

Abstracts 1 Mai au 31 Août 2004

Berra, L.; De Marchi, L.; Yu, Z.X.; Laquerriere, P.; Baccarelli, A.; Kolobow, T.: Endotracheal tubes coated with antiseptics decrease bacterial colonization of the ventilator circuits, lungs, and endotracheal tube. *Anesthesiology*. 100: 1446-1456 (2004).

NOTES: Background Formation of a bacterial biofilm within the endotracheal tube (ETT) after tracheal incubation is rapid and represents a ready source of lung bacterial colonization. The authors investigated bacterial colonization of the ventilator circuit, the ETT, and the lungs when the ETT was coated with silver-sulfadiazine and chlorhexidine in polyurethane, using no bacterial/viral filter attached to the ETT. Methods: Sixteen sheep were randomized into two groups. Eight sheep were incubated with a standard ETT (control group), and eight were incubated with a coated ETT (study group). Animals were mechanically ventilated for 24 h. At autopsy, the authors sampled the trachea, bronchi, lobar parenchyma, and ETT for quantitative bacterial cultures. Qualitative bacterial cultures were obtained from the filter, humidifier, inspiratory and expiratory lines, and water trap. ETTs were analyzed with light microscopy, scanning electron microscopy, and laser scanning confocal microscopy. Results: In the control group, all eight ETTs were heavily colonized (10^5 - 10^8) colony-forming units [cfu/g], forming a thick biofilm. The ventilator circuit was always colonized. Pathogenic bacteria colonized the trachea and the lungs in five of eight sheep (up to 10^9 cfu/g). In the study group, seven of eight ETTs and their ventilator circuits showed no growth, with absence of a biofilm; one ETT and the respective ventilator circuit showed low bacterial growth (10^3 - 10^4 cfu/g). The trachea was colonized in three sheep, although lungs and bronchi showed no bacterial growth, except for one bronchus in one sheep. Conclusions: Coated ETTs induced a nonsignificant reduction of the tracheal colonization, eliminated (seven of eight) or reduced (one of eight) bacterial colonization of the ETT and ventilator circuits, and prevented lung bacterial colonization

Betjes, M.G.H.; van Agteren, M.: Prevention of dialysis catheter-related sepsis with a citrate-taurolidine-containing lock solution. *NEPHROLOGY. DIALYSIS. TRANSPLANTATION*. 1546-1551 (196).

NOTES: Background. The use of haemodialysis catheters is complicated by catheter-related sepsis. Intraluminal colonization of the catheter with bacteria is important in the pathogenesis of catheter-related sepsis. The use of a catheter lock solution containing the antimicrobial taurolidine might prevent bacterial colonization, thereby reducing the incidence of catheter-related sepsis. Methods. In a randomized prospective trial, patients receiving a dialysis catheter were included and catheters were locked with either heparin or a citrate-taurolidine-containing solution. Blood cultures drawn from the catheter lumen were routinely taken every 2 weeks and at time of removal of

the catheter to detect bacterial colonization. Catheter-related sepsis and exit-site infections were registered for both groups. Results. A total of 76 catheters were inserted in 58 patients. The incidence of catheter colonization progressed slowly over time with no differences between dialysis catheters filled with heparin or citratetaurolidine-containing solution. The number of exit-site infections was also similar between both groups. In the heparin group, four cases of catheter-related sepsis occurred as opposed to no sepsis episodes in the patients with catheters locked with the citrate-taurolidine-containing solution ($P < 0.5$). No side effects with the use of citrate-taurolidine catheter lock solution were noted. Conclusions. This study shows that catheter filling with a solution containing the antimicrobial taurolidine may significantly reduce the incidence of catheter-related sepsis. Taurolidine appears to be effective and safe and does not carry the risk for side effects that have been reported for other antimicrobial lock solutions containing gentamicin or high concentrations of citrate

Bhattacharyya, N.; Kepnes, L.J.: The effectiveness of immersion disinfection for flexible fiberoptic laryngoscopes. OTOLARYNGOLOGY. HEAD. AND. NECK. SURGERY 130: 681-685 (2004).

NOTES: OBJECTIVE. We sought to determine whether high-level disinfection renders fiberoptic laryngoscopes free of nonviral infectious microorganisms. METHODS: Six flexible fiberoptic laryngoscopes in heavy use were subjected to surveillance cultures at the beginning, middle, and end of the clinical workday after high-level disinfection to determine if microorganisms could be recovered. Control cultures were obtained by direct contamination of the endoscope with saliva. The rate of microorganism recovery from the endoscopes after high-level disinfection was determined and compared with control specimens. RESULTS: Among a total of 48 cultures submitted from in use but disinfected fiberoptic laryngoscopes, 1 positive culture (positive rate, 2.1%) for mold species was recovered. No positive bacterial cultures occurred. Eleven of 11 (100%) control cultures were positive for bacterial species ($P < 0.001$). The confidence interval for the risk of microorganism contamination of a disinfected laryngoscope ranged from 0.11% to 11.6%. CONCLUSION., High-level disinfection provides a reasonably effective method of reducing bacterial and fungal contamination of flexible fiberoptic laryngoscopes. Appropriate surveillance technique should be used in each clinical setting with flexible fiberoptic scopes to ensure adequate disinfection effectiveness

Block, C.: The effect of Perasafe((R)) and sodium dichloroisocyanurate (NaDCC) against spores of Clostridium difficile and Bacillus atrophaeus on stainless steel and polyvinyl chloride surfaces. JOURNAL. OF. HOSPITAL. INFECTION. 57: 144-148 (2004).

NOTES: *Clostridium difficile* is an important cause of nosocomial diarrhoea. The aim of this study was to evaluate the potential for Perasafe(R), a recently introduced biocide, to contribute to control of *C. difficile* spores in the patient environment, in comparison with the chlorine-releasing agent sodium dichloroisocyanurate (NaDCC). These agents were evaluated against a water control, in a surface test on stainless steel and polyvinyl chloride (PVC) floor covering, materials commonly found in the hospital environment. The organisms studied were a toxigenic clinical isolate of *C. difficile*, and *Bacillus atrophaeus* (formerly *B. subtilis* var niger). The data indicate that in our in vitro system, Perasafe was significantly more active than NaDCC (1000 ppm available chlorine) against *C. difficile* spores dried on stainless steel surfaces, and against *B. atrophaeus* on PVC floor covering material, achieving mean log(10) reduction factors in viable counts of 6 and 5.5, respectively, at 10 min exposures. Perasafe appeared to be less lethal in 10 min exposures to *C. difficile* spores fixed on PVC floor covering material. In general, 1000 ppm chlorine generated from NaDCC showed lower log(10) reduction factors in viable counts at 10 min, ranging from 0.7 to 1.5, than Perasafe which ranged from 2.7 to 6.0. The potential efficacy of Perasafe in reducing the density of *C. difficile* spores in the patient environment in hospitals, nursing homes or other long-stay facilities should be evaluated in field studies

Bloss, R.; Kampf, G.: Test models to determine cleaning efficacy with different types of bioburden and its clinical correlation. JOURNAL. OF. HOSPITAL. INFECTION. 56 Suppl. 2: S44-S48 (2004).

NOTES: The importance of cleaning as a first crucial step in reprocessing instruments and endoscopes is recognized worldwide. However, no standards to determine the efficacy of cleaning have been established. We have therefore investigated Bodedex forte, a new cleaner, in various test models derived from critical types of bioburden on flexible endoscopes. Removal of dried blood from metal carriers was determined in comparison with standard instrument disinfectants. Removal of biofilm endotoxin from silicone test pieces and removal of dried X-ray contrast medium from polyethylene pieces was measured in comparison with one other standard cleaner. Residual bacteria in a biopsy channel from duodenoscopes following use of Bodedex forte, compared with two other cleaners, were measured in an endoscopy unit. After 15 min exposure to Bodedex forte, 95% of the dried blood were removed. Removal was between 0 and 86% with the disinfectants. Bodedex forte reduced endotoxin by $1.91 + 0.19 \log(10)$ -steps compared with $0.43 + 0.19 \log(10)$ -steps Cidezyme ($p < 0.001$; two-sided t-test). Removal of dried X-ray contrast medium was 99% with Bodedex forte and 94% with a conventional cleaner. No bacterial contamination after reprocessing was found in 98% of duodenoscopes with Bodedex forte (78 duodenoscopes), in 72% with a conventional cleaner (129 duodenoscopes) and in 69% with an

enzymatic cleaner (100 duodenoscopes). The difference between the three cleaners was significant ($p < 0.001$; chi-squared test). The superiority of the cleaning capacity of the new cleaner was demonstrated in various test models, which were designed according to the clinical relevance of different bioburdens. Implementation of accepted and reproducible standards for testing the cleaning efficacy will remain a goal for the next years

Bornstain, C.; Azoulay, E.; De Lassence, A.; Cohen, Y.; Costa, M.A.; Mourvillier, B.; Descorps Declere, A.; Garrouste Orgeas, M.; Thuong, M.; Schlemmer, B.; Timsit, J.F.: Sedation, sucralfate, and antibiotic use are potential means for protection against early-onset ventilator-associated pneumonia. *CLINICAL. INFECTIOUS. DISEASES.* 38: 1401-1408 (2004).

