that reinforces the disapproval of this practice is the consideration that even though the recovered microorganisms had low pathogenic potential, they could behave as opportunist, capable of harming the host when the environmental and immune conditions are favorable to microorganism development, causing infection.

Keywords: Dental high-speed equipment, disinfection, ethanol

PS-147

Antimicrobial Activity of a Disinfectant

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Introduction: Freebac contains 35% hydrogen peroxide, and is a disinfectant developed using nanotechnology. It can be used to disinfect floors, surfaces, tools and equipment, air and water. It has been approved for disinfecting drinking water in Turkey, Germany, the Netherlands, and the UK. Our aim is to evaluate the antimicrobial effectiveness of this disinfectant on surfaces in a hospital setting.

Materials and Methods: A surface disinfection test was performed in this study. A 1% solution of the disinfectant was prepared in accordance with the manufacturer's recommendations. The activity of the disinfectant was tested against *Klebsiella pneumoniae*, ESBL-positive *Escherichia coli* and vancomycin-resistant enterococcus bacteria. 0.5 and 1 McFarland standard dense colonies produced in culture media were wiped onto a sterile surface using a sterile swab. After the surface had dried, disinfectant and 10% bleach were applied on the surfaces for 1 minute or 2 minutes. After the surface was wiped off with sterile gauze, samples obtained from the surface using a sterile swab were cultured in Müeller Hinton Agar. The media were incubated at 37°C and bacterial growth was evaluated.

Results: 10% bleach solution and 1% freebac were found to be active against all bacteria at two different bacterial concentrations.

Conclusion: Disinfectants should be tested for their activity before their use.

Keywords: Antimicrobial activity, disinfectant

PS-148

Evaluation of the Hand Washing Practice and Knowledge Levels of Dentists

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Introduction: Dentistry is an area that very clear the formation and spread of infection in terms of both patients and dentist. Dental practitioners may encounter with variety of pathogenic microorganisms in saliva, respiratory secretions and blood (like Hepatitis B virus, hepatitis C virus, herpes simplex type 1 and type 2, human immunodeficiency virus, Mycobacterium tuberculosis) during the dental procedures. Hand hygiene is the most effective and important way for prevention. Hand washing have an vital importance due to break the path of faecal-oral transmission.

Aim: Purpose of this study is to evaluate the level of knowledge of dentists and behaviors related to hand washing.

Materials and Methods: Actively working a total of 137 practitioners, PhD students and faculty members (oral surgery, oral diagnosis, endodontics, orthodontics, prosthodontics, periodontics, pediatric dentistry, a total of seven clinics), was participated in the study. Actively working in dentistry clinic seven total of 137 doctoral students, residents and faculty members participated in the study. A questionnaire included 10 questions was prepared about hand washing and using of hand sanitizer, and it was applied the practitioners as a time-limited. Knowledge levels of dentists was evaluated about hand washing and using of hand sanitizer.

Results: In the questionnaire applied the dentist, 77% of the participants were indicated that hand washing is the most effective way in order to infections diseases. Correct answers about method of the correct hand washing, hygienic hand washing and using of hand sanitizer was respectively 73%, 13% and 93%. Questions are evaluated the using of hand disinfectants and gloves was correctly answered rate of 73% and 93% respectively. Question are evaluated the "what have to a dentist do, presence of an open wound and event of hand contamination?" was answered correctly rate of 77% and 84% respectively.

Conclusion: It detected that knowledge levels about hygienic hand washing were found low among all participants. It determined that the most correct application was found the using of disinfectants. This result was associated with using of hand disinfectants are very much preferable to hand washing. Training should be made more effective to increase the knowledge level and to gain the right habits and physicians should periodically evaluate by the behavior scales.

Keywords: Hand washing, dentist

PS-149

The Assessment of Hand Antiseptic After the Clinical Practice which is Known as Skin

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Objective: Maximum resistance to health care workers in the use of hand antiseptic is the state of drying and cracking occurring on the hands. This case is determining the importance of the product to be selected for hand antiseptics. With the recommendations of the CDC, alcoholbased hand gel is to be used more effectively in the process of the formulation of the products antiseptics and made a study based on the skin. In this study, due to the product's formulation excipients "skin-friendly" in the form of alcohol-based hand gel called antiseptic is going to be compared with the product currently used. Hand antiseptic solution called gel skin-friendly form of usage will be provided and then used for determining and comparing with the product that is currently used, by this way the views will be assembled.

