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quantitative detection is difficult from environments in which mycobacteria co-exist with usual bacteria.
Aim/Objective: To evaluate a method for the selective and quantitative detection of mycobacteria from water in hospital environments, and to detect usual bacteria and mycobacteria quantitatively using with the new method in endoscope reprocessors.
Methods: We have developed a modified oxalic-acid method (OAM) anew. In the OAM, samples are treated with oxalic-acid solutions for 30 min. After neutralization with a phosphate buffer, samples are filtrated with filters (pore size: 0.45 mm). The filters are placed onto 7H11 agar which contained nalidixic acid and amphotericin B for culture of mycobacteria.
Results: On the concentration of oxalic acid in OAM, a 0.05% solution killed most of gram-negative rods, whereas it did not decrease CFU of M. fortuitum, a rapid grower. Some of methylobacteria survived after the treatment, whose red or orange colonies were easily distinguished from those of other bacteria. A 0.5% solution reduced CFU of M. fortuitum, whereas most of M. avium were still alive after the treatment. Bacteriological surveillance was performed with OAM at 9 water samples in 9 endoscope reprocessors. In contaminated bacteria, range at usual bacteria distributed widely (from 0 to 258 CFU/ml). Mycobacterial contamination surpassed that of usual bacteria (range from 6.8 to 635 CFU/ml, average 251 CFU/ml). The contamination of mycobacteria did not correlate with that of usual bacteria. In contaminated mycobacteria, rapid growers, especially M. fortuitum, were mainly detected. M. avium was also detected to some extent at 4 samples.
Discussion/Conclusion: The new method of ours disclosed that water and supply water pipes in endoscope reprocessors were contaminated with mycobacteria more than with usual bacteria.

P9.09
Air Sampling for Bacterial and Fungal Cultures in Operating Rooms
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Background: The usefulness of bacterial and fungal cultures in operating rooms has been questioned. In our country air cultures are mandatory because of local regulations.
Objectives: The aim of this study is to assess the efficacy of bacterial and fungal cultures in air samples in operating rooms.
Methods: Operating rooms for vascular, heart, ocular and ortophedic surgery with prosthesis are classified as high risk. Cultures for bacteria and fungi early in the morning with an empty operating room and a second culture on the same day during surgical activity are made every month. The MAS 100 (MERCK) microbial air sampler is used. Samples for bacteria are cultured in blood agar and incubated 48 hours at 35ºC. Fungal cultures are made in Saboureaud + Cloranfenicol and incubated 7 days. Standard for high risk: fungal cultures 0 cfu/1000 liters of air and bacterial cultures <10 cfu/1000 l.
Results: Since March 2005, 306 samples have been recovered in high-risk operating rooms. Bacterial cultures 21.57% positives in the empty room samples, cfu range 10–208; and 70.27% positives during surgical activity cfu range 10–349. Fungal cultures: 4% positives in the empty room samples cfu range 1–8 and 8% positives during surgical activity cfu range 1–2. Repeated positive bacterial cultures were found in early morning samples and in samples during surgical activity in vascular and heart surgery operating rooms. New cultures were made just in the air intake to discard a contamination of the ventilation system. Air intake cultures were negatives, therefore a meticulous review of the cleaning procedure and environmental cultures were made. Bacterial cultures of the fan of the blood exchanger located inside the operating room were positives. The apparatus was cleaned and since then air cultures had been negatives.
Conclusions: Bacterial and fungal cultures in air samples from operating rooms can be useful to check the efficacy of the cleaning procedures in the operating

P9.10
Legionella Control in a Hospital Water Supply System: Missing Sieves in Thermostatic Mixers Causing a Persisting Problem
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Background: After the outbreak of Legionella disease related to the Westfriese Flora, flower exhibition and fair, in Bovenkarspel the Netherlands, new more strict guidelines and laws for the prevention of Legionella in water supply systems were emerged by the Dutch government. Conforming these guidelines and laws hot tap and drink water systems of public buildings and institutions have to meet certain requirements. The owner of the water systems is obliged to draw up a Legionella prevention management policy.
Objective: Purpose of our study was to determine the problem causing the contamination of the water supply system, to accomplish less than 50 Colony Forming Units (CFU) Legionella sp. isolated par litre.
Methods: Two times a year microbiological and temperature measurements were performed in an old department of the Amphia Hospital.
Results: In 2002 more than 50 CFU Legionella sp. were cultured in several samples of cold water tap points (range: 50–5000 CFU). At this time temperature measurements showed cold water temperatures >250C (>770F), so called 'hot spots'. Inspection and analysis of the water system (the infected strain) followed. After elimination of dead ends and placement of reflux valves at several places in the water system (i.a. coffeemachines, fire-hoses), still one 'hotspot' was left. To find the cause of this 'hotspot', we explored a thermostatic mixer. We found a shunt between the hot and cold water system, which lead to the high cold water temperature.
Conclusion: Cause of the risk full high cold water temperatures were based on obstruction and wear and tear of a reflux-valve in a thermostatic mixer. We concluded that the required sieves to prevent debris in the water system were not installed. Large particles in the old water system of the department caused the damage to the reflux-valve. Something as little as a missing sieve can cause a major problem in the prevention of Legionella in the water system.

P9.11
A Method to Visualize Exhaled Aerosols Produced During the Use of Oxygen Masks Using Optical Flow
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Background: Several infectious agents (measles, chickenpox and tuberculosis) are already known to be transmitted by aerosols. The 2003 severe acute respiratory syndrome outbreaks and the more recent concerns about the human cases of avian influenza (H5N1) have stimulated an interest to improve the effectiveness of aerosol infection control.
Aims: We developed a technique to visualize exhaled aerosols during patients' use of oxygen masks in healthcare settings. From such visualization, the behaviour of exhaled aerosols in various clinical situations will be characterized. This will allow more effective aerosol infection control protocols to be implemented.