NOTES: To examine risk factors for early-onset ventilator-associated pneumonia (EOP) in patients requiring mechanical ventilation (MV), we performed a prospective cohort study that included 747 patients. Pneumonia was defined as a positive result for a protected quantitative distal sample. EOP was defined as pneumonia that occurred from day 3 to day 7 of MV. Eighty patients (10.7%) experienced EOP. Independent predictors of EOP were male sex (odds ratio [OR], 2.06; 95% confidence interval [CI], 1.18-3.63), actual Glasgow Coma Scale value of 6-13 (OR, 1.95; 95% CI, 1.2-3.18), high Logistic Organ Dysfunction score at day 2 (OR, 1.12 per point; 95% CI, 1.02-1.23), unplanned extubation (OR, 3.19; 95% CI, 1.28-7.92), and sucralfate use (OR, 1.81; 95% CI, 1.01-3.26). Protection occurred with use of aminoglycosides (OR, 0.36; 95% CI, 0.17-0.76), beta-lactams and/or beta-lactamase inhibitors (OR, 0.47; 95% CI, 0.28-0.83), or third-generation cephalosporins (OR, 0.33; 95% CI, 0.16-0.74). Sucralfate use and unplanned extubation are independent risk factors for EOP. Use of aminoglycosides, beta-lactams/beta-lactamase inhibitors, or third-generation cephalosporins protects against EOP

Brun Buisson, C.; Doyon, F.; Sollet, J.P.; Cochard, J.F.; Cohen, Y.; Nitenberg, G.: Prevention of intravascular catheter-related infection with newer chlorhexidine-silver sulfadiazine-coated catheters: a randomized controlled trial. *INTENSIVE. CARE. MEDICINE.* 30: 837-843 (2004).

NOTES: Background. The indication of antiseptic-coated catheters remains debated. Objective. To test the ability of the new generation of chlorhexidine-silver and sulfadiazine-coated catheters, with enhanced antiseptic coating, to reduce the risk of central venous catheter (CVC)-related infection in ICU patients. Design. Multicentre randomized double-blind trial. Patients and setting. A total of 397 patients from 14 ICUs of university hospitals in France. Intervention. Patients were randomized to receive an antiseptic-coated catheter (ACC) or a standard non-coated catheter (NCC). Measurements. Incidence of CVC-related infection. Results. Of 367 patients

having a successful catheter insertion, 363 were analysed (175 NCC and 188 ACC). Patients had one (NCC?2, ACC?0) or more (NCC?, ACC?) CVC inserted. The two groups were similar for insertion site [subclavian (64 vs 69)] or jugular (36 vs 31%), and type of catheters (single-lumen 18 vs 18%; double-lumen 82 vs 82%), and mean (median) duration of catheterisation [12.0+/-11.7 (9) vs 10.5+/-8.8 (8) days in the NCC and ACC groups, respectively]. Significant colonisation of the catheter occurred in 23 (13.1%) and 7 (3.7%) patients, respectively, in the NCC and ACC groups (11 vs 3.6 per 1000 catheter-days; $p=0.01$); CVC-related infection (bloodstream infection) occurred in 10 (5) and 4 (3) patients in the NCC and CC groups, respectively (5.2 vs 2 per 1000 catheter days; $p=0.10$). Conclusions. In the context of a low baseline infection rate, ACC were associated with a significant reduction of catheter colonisation and a trend to reduction of infection episodes, but not of bloodstream infection

Cimiotti, J.P.; Wu, F.; Della Latta, P.; Nesin, M.; Larson, E.: Emergence of resistant staphylococci on the hands of new graduate nurses. *INFECTION. CONTROL AND. HOSPITAL. EPIDEMIOLOGY.* 25: 431-435 (2004).
NOTES: OBJECTIVE: To describe the aerobic microbial flora on the hands of experienced and new graduate nurses over time. DESIGN: A prospective cohort design that examined the relationship between duration of employment in an intensive care unit (ICU) and the microbial flora on the hands of experienced and new graduate nurses during a 23-month period. SETTING: A 50-bed, level III-IV neonatal ICU in New York City. PARTICIPANTS: Twelve experienced nurses and 9 new graduate nurses working full time in the NICU. INTERVENTION: One hundred fifty samples were obtained from the clean, dominant hands of the nurses. Cultures were performed at baseline and then quarterly for each experienced and new graduate nurse. Baseline and final cultures of *Staphylococcus epidermidis* were further examined using pulsed field gel electrophoresis. RESULTS: At baseline, a significantly larger proportion of the experienced nurses had methicillin-resistant, coagulase-negative staphylococci isolated from their hands compared with the new graduate nurses (95% and 33%, respectively; $P = .0004$). For a second culture, performed 1 to 4 months later, there were no longer significant differences between the two groups (82% and 54%, respectively; $P = .12$). By the last culture, all staphylococcal isolates were methicillin resistant in both groups of nurses; 3 were methicillin-resistant *S. aureus*. CONCLUSIONS: Colonization with methicillin-resistant staphylococci occurred after brief exposure to the hospital environment, despite the use of antiseptic hand hygiene agents. Furthermore, at final culture, the two groups shared one dominant hospital-acquired strain of *S. epidermidis*

Colak, T.; Ersoz, G.; Akca, T.; Kanik, A.; Aydin, S.: Efficacy and safety of reuse of disposable laparoscopic instruments in laparoscopic cholecystectomy - A prospective randomized study. SURGICAL. ENDOSCOPY. AND. OTHER. INTERVENTIONAL. TECHNIQUES. 18: 727-731 (2004).

NOTES: Background: The aim of this prospective randomized study was to investigate the efficacy and safety of the reuse of disposable laparoscopic instruments (DLI) in laparoscopic cholecystectomy. Methods: A total of 125 consecutive patients with symptomatic cholelithiasis were randomly assigned to undergo laparoscopic cholecystectomy with single-use DLI (group 1, n = 62) or DLI that were reused (group 2, n 63) after high-level disinfection by alkalized 2% glutaraldehyde. Operative and postoperative outcomes were investigated. Results: There was no significant difference between group 1 and group 2 in mean operating time, linear analogue pain scale score, duration and amount of analgesic administration, or hospital stay. Total incidence of complications (3.2% vs 4.8%, $p = 0.50$) and infection rates (1.6% vs 3.2%, $p = 0.57$) were also similar when group 1 was compared to group 2. Conclusion: This study showed that reusing DLI did not change the operative and postoperative outcomes or the infection rate for laparoscopic cholecystectomy when strict rules for disinfection were followed

Darbord, J.C.: Importance of cleaning for reprocessing endoscopes and thermolabile sterile medical devices: French use and regulations. JOURNAL. OF. HOSPITAL. INFECTION. 56 Suppl. 2: S40-S43 (2004).

NOTES: In France, endoscope maintenance regulations present some particularities in terms of the definitions and texts referring to the disinfection and sterilization of medical devices, with respect to the prion risk. The main measures specified are a double cleaning prior to disinfection, with some stipulations concerning the procedure itself, such as time Limits, duration and rinsing. The use of aldehydes in cleaning products is prohibited and it is recommended that peracetic acid, or any chlorinated product, be used at the disinfection phase. For machines, the recycling of detergents or disinfectants is prohibited, and traceability procedures are mandatory. The French Agency for Safety of Health Products (AFSSAPS) is committed to providing standards that prevent any undesirable consequences for the patient, the operator or the equipment. All these measures will be described in a 'user's guide' intended for medical care units, to be released by the National Technical Committee on Nosocomial Infections (CTIN)

Dryden, M.S.; Dailly, S.; Crouch, M.: A randomized, controlled trial of tea tree topical preparations versus a standard topical regimen for the clearance of MRSA colonization. JOURNAL. OF. HOSPITAL. INFECTION. 56: 283-286 (2004).

NOTES: Two topical MRSA eradication regimes were compared in hospital patients: a standard treatment included mupirocin 2% nasal ointment, chlorhexidine gluconate 4% soap, silver sulfadiazine 1% cream versus a tea tree oil regimen, which included tea tree 10% cream, tea tree 5% body wash, both given for five days. One hundred and fourteen patients received standard treatment and 56 (49%) were cleared of MRSA carriage. One hundred and ten received tea tree oil regimen and 46 (41%) were cleared. There was no significant difference between treatment regimens (Fisher's exact test; $P = 0.0286$). Mupirocin was significantly more effective at clearing nasal carriage (78%) than tea tree cream (47%; $P = 0.0001$), but tea tree treatment was more effective than chlorhexidine or silver sulfadiazine at clearing superficial skin sites and skin lesions. The tea tree preparations were effective, safe and well tolerated and could be considered in regimens for eradication of MRSA carriage

Duggirala, A.V.; Chen, F.M.; Gergen, P.J.: Postoperative adverse events in teaching and nonteaching hospitals. *FAMILY. MEDICINE.* 36: 508-513 (2004).
NOTES: Background and Objectives: With the recent attention on quality of care and residency training, teaching hospitals are coming under greater scrutiny. Despite several studies, there is still no consensus on whether teaching hospitals deliver higher quality of care than nonteaching hospitals. Methods: This was a retrospective cross-sectional study, using national hospital data. The sample consisted of 3,818 acute care hospitals in the National Inpatient Sample from 1990-1996. The quality indicators were postoperative adverse events, including venous thrombosis/pulmonary embolism (DVT/PE), pulmonary compromise, pneumonia, and urinary tract infection (UTI). Hospitals were classified as major teaching, other teaching, and nonteaching. Quality indicator rates of hospital types were compared and multivariate regression performed to control for specific hospital characteristics. Results: Teaching hospitals had higher rates of postoperative DVT/PE and pulmonary compromise but lower rates of UTI, compared with nonteaching hospitals. In the multivariate analysis, teaching hospitals were more likely to have higher postoperative DVT/PE rates, and other teaching hospitals had higher rates of pulmonary compromise and UTI. Postoperative pneumonia rates were higher in major teaching hospitals than nonteaching hospitals. Conclusions: Rates of postoperative adverse events were higher in teaching hospitals compared to nonteaching hospitals. These findings suggest that quality of care, as measured by postoperative adverse events, may not be higher in teaching hospitals

Dziewas, R.; Ritter, M.; Schilling, M.; Konrad, C.; Oelenberg, S.; Nabavi, D.G.; Stogbauer, F.; Ringelstein, E.B.; Ludemann, P.: Pneumonia in acute stroke

patients fed by nasogastric tube. JOURNAL. OF. NEUROLOGY. NEUROSURGERY. AND. PSYCHIATRY 75: 852-856 (2004).