Introduction: For nosocomial infections the most effective prevention is the application of hand cleaning. Many studies reveal that through health personnel in hospital acquired infections formation and spreading of their hands. The provision of appropriate applications for health personnel for hand hygiene is decreasing the hospital infection rates. To improve hand hygiene of health staff, it choice of the appropriate hand antiseptic is necessary. For the selection of the appropriate hand antiseptic, the conditions are stated clearly in the CDC, WHO, the Association of Canadian Community and Hospital Infections Institution guides. The dermatological problems (drying, cracking and color changing) take the first place in not using the health staff the alcohol based hand antiseptic. Chronic skin wounds, provides you the ability to reproduce a perfect place for microorganisms and delays the improvement of wound.

Materials and Methods: The study takes place in a private institution on staff who serves in to separate units at an amount of 44 and for a 3 month period. To the current 100 mL solution of 2-propanol (60 g) 50% benzalkonium chlorine solution (0.3 g) undesilenic acid (0.1 g) is compared with 85% ethanol contained gel formed hand antiseptic. At the beginning of the study from 44 staff that are currently using the hand antiseptic is requested to evaluate it and the to try the new product for 3 months and to evaluate the new product. At the study the data are gathered in a hand antiseptic evaluation sheet. The evaluation sheet contains 5 parameter likert scale where the product evaluation is done and demographic information. The data is assessed and analyzed in SPSS 11 program. In the analysis the identification analysis and T-test is imposed. The meaningful data is accepted as $p< 0.05$.

Indications: The participation ratio is such as 68% nurse 12% doctor 20% personnel. Participants' age groups concentrated in the range of 20-30 (62%). Participants have reported their daily usage at an average of 48 ± 12 times hand antiseptic. Protective hand cream use according to weather condition is 40.9% and on the daily rate is 45.5% of users.

Keywords: Gel hand antiseptic, skin-friendly

User reviews

	Current product	The new generation gel	p
Feeling of the skin during application	3.14 ± 0.51	1.91 ± 0.71	0.02
Feeling of the skin after application	2.95 ± 0.65	1.89 ± 0.84	0.001
Drying rate of the product	3.11 ± 0.72	2.14 ± 0.77	0.071
Not dry skin	3.11 ± 0.58	1.52 ± 0.55	0.037
The smell of the product during use	4.09 ± 0.71	4.20 ± 0.67	0.39
The smell of the product after use	1.75 ± 0.69	2.43 ± 0.73	0.026
Overall satisfaction	4.20 ± 0.88	1.59 ± 0.58	0.045

PS-150

Disinfecting Agents which Used in Operating Rooms' Have Toxic Effects on Healthcare Personnel Health

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Operating rooms are specialised places, where healthcare staff uses various equipments to perform surgical interventions on patients. Therefore, transmission of infections has great importance in these places. Within the fight against surgical infections all methods are important individually and complementary to each other. One of the most important ones is disinfection. The disinfectants [formaldehyde, gluteraldehyde (known as commercial name-Cidex-, isopropyl alcohol)] are toxic to microorganisms, but also human cells. Specially healthcare staff who work in operating rooms are exposed to these toxic effects frequently. When we look at health problems caused by these chemicals; aldehydes; cause serious skin, eye and respiratory tract irritation, headache, nausea and vomiting. Moreover aldehyde is known to be toxic to germinal cells and causing fertility problems. Alcohols; are absorbed through skin and cause irritation of skin, eyes, upper respiratory tract and trachea. Iodine; causes, burns, allergic reactions, cough, respiratory distress, dizziness. Quarternary ammonium compunds causes ashtma, allergic reactions and sensitivity of skin. In order to minimise these harmful effect, healthcare staff should be aware of principles of utilization of these chemicals and strictly obey those principles. Disinfection, decontamination and antisepsis procedures are important processes that infection control committees should evaluate and follow. Standardization should be the first aim of the committee. Owing to standardizations; instrument choises and usage processes are become easier and prevents misusage. Making the right choices of disinfection methods and using the right instrument at the right time are the main principles of standardization. In order to protect healthcare staff disinfectants which are easy to use should be chosen, and chemicals should be used in proper concentration, with proper air circulation and within proper duration. It shouldn't be forgotten that, all antimicrobial compound have toxic effects, so users of these compounds should be provided with proper protective equipments such as glasses, gloves etc.