Methods: We used a human patient simulator (HPS) fitted with a variety of oxygen masks attached to an air supply into which a smoke tracer had been introduced. This smoke tracer was therefore mixed with, and enabled visualization of, the air that was inhaled/exhaled by the HPS, in a variety of simulated respiratory conditions. All scenarios were captured by a digital video (DV) camera. Analysis of the DV images was performed using an engineering technique known as optical flow. This method defines 2-dimensional velocity vectors for each smoke particle visible in the DV image and integrates them into a final picture describing the behaviour of the smoke particles visible during any particular HPS breathing cycle.
Results: The visualization of exhaled aerosols using the optical flow technique is possible, though optimum conditions are required and the interpretations are complex.
Conclusions: Preliminary data can be produced relatively quickly to show the distance traveled by potentially infected exhalation flows in a variety of settings. These distances will assist infection control teams to improve their aerosol infection control protocols within healthcare settings where such oxygen masks are frequently used in patients suffering from respiratory problems.

P9.12
Surveillance of Legionella Waterline Colonization in a Hospital of Rome, Italy

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Background: In many hospital's legionella outbreaks, hot water systems are the most frequent source of infection.
Objectives: Considering the old age of the hospital waterline, an investigation on legionella water colonization was performed to evaluate the system weakness and to implement environmental preventive measures.
Methods: Three repeated campaigns of water sampling were performed in different seasons from February 2004 to June 2006. Overall, 66 water samples were collected: 52 in wards with at-risk patients from 3 buildings [two old (A-B) and one new (C)]; other 14 samples from boilers. The samples were analysed, following national legionella standard methods; water temperature, pH and residual free chlorine were determined at the time of collection.
Results: A total of 8 samples (12.1%) resulted positive for Legionella spp. In hospital wards 6 (11.5%) samples were positive and the isolates were L. gormanii (1) and L. pneumophila (5). The highest colonization rate was observed in building C (26.7%), vs 5.5% in B and 5.3% in A. 14.3% samples from boilers were also colonized by L. pneumophila. The percentage of positive samples was: 6.7% in autumn-winter and 23.8% in spring-summer campaigns. The average temperature was lower in colonized samples (39.1° vs 46.5°). In 71.4% of samples the level of L. pneumophila contamination was beween 1,000 and 10,000 CFU/L.
Conclusion: Hospital water system seams to be affected by Legionella colonization most frequently in spring-summer and in the new buildings (C). It is necessary now to investigate on the temperature level mantained in hot-water system and also to observe if the structural characteristics of water ducts of C-building can influence the colonization observed.

P9.13
Environmental Decontamination with Vaporized Hydrogen Peroxide (VHP®)

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Aim: To investigate the effect of environmental disinfection in enclosed hospital areas with case studies in emergency vehicles.
Background: The impact of environment control of microbial contamination is often debated in clinical applications. The true efficacy of environment disinfection has rarely been investigated. In this study, the efficacy of environmental disinfection has been tested in emergency vehicles (as an example of an enclosed healthcare environment) in the British Isles.
Materials and methods: Emergency vehicles at twenty ambulance sites were investigated. Multiple environmental sites were swabbed before and after environmental disinfection. Environmental disinfection included the of chemical disinfectants Each swab was plated to estimate the mesophilic, aerobic level of microbial contamination.
Results: The level of microbial contamination was relatively consistent across the various sites tested. Environmental disinfection with a broad spectrum of liquid disinfectants had little to no effect on the surface levels of microbial contamination. Fumigation with VHP was found to consistently be an efficient method of disinfection, including electronic equipment.
Conclusions: The use of various environmental liquid disinfectants may be inefficient and, given the various discussions on the risk/benefit of their application, require further review. Gaseous hydrogen peroxide systems may be a useful technology for the fumigation of enclosed clinical environments, including their intrinsic electronic equipment. Further studies are required to understand the impact of environmental disinfection on infection rates in hospital environments.

P9.14
Decontamination Efficacy of a Non-Alcoholic Hand Gel Containing a Novel Copper-Based Biocide

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Hand decontamination by application of purpose-made hand gels is essential for infection control. Most hand gels currently contain isopropyl alcohol, which bestows biocidal and rapid drying properties to the gel. Alcohol is neither friendly to the hands nor the environment, and is absorbed into the bloodstream. We formulated four non-alcoholic aloe vera hand gels, three including one of three novel inorganic biocides (WB50, AL42, and PC33) containing 300 ppm effective copper, and asked whether these could decontaminate the hands as effectively as a commercial preparation. 106 CFU of MRSA, or E coli, were applied to the hands of volunteers, and palm/finger imprints taken immediately afterwards. One of the four hand gels was then rubbed on the hands, and subsequent imprints were taken at timed intervals. Unlike the aloe vera control, no MRSA could be retrieved from either the AL42 or WB50-containing gels immediately after application, and at all times afterwards. MRSA could be retrieved from PC33-treated hands for 15 minutes. Unlike the control, E coli could not be retrieved at any time point from hands treated with AL42-containing gel; complete disappearance of the organism was only seen at later time points for the other two gels. We conclude that AL42-containing gel rapidly and effectively eradicates viable organisms from hands, and may offer a more personally and ecologically acceptable alternative to alcohol-containing gels. We are currently assessing this gel for C difficle activity, acceptability, and ease of use, and data concerning this will also be presented.