NOTES: Background: Aspiration pneumonia is the most important acute complication of stroke related dysphagia. Tube feeding is usually recommended as an effective and safe way to supply nutrition in dysphagic stroke patients. Objective: To estimate the frequency of pneumonia in acute stroke patients fed by nasogastric tube, to determine risk factors for this complication, and to examine whether the occurrence of pneumonia is related to outcome. Methods: Over an 18 month period a prospective study was done on 100 consecutive patients with acute stroke who were given tube feeding because of dysphagia. Intermediate outcomes were pneumonia and artificial ventilation. Functional outcome was assessed at three months. Logistic regression and multivariate regression analyses were used, respectively, to identify variables significantly associated with the occurrence of pneumonia and those related to a poor outcome. Results: Pneumonia was diagnosed in 44% of the tube fed patients. Most patients acquired pneumonia on the second or third day after stroke onset. Patients with pneumonia more often required endotracheal intubation and mechanical ventilation than those without pneumonia. Independent predictors for the occurrence of pneumonia were a decreased level of consciousness and severe facial palsy. The NIH stroke scale score on admission was the only independent predictor of a poor outcome. Conclusions: Nasogastric tubes offer only limited protection against aspiration pneumonia in patients with dysphagia from acute stroke. Pneumonia occurs mainly in the first days of the illness and patients with decreased consciousness and a severe facial palsy are especially endangered

Eason, E.; Wells, G.; Garber, G.; Hemmings, R.; Luskey, G.; Gillett, P.; Martin, M.: Antisepsis for abdominal hysterectomy: a randomised controlled trial of povidone-iodine gel. BJOG. AN. INTERNATIONAL. JOURNAL. OF. OBSTETRICS. AND. GYNAECOLOGY. 111: 695-699 (2004).

NOTES: Objective To assess whether infectious morbidity after total abdominal hysterectomy is decreased by the addition of 20 cc povidone-iodine gel at the vaginal apex after the usual vaginal preparation with povidone-iodine solution. Study design Randomised controlled trial. Setting Fifteen secondary and tertiary hospitals in Canada. Sample A total of 1570 women undergoing planned total abdominal hysterectomy. Methods Computer-generated randomisation using a centralised telephone service was stratified by study centre with variable block size. In the operating room, a swab for bacterial vaginosis was taken before vaginal antisepsis. Study group remained concealed until the standard surgical preparation in the operating room was complete. Then povidone-iodine gel 20 cc was placed at the vaginal apex in the intervention group only. Participants were followed for one

month post-operative. Main outcome measures The primary outcome was post-operative infectious morbidity during the 30 days after surgery, defined as: febrile morbidity with hospital stay greater than five days or antibiotic treatment, or infection requiring readmission to hospital or additional visit. Other outcomes included abdominal wound infection, pelvic abscess and other pelvic infections. Results Post-operative infectious morbidity within 30 days occurred in 128/780 (16%) women receiving povidone-iodine gel preparation and 142/790 (18%) women not receiving gel (RR 0.9, 95% CI 0.7 to 1.1). Pelvic abscess was diagnosed in 0 patients in the gel group and in seven patients in the control group ($P < 0.01$). No significant difference was found in pelvic cellulitis (eight in each group) or abdominal wound infection (51 in the gel group and 58 in the control group, $P = 0.5$). Conclusion Povidone-iodine vaginal gel antisepsis led to a 9% relative decrease in overall infectious morbidity after abdominal hysterectomy, which was not statistically significant. Povidone-iodine vaginal gel decreased the risk of pelvic abscess after total abdominal hysterectomy

Exner, M.; Vacata, V.; Hornei, B.; Dietlein, E.; Gebel, J.: Household cleaning and surface disinfection: new insights and strategies. JOURNAL. OF. HOSPITAL. INFECTION. 56 Suppl. 2: S70-S75 (2004).

NOTES: Recently, new insights into the persistence of pathogens, their transfer from inanimate surfaces to humans and the risk of contamination and dissemination of pathogens by detergents have been gained. Furthermore, new experimental data on the interruption of chains of infection by disinfectants as well as results of outbreak-control studies are now available. Hence it has become necessary to reassess the potential benefits using disinfectants to prevent and control nosocomial infections. Based on the new findings and in view of the increasing incidence of nosocomial infections and antibiotic resistances, the German Robert-Koch-Institut has issued completely revised recommendations on Household Cleaning and Surface Disinfection. With respect to these recommendations we developed a new test method, which allows comparison of the efficacy of disinfection in reducing the microbial loads and their dissemination with that of cleaning procedures under practical conditions. In a multi-factor approach, mechanical properties (wet mop technique), utensils (different mop materials) and active agents (disinfectant, detergent) were taken into consideration. We found that under the given conditions, dissemination of the test organism *Staphylococcus aureus* did not take place when using aldehydes and peroxides, it did take place, however, when water, surfactants, and the disinfectants glycol derivatives, quaternary ammonium compounds and alkylamines were used

Fichet, G.; Comoy, E.; Duval, C.; Antloga, K.; Dehen, C.; Charbonnier, A.; McDonnell, G.; Brown, P.; Lasmezas, C.I.; Deslys, J.P.: Novel methods for disinfection of prion-contaminated medical devices. *Lancet* 364: 521-526 (2004).

NOTES: Background The unique resistance of prions to classic methods of decontamination, and evidence that prion diseases can be transmitted iatrogenically by medical devices pose a serious infection control challenge to healthcare facilities. In view of the widespread tissue distribution of the variant Creutzfeldt-Jakob disease agent in human beings, new practicable decontamination procedures are urgently needed. Methods We adapted an in-vivo method using stainless steel wires contaminated with prions to the hamster-adapted scrapie strain 263K. A new in-vitro protocol of surface contamination compatible with subsequent biochemical detection of PrPres (protease-resistant form of the prion protein) from the treated surface was developed to explore the mechanisms of action of methods of decontamination under test. These models were used to investigate the effectiveness of innovative physical and chemical methods of prion inactivation. Findings Standard chemical decontamination methods (NaOH 1N, NaOCl 20 000 ppm) and autoclaving in water at 134degreesC reduced infectivity by >5.6 log(10) lethal doses; autoclaving without immersion was somewhat less effective (4-4.5 log reduction). Three milder treatments, including a phenolic disinfectant, an alkaline cleaner, and the combination of an enzymatic cleaner and vaporised hydrogen peroxide (VHP) were also effective. VHP alone, which can be compatible with electronic components, achieved an approximately 4.5 log reduction in infectivity (equivalent to autoclaving without water immersion). Interpretation New decontamination procedures are proposed to ensure the safety of medical and surgical instruments as well as surfaces that cannot withstand the currently recommended prion inactivation procedures

French, G.L.; Otter, J.A.; Shannon, K.P.; Adams, N.M.T.; Watling, D.; Parks, M.J.: Tackling contamination of the hospital environment by methicillin-resistant *Staphylococcus aureus* (MRSA): a comparison between conventional terminal cleaning and hydrogen peroxide vapour decontamination. *JOURNAL OF HOSPITAL INFECTION*. 57: 31-37 (2004).

NOTES: The hospital environment can sometimes harbour methicillin-resistant *Staphylococcus aureus* (MRSA) but is not generally regarded as a major source of MRSA infection. We conducted a prospective study in surgical wards of a London teaching hospital affected by MRSA, and compared the effectiveness of standard cleaning with a new method of hydrogen peroxide vapour decontamination. MRSA contamination, measured by surface swabbing was compared before and after terminal cleaning that complied with UK national standards, or hydrogen peroxide vapour

decontamination. All isolation rooms, ward bays and bathrooms tested were contaminated with MRSA and several antibiogram types were identified. MRSA was common in sites that might transfer organisms to the hands of staff and was isolated from areas and bed frames used by non-MRSA patients. Seventy-four percent of 359 swabs taken before cleaning yielded MRSA, 70% by direct plating. After cleaning, all areas remained contaminated, with 66% of 124 swabs yielding MRSA, 74% by direct plating. In contrast, after exposing six rooms to hydrogen peroxide vapour, only one of 85 (1.2%) swabs yielded MRSA, by enrichment culture only. The hospital environment can become extensively contaminated with MRSA that is not eliminated by standard cleaning methods. In contrast, hydrogen peroxide vapour decontamination is a highly effective method of eradicating MRSA from rooms, furniture and equipment. Further work is needed to determine the importance of environmental contamination with MRSA and the effect on hospital infection rates of effective decontamination

Gastmeier, P.; Geffers, C.; Schwab, F.; Fitzner, J.; Obladen, M.; Ruden, H.: Development of a surveillance system for nosocomial infections: the component for neonatal intensive care units in Germany. *JOURNAL OF HOSPITAL INFECTION*. 57: 126-131 (2004).

NOTES: Neonates are at high risk of nosocomial infections and surveillance has been shown to be valuable for the reduction of nosocomial infections. The National Nosocomial Infections Surveillance (NNIS) system established in the US has a special surveillance component for neonatal intensive care units (NICUs) with some fairly specific methods. However, there are no specific definitions of nosocomial infections in this patient group. When creating a surveillance component for NICUs in Germany we therefore decided not to adopt merely all Centers for Disease Control and Prevention definitions and NNIS methods, but also to develop our own surveillance methods for this patient group. For this process four steps became necessary: (1) development of modified definitions for nosocomial infections and their evaluation; (2) testing the NNIS method in three NICUs with infection control nurses; (3) a pilot project for a surveillance component within the national surveillance system in Germany; and (4) establishment of a surveillance component within our national surveillance system. The system is now established in 33 hospital departments and 66 NICUs participate in the surveillance system. We have an overview of 3357 neonates in three birthweight groups. This article explains the reasons for the various steps, and the advantages and disadvantages of modification of the original NNIS methods and definitions

Girou, E.; Chai, S.H.T.; Oppein, F.; Legrand, P.; Ducellier, D.; Cizeau, F.; Brun Buisson, C.: Misuse of gloves: the foundation for poor compliance with hand

hygiene and potential for microbial transmission? JOURNAL. OF. HOSPITAL. INFECTION. 57: 162-169 (2004).