Keywords: Disinfection, staff health

PS-151

Evaluation of Hand Washing Status of Dentists Working at Dentistry School

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Introduction: Changing habits of hand washing is very important due to most effective and least expensive method to prevention of infectious diseases. Although hand washing habits of health care workers increased in recent years, shortcomings and incorrect applications are still available today in this regard.

Aim: This study aimed to determine the knowledge level of hand hygiene for dentists.

Materials and Methods: A questionnaire included 10 questions was prepared about hand washing and using of hand sanitizer, and it was applied the practitioners as a time-limited. Knowledge levels of dentists about hand washing and using of hand sanitizer was evaluated.

Results: In the questionnaire applied the dentist, 77% of the participants were indicated that hand washing is the most effective way in order to prevention of infections diseases. Question about the use of alcohol-based hand sanitizer and hand washing procedures was correctly answered at rate of 70%. Although questions about issues to be considered during the hand washing were correctly answered at rate of 93%, questions about the using of hand disinfectants are given the correct answer at rate of 68%. Questions about the procedure in the event of visibly hand contamination were answered correctly by 74% on average. Question about the action in the presence of the open wound was answered correctly rate of 84%. Question about method of the washing hand was answered incorrectly rate of 86%.

Conclusion: It detected that knowledge level about method of the hand washing and using of hand disinfectant is high in the questionnaire performed to dentist. It is identified that level of awareness about type of the hand washing was low and, education is needed in this regard.

Keywords: Hand washing status, dentistry school

PS-152

Microbial Contamination Rates Between Touchscreen and Keypad Mobile Phones Used in Healthcare Setting

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Introduction and Aims: The use of mobile phones in the clinical environment by healthcare workers has become widespread. Contaminated hand-held devices have the potential to be reservoirs for cross contamina¬tion of patients and other staff. They may act as a mobile reservoir for microbial pathogens of nosocomial and other infections. Touch screen mobile phones are increasingly used in the hospital and these phones are used more often by their owners than keypad mobile phones. Many of these devices have a touch screen with a solitary smooth surface as opposed to a key pad with separate buttons and numerous crevices. In this study, aimed that compare to rates of bacterial contamination of touchscreen and keypad devices used in the healthcare setting.

Materials and Methods: In this study, a total of 205 (146 touchscreen and 59 keypad devices) mobile phone were examined for microbial contamination. We have investigated the effects of the age, gender, clinics, education level of the healthcare workers on the microbial contamination rate of mobile phones. Conventional agar contact and swabbing techniques was used to detect the presence of bacteria on the mobile phones. Totally 444 samples were collected from the most handled parts of the phone (keypad, front, back and metallic surfaces). All slides were incubated aerobically at 37°C for 48 hours. Isolated microorganisms were identified with conventional microbiological methods and VITEK 2 automated system (Biomerieux inc.).

Results: 201 (98%) of all mobile phones were determined bacterial contamination. we were determined bacterial contamination 143 (97.9%) of the touch screen, and 58 (98.3%) of the keypad mobile phones, but the difference was not statistically significant. The most frequently isolated microorganisms were coagulase-negative staphylococcus, *S. aureus*, *Enterococcus* spp., *Bacillus* spp., *Streptococcus* spp., *Micrococcus*, difteroids and *E. coli*.

We were found out the total number of colonies of contamination touchscreen phones more than keypad phones ($p< 0.005$). The difference can be explained with relation between the touchscreen size of mobile phones and increasing the number of colonies ($p< 0.005$). Because statistically significant difference due to the screen size of 5" and above mobile phones.

Conclusion: Our study shows that when compared with keypad mobile phones, touchscreen mobile phones are considerably less contaminated but have more colonies. We need to minimize the risk posed by these devices.

PS-153

Investigation of the Efficiency of Vapour Disinfection Device in Surface Disinfection by Two Different Methods

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Introduction: Environmental contamination is an emerging problem in healthcare settings. Hospital acquired infections can occur due the contamination of hospital environment. In this study, we aimed to investigate the efficiency of the vapour disinfection device (TECNOVAP EVO 304 ASEPSIS DEVICE) which is used for disinfection in hospital environments by bacterial colony counting and ATP measurement methods.