NOTES: Improvement in hand hygiene compliance is important for reducing cross-infection by micro-organisms. The objective of this prospective observational study was to measure how the improper use of gloves limits compliance to hand hygiene and exposes patient's to infection. The study was conducted in five wards (three intensive care units and two medical wards) in a French university hospital. Staff-patient and staff-environment contacts were observed in 120 healthcare workers caring for patients colonized or infected with pathogenic bacteria. Hand hygiene was not undertaken due to improper gloving in 64.4% (95% CI, 64.1% to 65.1%) of instances. Possible microbial transmission might have occurred in 18.3% (95% CI, 17.8% to 18.8%) of all contacts because used gloves were not removed before performing care activities that necessitated strict aseptic precautions. Failure to change or remove contaminated gloves was a major component in the poor compliance with hand hygiene and carried a high-risk of microbial transmission. Improving hand hygiene compliance will require changing healthcare workers behaviour towards glove use

Goulenok, C.; Monchi, M.; Chiche, J.D.; Mira, J.P.; Dhainaut, J.F.; Cariou, A.: Influence of overweight on ICU mortality - A prospective study. Chest 125: 1441-1445 (2004).

NOTES: Study objective: Overweight patients seem to have a poorer outcome and a higher risk of complications during their stay in the ICU. We conducted a prospective study in order to examine the relationship between body mass index (BMI) and mortality among these patients. Design: Prospective clinical study. Setting: A 24-bed medical ICU in a university-affiliated hospital. Methods: All patients hospitalized in the ICU over a 1-year period were included except those dying or being discharged from the hospital within 24 h of admission. Overweight patients were defined as those having a BMI > 75th percentile of this selected ICU population. Other data collected were demographic and ICU-related data. The Mann-Whitney test was used to compare numeric data between groups (ie, obese and nonobese populations). Variables that were significantly associated with ICU mortality by univariate analysis were entered into a multiple logistic regression model, allowing the determination of independent predictors. Results: Eight hundred thirteen patients were included in the study. The limit of the upper quartile of the BMI was 27. This value was used to separate obese (n = 215) and nonobese (n = 598) groups. Significant differences between obese and nonobese patients were observed in age, length of stay in the ICU, simplified acute physiology score (SAPS) II, and ICU mortality. The observed mortality of obese patients was significantly higher than that predicted by SAPS II (32% vs 18%, respectively; p = 0.001). No difference was observed in

frequency of nosocomial infection or duration of mechanical ventilation for mortality in ICU patients. Using a multivariate analysis, the predictive factors of mortality were SAPS II ($p < 0.0001$) and BMI > 27 ($p < 0.01$). Conclusion: This is the first prospective study showing high BMI value as an independent prognostic factor of mortality for ICU patients. The prognostic scoring systems currently in use, which were designed to predict the mortality of ICU patients, do not include BMI or do not consider obesity. These may underestimate, therefore, the risk for the specific population of obese patients

Hajjar, J.; Girard, R.; Marc, J.M.; Ducruet, L.; Beruard, M.; Fadel, B.; Foret, M.; Lerda, D.; Roche, C.; Vallet, M.; Ayzac, L.; Fabry, J.: Surveillance of infections in chronic hemodialysis patients. *NEPHROLOGIE*. 25: 133-140 (2004).

NOTES: Objective: to confirm rates of infections from a previous survey in chronic hemodialysis patients; to get information about incidents and manipulations of vascular access-site, number and reasons of hospitalisation; to assess a relationship between the frequency of vascular access-site infections (VASI) and quality of care during the procedures of vascular access-site use. Design: prospective, multicenter survey performed from February 2000 to January 2001, including all patients underwent chronic hemodialysis in 5 participating centers. Standardized definitions used and different clinical and biological risk factors recorded. Results: 429 patients for a total of 4273 dialysis months (DIM) were enrolled. 245 infections in 164 infected patients were reported. The overall rate was 5.73 infections per 100 DM (18 VASI, 25 bacteraemia, 84 respiratory, 29 urinary tract, 1 endocarditis and 88 other infections). 50% of infections were microbiologically documented. 19 of 21 antibiotic resistant microorganisms were methicillin resistant *Staphylococcus aureus*. Compared to the incidence rate of fistula (0.05 per 1000 days of follow-up) or prosthesis related VASI (0.11), the incidence rate of catheter, related VASI (0.65) was significantly higher. Poor hygiene and duration of catheter use were the significant risk factors for VASI showed by logistic analysis regression. VASI and bacteraemia occurred more frequently after incident or manipulation of the vascular access-site. The decrease of, VASI between the 2 periods of survey was significantly higher in, centers having reduced the catheter use and implemented written protocols. Conclusions: this second period of surveillance has confirmed the frequency of infections rate in chronic hemodialysis patients, and particularly bacteraemia and VASI. This study has allowed, to establish I risk factors for infections and showed that VASI in hemodialysis are related to factors in part preventable

Heeg, P.: Reprocessing endoscopes: national recommendations with a special emphasis on cleaning - the German perspective. *JOURNAL. OF. HOSPITAL. INFECTION.* 56 Suppl. 2: S23-S26 (2004).

NOTES: Transmission of pathogens through endoscopes or endoscopic procedures has been documented frequently, although reliable data on the incidence of endoscope-associated infections do not exist. In order to control such infections as well as to ensure adequate quality management in endoscopy, the German Robert Koch Institute has produced recommendations for hygienic processing of flexible endoscopes and accessory devices. Reprocessing using a washer disinfectant is explicitly preferred to manual procedures. Control measures are focused on microbiological sampling and limiting values have been defined for rinsing fluids taken from the channels of the scopes. Although the guideline leaves a number of questions open, e.g. test methods to control the efficacy of the cleaning process. It helps to establish quality management in the field of endoscopy and to improve the level of safety both for patients and staff

Heinemann, S.; Symoens, F.; Gordts, B.; Jannes, H.; Nolard, N.: Environmental investigations and molecular typing of *Aspergillus flavus* during an outbreak of postoperative infections. *JOURNAL. OF. HOSPITAL. INFECTION.* 57: 149-155 (2004).

NOTES: After an outbreak of sternal surgical-site infections (SSSI) with *Aspergillus flavus* following cardiac surgery, a mycological survey of air and surfaces (41 and 149 samples, respectively) was performed throughout the surgical ward (SW) and in other areas of the hospital. Results showed massive contamination by *A. flavus*: more than 100 cfu per contact plate were frequently observed in some areas of the SW. The distribution of the *A. flavus* spores in the building, and especially in the SW, enabled the location of a possible source within the non-medical part of the SW, but the true source could not be identified. Four other surveys were made to follow up the decontamination process; the contamination level did not fall rapidly, needing repetitive cleaning operations. Strains from patients and from the hospital environment selected all over the SW were typed by random amplification of polymorphic DNA (RAPD), using two different primers (ERIC-1, BG-2). ALL these strains showed the same genotype, proving the clonal single-source of the environmental contamination and the intra-operative acquisition of *A. flavus* in the SSSI outbreak

Hoffman, J.M.; Wadhvani, R.; Kelly, E.; Dixit, B.; Cardenas, D.D.: Nitrite and leukocyte dipstick testing for urinary tract infection in individuals with spinal cord injury. *JOURNAL. OF. SPINAL. CORD. MEDICINE.* 27: 128-132 (2004).

NOTES: Objective: To determine sensitivity, specificity, and positive and negative predictive values of nitrite (NIT) and leukocyte esterase (LE) testing

in relation to laboratory evidence of significant bacteriuria and urinary tract infection (UTI) in persons with spinal cord injury (SCI). Design: Monthly urine cultures were compared with results of dipstick testing. Setting: Community based. Methods: Fifty-six people with SCI were evaluated on a monthly basis with dipstick testing for NIT and LE as well as urine cultures. Participants reported whether they believed that they had a UTI and, if so, whether they were treated for the UTI and what symptoms they had experienced. Results: The sensitivity rate for the most comprehensive criteria-defined as positive NIT test, a positive LE positive, or both a positive NIT test and positive LE test-was 0.64 and the specificity rate was only 0.52. No single type of bacteria was found to occur in more than 30% of the urine samples. Conclusion: Reliance on dipstick testing for NIT and LE in individuals with SCI can lead to high rates of overtreatment for UTI, given the fact that regular catheterization is associated with significant bacteriuria. Individuals with SCI should be evaluated with urine culture to ensure proper treatment

Kampf, G.: The six golden rules to improve compliance in hand hygiene. JOURNAL. OF. HOSPITAL. INFECTION. 56 Suppl. 2: S3-S5 (2004).