Materials and Methods: Vapour at 170˚C was applied to the surfaces by the device for 30 seconds for disinfection and the surfaces were wiped with the sponge of the device. The wood surfaces were contaminated experimentally with various microorganisms and bacterial colony count was made before and after the vapour disinfection procedure. And microbial sampling and ATP measurement methods were made for hospital kitchens and the surfaces which contact with hands frequently before and after the disinfection. The samples were taken from 25 m^2 area with wet sponges for bacterial colony count. Commercial Clean-Trace™ instrument was used for the ATP measurement.

Results: The efficiency of the vapour cleaning-disinfection was found to be significant by the evaluation of the results of bacterial colony count and ATP measurement from the experimentally contaminated plaques and surfaces which contaminated with hands. Results of the bacterial colony count and ATP measurement were presented in the Table.

Conclusion: The efficiency of vapour disinfection method was evaluated by microbiological procedures and ATP measurement method. In conclusion, vapour disinfection device can be used as an efficient disinfection technique with the purpose of cleaning-disinfection in hospital environment.

PS-154

Investigation the Efficacy of Dry Mist Device that Uses Hydrogen Peroxide Stabilized with Colloidal Silver Against Microorganisms that cause Nosocomial Infections

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Introduction: Nosocomial infections are one of most important problems for hospitals. Contaminated environmental surfaces were assumed to play a major role in the transmission of nosocomial pathogens. It is important to select right disinfectant and application technique to remove the microbial flora from the hospital enviroment to prevent nosocomial infections. Vapour decontamination and fogging techniques are using for hospital enviroment disinfection for years. These procedures can be reached in many areas in the hospital enviroment that other disinfectants cannot reach during disinfection procedure. In this study, we aimed to investigate the efficacy of Dry Mist Diffusion device that uses hydrogen peroxide stabilized with colloidal silver for disinfection of hospital enviroment.

Materials and Methods: Two groups (control and study research groups) were formed to investigate the effectiveness of the product for disinfection. The strains tested in this study were; methicillin resistant *Staphylococcus aureus* (MRSA), multidrug resistant *Acinetobacter baumannii*, *Klebsiella pneumoniae* strains isolated from nosocomial infections and referance strains of vancomycin resistant *Enterococcus faecalis* ATCC (51299), *Enterococcus* spp. ATCC (10541), *Escherichia coli* ATCC (8739), *Pseudomonas aeruginosa* ATCC (15442). Suspension of Mcfarland standard 0.5 were prepared from each of these strains. From each suspension 0.1 ml were spread onto the surface of different particleboards (25 cm^2) and faiences (25 cm^2) and were air dried. The solution of 6% (Dismist, Turkey) was obtained by dilution of concentrated disinfectant desoform 50 and dismist solution (colloid silver diluents and stabilizer). This final solution was applied with device by selecting the appropriate program based on the volume of the room. After the three hours of disinfection procedure, 0.2 mL of Dey-Engley Neutralizing broth (Sigma-Aldrich) was applied (exception of control group). Samples were taken from the surfaces and inoculated onto the 5% sheep blood agar plates and incubated for 24 h at 37°C. Control and test plates were evaluated after the incubation.

Results: After the application of disinfection procedure; compared with the control group the number of microorganisms on surfaces placed close to the device was found as; MRSA and *Enterococcus* spp. reduced from 10^7 to 10^2 and bacterial growth was not detected in *E. coli* ATCC (8739), *K. pneumoniae*, *P. aeruginosa* ATCC (15442) and *A. baumannii* strains. Bacterial growth was detected in samples taken from the surfaces for all of the control group microorganisms. After the disinfection procedure bacterial growth on the surfaces that were placed away from the device was detected as; 3 log reduced in MRSA and *Enterococcus* spp., 4 log decreased in *E. coli* and no growth was detected for *A. baumannii*, *K. pneumoniae*, *P. aeruginosa*.

Conclusion: Our study showed that 6% concentration of the hydrogen peroxide which had been stabilized with colloidal silver and applied with Dry Mist device was an effective disinfectant for nosocomial infection pathogens.

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