NOTES: Improvement of compliance in hand hygiene is probably the most effective step in reducing the incidence of nosocomial infections (NI). But improvement of compliance is known to be complex. Six possibilities for improving compliance are available although some of them may be difficult to carry out. Rule 1: Select an alcohol-based hand rub which has a good skin tolerance and is acceptable to health care workers to use. This has been shown to improve compliance. Rule 2: The hand rub shall be easily available. Wall dispensers near the patient and pocket bottles may well help. Other possibilities should be assessed locally. Rule 3: Implement teaching and promotion of hand hygiene, which has been shown to be very effective. This is may be the most effective tool. but will cost time and money. If money is a problem, rule 4 may be the solution. Rule 4: Create a hospital budget which covers all costs involved with preventable nosocomial infection. Combine it with the budget for hand hygiene products. Even a small number of prevented NI largely outweighs the cost of effective hand hygiene products. Rule 5: Get senior staff to set a good example in order to motivate junior staff, because negligence in hand hygiene appears to correlate with the number of professional years. Rule 6: Have the patient-staff ratio well balanced. It has been shown that staff shortage decreases hand hygiene compliance. Other factors may be important as well, but implementation of these 6 golden rules could be an effective step into the right direction

Kampf, G.; Bloss, R.; Martiny, H.: Surface fixation of dried blood by glutaraldehyde and peracetic acid. JOURNAL. OF. HOSPITAL. INFECTION. 57: 139-143 (2004).

NOTES: The difficulties of successful prion inactivation by chemical agents has Led to changes in recommendations regarding the reprocessing of instruments including flexible endoscopes. One of the changes is the preference for peracetic acid instead of glutaraldehyde in order to avoid fixation of organic material, but the surface fixation by various active agents has not been fully investigated. We used a standardized amount of dried blood soil on metal carriers (on average 22 mg). One part of the carriers was exposed to different disinfectants (four based on peracetic acid, three based on glutaraldehyde, two based on quaternary ammonium compounds (QAC), one based on QAC and amines, one based on phenols and one cleaning agent) and air dried. The difference compared with the non-exposed soiled carrier was taken as the measure of blood removal by exposure to the disinfectants. In addition the other part of the carriers was exposed to a cleaning agent and air dried. The Cleaning agent itself was capable of removing more than 99% of the dried blood and served as a control for non-fixation. The rate of fixation of dried blood was calculated as the ratio of the weight of residual soil on 'soiled, disinfected and cleaned' carriers and on 'soiled and disinfected' carriers. All experiments were repeated eight times. Blood removal varied between 90.3% +/- 1.5% (phenol-based disinfectant) and <10% (glutaraldehyde-based preparations). Fixation of the remainder was between 76.9 +/- 8.4% and 102.5 +/- 1.1% with glutaraldehyde and between 19.2% +/- 3.3% and 78.1% +/- 2.4% with peracetic acid. No other preparations showed a potential for blood fixation (<1.3%). Our findings underline the potential for blood fixation, not only by glutaraldehyde, but also by peracetic acid, and support the evidence that effective cleaning should precede the chemical disinfection

Kampf, G.; Ostermeyer, C.: Efficacy of alcohol-based gets compared with simple hand wash and hygienic hand disinfection. JOURNAL. OF. HOSPITAL. INFECTION. 56 Suppl. 2: S13-S15 (2004).

NOTES: A recent research letter on the limited efficacy of alcohol-based hand gets has alerted the global infection control community and raised the question of the true significance of data obtained according to EN 1500. It has been described that a 1 min simple hand wash reduces artificial contamination of hands by a log(10) reduction factor of 2.8 and a 1 min reference hand disinfection with 2-propanol (60%, v/v) by a factor of 4.6 steps. The EN 1500 get data show that the 30 s efficacy of most gets is closer to a simple hand wash than to the reference hand disinfection. The 30 s efficacy of most alcohol-based liquid products and one get, however, is almost identical to the reference hand disinfection. In many European countries alcohol-based Liquid products have been established as a standard practice in hygienic hand disinfection for decades. Replacement of these

products with most available gets would be a step backward in terms of efficacy and has still to be seen critically from the efficacy point of view

Langgartner, J.; Linde, H.J.; Lehn, N.; Reng, M.; Scholmerich, J.; Gluck, T.: Combined skin disinfection with chlorhexidine/propanol and aqueous povidone-iodine reduces bacterial colonisation of central venous catheters. *INTENSIVE. CARE. MEDICINE.* 30: 1081-1088 (2004).

NOTES: Objective. Central venous catheter (CVC)-related infections may be caused by micro-organisms introduced from the skin surface into deeper tissue at the time of CVC insertion. The optimal disinfection regimen to avoid catheter-related infections has not yet been defined. This study compares three different approaches. Design. Prospective randomised trial. Setting. A tertiary care hospital. Patients and participants. One hundred nineteen patients scheduled electively to receive 140 CVCs. Interventions. Skin disinfection was performed with either povidone-iodine 10% (PVP-iodine), chlorhexidine 0.5%/propanol 70%, or chlorhexidine 0.5%/propanol 70% followed by PVP-iodine 10%. Prior to disinfection, a swab from the site of insertion was taken for culture. CVCs were removed if no longer needed or infection was suspected. All catheters were cultured quantitatively after removal. Measurement and results. Bacteria could be isolated from 20.7% of the catheter tips. Bacterial growth was found in 30.8% of the catheters placed after skin disinfection with povidone-iodine, in 24.4% after disinfection with propanol/chlorhexidine and in 4.7% after disinfection with propanol/chlorhexidine followed by povidone-iodine ($p=0.006$). In 15 cases, the same organism was isolated from the skin swab and the catheter tip. Ten of these paired isolates showed the same pattern in a pulsed-field gel electrophoresis analysis. Conclusions. Skin disinfection with propanol/chlorhexidine followed by PVP-iodine was superior in the prevention of microbial CVC colonisation compared to either of the regimens alone. These results support the concept that catheter infections can originate from bacterial translocation at the time of catheter insertion

Lee, J.H.; Rhee, P.L.; Kim, J.H.; Kim, J.J.; Paik, S.W.; Rhee, J.C.; Song, J.H.; Yeom, J.S.; Lee, N.Y.: Efficacy of electrolyzed acid water in reprocessing patient-used flexible upper endoscopes: Comparison with 2% alkaline glutaraldehyde. *JOURNAL. OF. GASTROENTEROLOGY AND. HEPATOLOGY* 897-903 (198).

NOTES: Background and Aim: Two percent glutaraldehyde, the most widely used liquid chemical germicide (LCG), may be hazardous to patients and medical personnel. Alternatives to glutaraldehyde, such as electrolyzed acid water (EAW), are being developed, but data from well-controlled studies with patient-used endoscopes are rare. The purpose of the present paper was to evaluate the high-level disinfection capability of EAW and compare it with

glutaraldehyde. Methods: A random sample of 125 endoscopes was collected immediately after upper endoscopic examination. After careful manual cleaning, endoscopes were divided into a glutaraldehyde and EAW group. After the disinfection procedure, samples from working channel (S-1), insertion tube (S-2), umbilical cord (S-3), and angulation knob (S-4) were taken and cultured. Another twenty endoscopes were experimentally contaminated with hepatitis B virus (HBV) and samples were collected after contamination (T-1), after manual cleaning (T-2), and after final disinfection (T-3). Polymerase chain reaction (PCR) for HBV-DNA was performed. Results: In the EAW group, culture-positive rates were 3.2% in S-1, 9.5% in S-2, 3.2% in S-3, and 27.0% in the S-4 samples. There was no significant difference between the EAW and glutaraldehyde groups for all sampling sites. However, in both groups, disinfection of the angulation knobs (S-4) was less efficient than the others. For the T-1 site, HBV-DNA was detected from all of them, and in 95% (19/20) of T-2. However, HBV-DNA was not detected from T-3 samples. Conclusions: Electrolyzed acid water is as efficient as glutaraldehyde in eliminating bacteria from patient-used endoscopes. After disinfection procedures using both methods, HBV-DNA was not detected from any endoscopes experimentally contaminated with HBV-positive mixed sera. However, some bacteria may remain on the surface of the endoscopes. Therefore, more careful precleaning of the endoscopes may help achieve high-level disinfection in the clinical setting

Martiny, H.; Floss, H.; Zuhlsdorf, B.: The importance of cleaning for the overall results of processing endoscopes. JOURNAL. OF. HOSPITAL. INFECTION. 56 Suppl. 2: S16-S22 (2004).

NOTES: Reprocessing comprises three steps: cleaning, disinfection and-if required-sterilisation. While the extents of disinfection and of sterilisation are quantitatively defined, there are only imprecise (qualitative) definitions of cleaning. There are two main reasons for accurate cleaning. First organic and inorganic materials that remain on inner and outer surfaces will interfere with the efficacy of the disinfectants. In case of endoscopes this will lead to channel blockages; they remain undisinfected. Second the bioburden found on endoscopes after use can be very high. Data available demonstrate that a bacterial. burden of up to 10^9 cfu/endoscope channel can be expected. Therefore it is necessary to perform a thorough cleaning. Studies using endoscopes showed a reduction in microbial counts by a factor of approximately 10^4 by cleaning (manual and mechanical). Therefore in 2001 the German Society of Hospital Hygiene (DGKH) specified its requirements and recommendations for determining cleaning efficacy separately from those for disinfection. Cleaning and disinfecting can be done manually or mechanically, but it seems impossible to validate manual processes. However our studies in two different washer-disinfectors (WD) showed differences in

cleaning efficacy. The tested cleaning processes showed different efficacies. Not all cleaning processes showed better results than water alone with regard to visible cleanliness and to a microbiological reduction *E. faecium*. Our results show that the evaluation of cleanliness exclusively by visible inspection is not sufficient, particular for the lumens of endoscopes. The results also show that a cleaning process may be very effective also in reducing micro-organisms present

McCoy, L.; Sorvillo, F.; Simon, P.: Varicella-related mortality in California, 1988-2000. PEDIATRIC. INFECTIOUS. DISEASE. JOURNAL. 23: 498-503 (2004).

NOTES: Background: Although surveillance for varicella in the United States has documented a reduction in cases since vaccine licensure in 1995, information is lacking on varicella-related mortality since vaccine introduction. This study identifies varicella-related mortality in California before and after vaccine introduction and assesses how high risk conditions and complications contributed to varicella deaths during this period. Methods: California death records mentioning varicella as either an underlying or contributing cause of death were selected from the 1988-2000 multiple cause-of-death files. Pre- and postvaccine periods were compared to assess differences in varicella mortality before and after vaccine introduction. Differences in varicella mortality by age, race/ethnicity and gender were also examined. ICD codes were used to identify high risk conditions and varicella-related complications. Results: A total of 228 varicella-related deaths were reported between 1988 and 2000 in California. Age-adjusted varicella mortality rates showed a downward trend during this period, dropping from a high of 0.97 per million in 1990 to a low of 0.22 per million in 1999. The average age-adjusted mortality rate declined from 0.67 per million prevaccine to 0.38 per million postvaccine. Compared with the prevaccine period, the average rate of decline in varicella mortality was greater after vaccine implementation. Infants had the highest mortality rate for the period. At least one immunocompromising condition was present in 38% of varicella-related deaths. Pneumonia was the most commonly reported complication. Conclusions: Varicella-related mortality declined in California after vaccine implementation, but potentially preventable varicella-related deaths continue to occur

McGuckin, M.; Taylor, A.; Martin, V.; Porten, L.; Salcido, R.: Evaluation of a patient education model for increasing hand hygiene compliance in an inpatient rehabilitation unit. AMERICAN. JOURNAL. OF. INFECTION. CONTROL 32: 235-238 (2004).

NOTES: Background: Transmission of microorganisms from the hands of health care workers is the main cause of health care-acquired infections.

Recent studies on bacterial contamination of hands by medical care specialty found the highest bacterial contamination on the hands of health care workers from rehabilitation units. The objective of this study is to determine the effect of a patient education model on hand hygiene (HH) compliance in a rehabilitation unit. Methods: A 6-week pre- and post-intervention study with a 3-month follow-up using a patient education model was conducted in a 24-bed inpatient rehabilitation unit located in an acute care hospital. Thirty-five patients were enrolled in the intervention phase of the study after agreeing to ask all health care workers who had direct contact with them, "Did you wash/sanitize your hands?" Compliance with the program was measured through soap/sanitizer usage per resident-day before, during, and after the intervention. Results: Usage increased from 5 HH per resident-day during the preintervention to 9.7 HH per resident-day during the intervention ($P < .001$), 6.7 HH per resident-day postintervention (6 weeks) ($P < .001$), and 7.0 HH per resident-day at 3 months ($P < .001$). Conclusions: Patient education increased HH compliance in an inpatient rehabilitation unit by 94% during the 6-week intervention, 34% during the 6 week post intervention, and 40% at 3-month follow-up. This program empowers patients with responsibility for their own care and provides ongoing HH education

McGuire, W.; McEwan, P.: Systematic review of transpyloric versus gastric tube feeding for preterm infants. ARCHIVES. OF. DISEASE. IN. CHILDHOOD. 89 Special Iss. SI: F245-F248 (2004).

NOTES: Aim: To determine if enteral tube feeding by the transpyloric versus the gastric route improves feeding tolerance, and growth and development, without increasing adverse events, in preterm infants. Methods: Systematic review of randomised controlled trials. A search was made of the Cochrane Controlled Trials Register (CCTR; 2003, issue 1), Medline (1966 to April 2003), and Embase (1980 to April 2003), and references in previous reviews. The data were extracted, analysed, and synthesised using the standard methods of the Cochrane Neonatal Collaborative Review Group. Results: Data were found from eight trials. No evidence of an effect on growth or development was found, but transpyloric feeding was associated with a greater incidence of gastrointestinal disturbance: relative risk (RR) 1.45, 95% confidence interval (CI) 1.05 to 2.09. Transpyloric feeding was also associated with increased mortality: RR 2.46, 95% CI 1.36 to 4.46. However, the trial that contributed most to this finding may have been affected by allocation bias. No significant differences were detected in the incidence of other adverse events, including necrotising enterocolitis, intestinal perforation, and aspiration pneumonia. Conclusions: No evidence of benefit was found, but evidence of harm was found. Feeding by the transpyloric route cannot be recommended for preterm infants

McHugh, C.G.; Riley, L.W.: Risk factors and costs associated with methicillin-resistant *Staphylococcus aureus* bloodstream infections. *INFECTION. CONTROL AND. HOSPITAL. EPIDEMIOLOGY.* 25: 425-430 (2004).
NOTES: OBJECTIVES: To compare the cost of hospitalization of patients with methicillin-resistant *Staphylococcus aureus* (MRSA) bloodstream infection (BSI) versus patients with methicillin-sensitive *S. aureus* (MSSA) BSI, controlling for severity of underlying illness; and to identify risk factors associated with MRSA BSI. DESIGN: Retrospective case-control study based on medical chart review. SETTING: A 640-bed, tertiary-care hospital in Seattle, Washington. PATIENTS: All patients admitted to the hospital between January 1, 1997, and December 31, 1999, with *S. aureus* BSI confirmed by culture. RESULTS: Twenty patients with MRSA BSI were compared with 40 patients with MSSA BSI. Univariate analysis identified 5 risk factors associated with MRSA BSI. Recent hospital admission ($P = .006$) and assisted living ($P = .004$) remained significant in a multivariate model. Costs were significantly higher per patient-day of hospitalization for MRSA BSI than for MSSA BSI (\$5,878 vs \$2,073; $P = .003$). When patients were stratified according to severity of illness as measured by the case mix index, a difference of \$5,302 per patient-day was found between the two groups for all patients with a case mix index greater than 2 ($P < .001$). CONCLUSION: These observations suggest that MRSA BSI significantly increases hospitalization costs compared with MSSA BSI, even when controlling for the severity of the patient's underlying illness. As MRSA BSI was also found to be significantly associated with a group of patients who have repeated hospitalizations, such infections contribute substantially to the increasing cost of medical care

Minnema, B.; Vearncombe, M.; Augustin, A.; Gollish, J.; Simor, A.E.: Risk factors for surgical-site infection following primary total knee arthroplasty. *INFECTION. CONTROL AND. HOSPITAL. EPIDEMIOLOGY.* 25: 477-480 (2004).
NOTES: OBJECTIVE: To identify risk factors associated with the development of surgical-site infection (SSI) following total knee arthroplasty (TKA). DESIGN: A case-control study. SETTING: A 1,100-bed, university-affiliated, tertiary-care teaching hospital. METHODS: Case-patients with SSI occurring up to 1 year following primary TKA performed between January 1999 and December 2001 were identified prospectively by infection control practitioners using National Nosocomial Infections Surveillance (NNIS) System methods. Three control-patients were selected for each case-patient, matched by date of surgery. Stepwise logistic regression analysis was used to determine the relation of potential risk factors to the development of infection. RESULTS: Twenty-two patients with infections (6 superficial and 16 deep) were identified. Infection rates per year were 0.95%, 1.07%, and 1.19% in 1999, 2000, and 2001, respectively. Logistic regression analysis identified two variables independently associated with the development of

infection: the use of closed suction drainage (odds ratio [OR], 7.0; 95% confidence interval [CI95], 2.1-25.0; $P = .0015$) and increased international normalized ratio (INR) (OR, 2.4; CI95, 1.1-5.7; $P = .035$). Factors not statistically associated with the development of infection included age, NNIS System risk index score, presence of various comorbidities, surgeon, duration of procedure or tourniquet time, type of bone cement or prosthesis used, or receipt of blood product transfusions. CONCLUSIONS: The use of closed suction drainage and a high postoperative INR were associated with the development of SSI following TKA. Avoiding the use of surgical drains and careful monitoring of anticoagulant prophylaxis in patients undergoing TKA should reduce the risk of infection

Montebugnoli, L.; Chersoni, S.; Prati, C.; Dolci, G.: A between-patient disinfection method to control water line contamination and biofilm inside dental units. JOURNAL. OF. HOSPITAL. INFECTION. 56: 297-304 (2004). NOTES: The aim of the present study was to evaluate the efficacy of a between-patient disinfection procedures to maintain low bacterial counts in dental unit water line (DUWL) effluents, and control dental water line biofilms. Six dental units already in use, that had never been cleaned, were monitored for three weeks. During the first week only baseline contamination levels were assessed with no treatment of the system. In the second week lines were flushed with water for 30 s before treating each patient. During the third week, a disinfection procedure with 0.26% peracetic acid, followed by a water flush, was implemented before treating each patient. DUWL samples were collected both at the beginning and at the end of 216 dental procedures (72 during each period), plated on R2A agar and incubated at room temperature for seven days to obtain total bacterial counts in colony forming units per millilitre. To assess biofilm control, nine dental units (five never used and four old dental units with established biofilm) were used for 30 days in routine dental practice undergoing five between-patient DUWL disinfecting cycles every day. Water line samples were removed at baseline and at the end of the study and examined by scanning electron microscopy to determine the presence or absence of biofilms. A significant difference ($P < 0.01$) in mean DUWL bacterial counts was found between the three sets of observations. Biofilms were not present in any of the new dental units and a demonstrable reduction in the biofilms from the four dental units with previous presence of established biofilms was observed at the end of the study. In this study, a between-patient disinfection procedure consisting of flushing DUWL with peracetic acid with use of water was efficacious in the control of both microbial contamination of dental treatment water and dental water line biofilms

Nomura, K.; Ogawa, M.; Miyamoto, H.; Muratani, T.; Taniguchi, H.: Antibiotic susceptibility of glutaraldehyde-tolerant *Mycobacterium chelonae* from bronchoscope washing machines. AMERICAN. JOURNAL. OF. INFECTION. CONTROL 32: 185-188 (2004).

NOTES: Background: Contamination of bronchoalveolar lavage fluid is a major problem in the world. Although 2% glutaraldehyde (GA) is widely used as a disinfectant for bronchoscope cleaning, recently, GA-tolerant mycobacteria have been isolated, which makes this problem more complicated. Methods: We studied the susceptibility to GA and antibiotics of mycobacteria isolated from bronchoscope washing machines in our hospital. We also studied the minimum inhibitory concentrations of GA and antibiotics with pump inhibitors. Results: Twenty-nine mycobacteria were isolated, of which 26 were *Mycobacterium chelonae*. Among 18 isolates of *M chelonae*, excluding 8 isolates in which some results were not reproducible, 50% (9 of 18) were 2% GA-tolerant. One hundred percent (9 of 9) of the GA-tolerant isolates and 11% (1 of 9) of the GA-sensitive isolates were either resistant or intermediately resistant to 2 or 3 classes of antibiotics. Efflux pump inhibitors did not influence the susceptibility to GA and antibiotics. Conclusions: It was suggested that there might be an association of GA tolerance with antibiotic resistance in *M chelonae*. There may be a different mechanism(s) other than that involving efflux pumps with regard to GA tolerance and antibiotic resistance in *M chelonae*. When bronchoscopy-related mycobacterial infections are suspected, physicians and clinical microbiologists should exercise care in handling GA-tolerant mycobacteria, which may be resistant to multiple antibiotics

Onur, R.; Ozden, M.; Orhan, I.; Kalkan, A.; Semercioz, A.: Incidence of bacteraemia after urodynamic study. JOURNAL. OF. HOSPITAL. INFECTION. 57: 241-244 (2004).

NOTES: The aim of the present study was to determine the incidence of bacteraemia after urodynamic study (UDS) in patients with lower urinary tract symptoms, and to evaluate the role of bacteraemia as a morbidity factor related to UDS. A total of 57 patients (mean age: 52.8 years, range: 8-76 years) were evaluated by UDS. Prophylactic antibiotics were not administered to any of the patients before the procedure. Before UDS, urine cultures were examined for the presence of infection of the urinary tract (UTI). Venous blood was taken before and just after performing UDS. There was no bacterial growth in blood cultures of any patients before the UDS. Of the 57 patients, two had bacteriuria before study. After UDS, bacteraemia was determined in four (7%) out of 55 patients. The two patients with a bacteriuria before the procedure also had positive blood cultures. Infectious complications are the most important morbidity factors related to the UDS. Despite the use of strict aseptic techniques, bacteraemia may occur in

patients undergoing UDS. The results of the present study may help when counselling patients who are to undergo UDS

Pacheco Fowler, V.; Gaonkar, T.; Wyer, P.C.; Modak, S.: Antiseptic impregnated endotracheal tubes for the prevention of bacterial colonization. JOURNAL. OF. HOSPITAL. INFECTION. 57: 170-174 (2004).

NOTES: The effect of endotracheal tubes (ETT) impregnated with chlorhexidine (CHX) and silver carbonate (antiseptic ETT) against Staphylococcus aureus, methicillin-resistant S. aureus (MRSA), Pseudomonas aeruginosa, Acinetobacter baumannii, and Enterobacter aerogenes [organisms associated with ventilator-associated pneumonia (VAP)], was evaluated in a laboratory airway model. Antiseptic ETT and control ETT (unimpregnated) were inserted in culture tubes half-fitted with agar media (airway model) previously contaminated at the surface with 10^8 cfu/mL of the selected test organism. After five days of incubation, bacterial colony counts on all ETT segments were determined. Swabs of proximal and distal ends of the agar tract in antiseptic and control models were subcultured. The initial and residual CHX levels, (five days post-implantation in the model) were determined. Cultures of antiseptic ETT revealed colonization by the tested pathogens ranging from 1-100 cfu/tube, compared with approximately 10^6 cfu/tube for the control ETT ($P < 0.001$). Subcultures from proximal and distal ends of the agar tract showed minimal or no growth in the antiseptic ETT compared with the control ETT ($P < 0.001$). The amount of CHX retained in the antiseptic ETT after five days of implantation was an average of 45% of the initial level. Antiseptic ETT prevented bacterial colonization in the airway model and also retained significant amounts of the antiseptic. These results indicate that the effectiveness of antiseptic-impregnated ETT in preventing the growth of bacterial pathogens associated with VAP may vary with different organisms

Parker, M.J.; Roberts, C.P.; Hay, D.: Closed suction drainage for hip and knee arthroplasty - A meta-analysis. JOURNAL. OF. BONE. AND. JOINT. SURGERY AMERICAN. VOLUME. 86A: 1146-1152 (2004).

NOTES: Background: The use of closed-suction drainage systems after total joint replacement is a common practice. The theoretical advantages for the use of drains; is a reduction in the occurrence of wound hematomas and infection. The aim of this meta-analysis was to determine, on the basis of the evidence from randomized controlled trials, the advantages and adverse effects of surgical drains. Methods: All randomized trials, as far as we know, that compared patients managed with closed-suction drainage systems and those managed without a drain following elective hip and knee arthroplasty were considered. The trials were identified with use of searches of the Cochrane Collaboration with no restriction on languages or source. Two

authors independently extracted the data, and the methods of all identified trials were assessed. Results: Eighteen studies involving 3495 patients with 3689 wounds were included in the analysis. The pooled results indicated that there was no significant difference between the wounds treated with a drain and those treated without a drain with respect to the occurrence of wound infection (relative risk, 0.73; 95% confidence interval, 0.47 to 1.14), wound hematoma (relative risk, 1.73; 95% confidence interval, 0.74 to 4.07), or reoperations for wound complications (relative risk, 0.52; 95% confidence interval, 0.13 to 1.99). A drained wound was associated with a significantly greater need for transfusion (relative risk, 1.43; 95% confidence interval, 1.19 to 1.72). Reinforcement of wound dressings was required more frequently in the group managed without, drains. No difference between the groups was seen with respect to limb-swelling, venous thrombosis, or hospital stay. Conclusions: Studies to date have indicated that closed suction drainage increases the transfusion requirements after elective hip and knee arthroplasty and has no major benefits. Further randomized trials with use of larger numbers of patients with full reporting Of Outcomes are indicated before the absence of any benefit, particularly for the outcome of wound infection, can be proved. Level of Evidence: Therapeutic study, Level I-2 (systematic review of Level-I randomized controlled trials [studies were homogeneous]). See Instructions to Authors for a complete description of levels of evidence

Pittet, D.: Challenges, treatment strategies and clinical progression of MRSA bacteremia. *Presse Medicale*. 33 Part 2 Suppl. S: S10-S17 (2004).

NOTES: Disturbing epidemiological data Over the past decade there has been a continuous progression in the percentage of *Staphylococcus aureus* strains resistant to methicillin (MRSA), a slight progression in coagulase-negative staphylococci strains resistant to methicillin and a spectacular progression of enterococci resistant to glycopeptides, not only in hospitals but also in intensive care settings. The increase in nosocomial septicemia is currently a major patient safety issue. Higher mortality in bacteremic patients The excess mortality globally observed in cases of bacteremia (compared with patients without bacteremia) is markedly enhanced with regard to secondary bacteremia. Bacteremia is responsible for a significant increase in the overall duration of hospitalization. Prognostic factors of staphylococci bacteremia The mortality rate is significantly higher in patients in whom initial therapy was inappropriate compared with those in whom it was adequate. The isolation of MRSA strains is a negative prognostic factor. Patients at risk of MRSA bacteremia Independent risk factors for MRSA bacteremia include prior exposure to antibiotics, a nosocomial origin, a history of hospitalization within the 6 preceding months, and the presence of a decubitus ulcer. To avoid MRSA bacteremias related to catheters, alternatives should be found to their

use, all hygiene rules should be carefully respected, the insertion point should be carefully disinfected and protected, and the catheter should be removed as rapidly as possible

Plentz, A.; Koller, G.; Weinberger, K.M.; Jilg, W.: Precision and stability of hepatitis B virus DNA levels in chronic surface antigen carriers. *JOURNAL OF MEDICAL VIROLOGY*. 73: 522-528 (2004).

NOTES: Quantitative determination of hepatitis B virus (HBV) DNA concentration is the most important measure for an estimation of the infectivity of an HBV positive health care worker and the basis for the decision whether he or she is allowed to perform exposure prone procedures. Thus questions are raised on how reliable quantitative HBV DNA assays are, and how stable is the HBV DNA concentration in a healthy chronic HBV carrier. Therefore, in the present study two commercially available quantitative HBV DNA assays, the Amplicor HBV Monitor and the HBV Test Hybrid Capture II, and an "in house" quantitative HBV TaqMan PCR, analysing 101 sera of HBsAg positive patients for HBV DNA were compared. In addition, HBV DNA concentrations were followed in 14 healthy chronic carriers for up to 6 years. Despite a good overall correlation between the three tests considerable differences were found for the results of individual sera. Fifty-one percent of sera showed differences within one order of magnitude, 45% differed by a factor above 10 and 4% even by a factor of 100 and higher. The follow-up of the HBV DNA concentrations in 14 carriers showed in 7 carriers a rather stable course with variations within one order of magnitude, whereas in the other half the DNA concentrations fluctuated by factors between 10^2 and 10^6 over the observation period. Thus, viral load determinations in health care workers have to be interpreted with some caution, especially when they are the basis of far-reaching decisions

Puzniak, L.A.; Gillespie, K.N.; Leet, T.; Kollef, M.; Mundy, L.M.: A cost-benefit analysis of gown use in controlling vancomycin-resistant *Enterococcus* transmission: Is it worth the price? *INFECTION CONTROL AND HOSPITAL EPIDEMIOLOGY*. 25: 418-424 (2004).

NOTES: OBJECTIVE: To determine the net benefit and costs associated with gown use in preventing transmission of vancomycin-resistant *Enterococcus* (VRE). DESIGN: A cost-benefit analysis measuring the net benefit of gowns was performed. Benefits, defined as averted costs from reduced VRE colonization and infection, were estimated using a matched cohort study. Data sources included a step-down cost allocation system, hospital informatics, and microbiology databases. SETTING: The medical intensive care unit (MICU) at Barnes-Jewish Hospital, St. Louis, Missouri. PATIENTS: Patients admitted to the MICU for more than 24 hours from July 1, 1997, to December 31, 1999. INTERVENTIONS: Alternating periods when all health-

care workers and visitors were required to wear gowns and gloves versus gloves alone on entry to the rooms of patients colonized or infected with VRE. RESULTS: On base-case analysis, 58 VRE cases were averted with gown use during 18 months. The annual net benefit of the gown policy was \$419,346 and the cost per case averted of VRE was \$1,897. The analysis was most sensitive to the level of VRE transmission. CONCLUSIONS: Infection control policies (eg, gown use) initially increase the cost of health services delivery. However, such policies can be cost saving by averting nosocomial infections and the associated costs of treatment. The cost savings to the hospital plus the benefits to patients and their families of avoiding nosocomial infections make effective infection control policies a good investment

Rejchrt, S.; Cermak, P.; Pavlatova, L.; Mickova, E.; Bures, J.: Bacteriologic testing of endoscopes after high-level disinfection. GASTROINTESTINAL. ENDOSCOPY. 60: 76-78 (2004).

NOTES: Background: There are no definitive data available concerning microbiologic safety of prolonged endoscope storage after reprocessing and disinfection. This study evaluated the durability of high-level disinfection of endoscopes stored in a dust-proof cabinet for 5 days. Methods: Three different types of endoscopes (upper endoscopes, duodenoscopes, colonoscopes) were tested. After completion of the endoscopic procedure, endoscopes were subjected to an initial decontamination, followed by manual cleaning with the endoscope immersed in detergent. The endoscopes then were placed in an automatic reprocessor that provides high-level disinfection. They then were stored by hanging in a dust-proof cabinet. Bacteriologic samples were obtained from the surface of the endoscopes, the openings for the piston valves, and the accessory channel daily for 5 days, and by flush-through (combined with brushing) from the accessory channels after 5 days of storage. Samples were cultured for all types of aerobic and anaerobic bacteria, including bacterial spores, and for Candida species. Results: For all assays, all endoscopes were bacteria-free immediately after high-level disinfection. Only 4 assays (of 135) were positive during the subsequent 5-day assessment (skin bacteria cultured from endoscope surfaces). All flush-through samples were sterile. Conclusions: When endoscope reprocessing guidelines are strictly observed and endoscopes are stored in appropriate cabinets for up to 5 days, reprocessing before use may not be necessary

Rochon Edouard, S.; Pons, J.L.; Veber, B.; Larkin, M.; Vassal, S.; Lemeland, J.F.: Comparative in vitro and in vivo study of nine alcohol-based handrubs. AMERICAN. JOURNAL. OF. INFECTION. CONTROL 32: 200-204 (2004).

NOTES: Background: Hygienic hand disinfection using alcohol-based handrubs (AHRs) is an alternative method to conventional handwashing in hospital

wards. Because a documented choice of such products would consider data from in-care evaluation, we designed a comparative study of 9 AHRs both in vitro and in vivo in actual care conditions. Methods: The bactericidal activity of AHRs was first measured in vitro against 4 hospital strains exhibiting multiple antibiotic resistance: *Acinetobacter baumannii*, *Staphylococcus aureus*, *Pseudomonas aeruginosa*, and *Enterobacter aerogenes*. In a second time, AHRs were tested in an intensive care unit for antibacterial activity against the cutaneous flora of personnel hands and for acceptance by the care personnel. Results: The 9 AHRs could be classified in 3 groups on the basis of their in vitro activity: products of the first group showed a bactericidal activity higher than 4 log(10) against the 4 strains. Only 1 of these products presented simultaneously an effective antibacterial activity against the cutaneous flora of care personnel hands and a good acceptance by the care personnel. Conclusion: The in vitro study allowed the differentiation of the AHRs tested on the basis of bactericidal activity, but evaluation in an in-care situation allowed further discrimination through both antibacterial activity and acceptance. Thus, the combination of in vitro and in vivo evaluations should provide helpful arguments in the choice of AHRs

Rosenthal, V.D.; Maki, D.G.: Prospective study of the impact of open and closed infusion systems on rates of central venous catheter-associated bacteremia. AMERICAN. JOURNAL. OF. INFECTION. CONTROL 32: 135-141 (2004).

NOTES: Objective: We sought to ascertain the effect of switching from an open infusion system to a closed system on rates and sequelae of central venous catheter (CVC)-associated bloodstream infection in the intensive care department (ICU) of 2 hospitals in Argentina. Methods: A prospective, controlled, time-series, cohort trial was undertaken in adult patients admitted to 4 level-III adult ICUs in Buenos Aires, Argentina, who had a CVC in place for at least 24 hours. Rates of CVC-associated bloodstream infection during a period of active surveillance with an open system (baselines externally vented, semirigid, noncollapsible, 1-port plastic bottles) were compared with rates after switching to a closed system (interventions nonvented, collapsible, 2-port plastic bags). Results: Between August 1999 and March 2002, 992 patients in the ICU with CVCs were enrolled. Patients during each study period (open system, 608; closed system, 384) were similar with respect to sex, severity-of-illness score, and prevalence of diabetes and cancer. Compliance with handwashing and CVC site care was also similar during the 2 study periods. The incidence of CVC-associated bacteremia during use of the closed system was significantly lower than during use of the open system (2.36 vs 6.52/1000 catheter-days, relative risk = 0.36, 95% confidence interval = 0.14-0.94, P = .02); bacteremias caused by gram-negative bacilli declined by 64%. in all, 17 patients with catheter-associated

bacteremia died during the period when the open system was in use (2.8%), versus only 1 (0.2%) during use of the closed system (relative risk 0.09, P = .003). The calculated cost savings in the 20 hospital-month intervention period was \$53,768 and 130.9 ICU days. Conclusion: Adoption of a closed infusion system resulted in major reductions in the incidence of catheter-associated bacteremia, related mortality, and cost. Because most Latin American hospitals still use externally vented fluid containers, switching to nonvented bags could substantially reduce rates of nosocomial bacteremia

Rossello Urgell, J.; Vaque Rafart, J.; Armadans Gil, L.L.; Vaquero Puerta, J.L.; Elorza Ricart, J.M.; Quintas Fernandez, J.C.; Hidalgo Pardo, O.; Arevalo Alonso, J.M.: The importance of the day of the week and duration of data collection in prevalence surveys of nosocomial infections. JOURNAL. OF. HOSPITAL. INFECTION. 57: 132-138 (2004).

NOTES: In a national prevalence survey setting, we studied whether the day of week selected for data collection, and the number of days needed to complete the survey, were associated with the prevalence of hospital-acquired infection (HAI). The EPINE (Estudio de Prevalencia de las Infecciones Nosocomiales en Espana) database (1990-2002) was analysed for the purposes of the study. Adjusting for the admission day in the week, the number of intrinsic risk factors, the number of extrinsic risk factors and the prevalence length of stay, a 'weekend effect' was confirmed in this study. The day of the week selected for data collection was related to the presence of infection in the surveyed patients, showing for the period of Saturday-Monday a higher prevalence of patients with HAI (adjusted OR 1.08, 95% CI 1.05-1.10). There was a crude positive trend between number of weeks and prevalence, but the number of days involved in data collection was finally not associated with the prevalence of HAI, once adjustment for hospital size was made. The percentage of repeated records increased linearly with hospital size, and the frequency of infections was higher within this group (OR 2.8, 95% CI 2.6-3.0). The results of this study highlight the need for encouraging hospitals to shorten the time spent in obtaining a prevalence survey. If it is impossible to carry out the survey within the limits of one day, data collection should then be limited to that period of the week, Tuesday to Friday

Rotter, M.L.: European norms in hand hygiene. JOURNAL. OF. HOSPITAL. INFECTION. 56 Suppl. 2: S6-S9 (2004).

NOTES: In the area of hand hygiene, European Norms exist, or are under development, with regard to protective gloves and for assessing the antimicrobial efficacy of hand disinfectants. Important norms for gloves are EN 420 (General requirements), EN 374 (Protective gloves against chemicals and microorganisms) and EN 455 (Medical gloves for single use). A

suspension test for the demonstration of bactericidal activity (prEN 12054) is obligatory for hand disinfectants in all fields of application; a test to prove activity against yeasts applies only to hygienic hand rub. (Optional) Claims for virucidal activities can be substantiated by prEN 1476 and, in future, for mycobactericidal capacity by a test which is still under development. In vivo tests exist for post-contamination treatments, hygienic hand wash and hygienic hand rub (EN 1499 and EN 1500 respectively), and for the preoperative surgical hand rub/wash (prEN 12791). The two former tests employ artificially contaminated hands, the latter test is done with clean hands. All in vivo tests use reference hand treatments (with unmedicated soap or 2-propanol 60% (vol.) or 1-propanol 60% (vol.), respectively) against the results of which are compared with those achieved with the product under test and with the same volunteers. An antiseptic soap needs to be significantly more efficacious than unmedicated soap, a product for hygienic hand rub must not be inferior to the reference treatment with 2-propanol, and a surgical hand disinfectant must not cause a smaller bacterial reduction than the reference preparation with 1-propanol, immediately, and after 3 h. An (optional) claim for sustained activity of a surgical disinfectant needs to be demonstrated by achieving a significantly stronger bacterial reduction after 3 h than the reference preparation

Rutala, W.A.; Weber, D.J.: RE processing endoscopes: United States perspective. JOURNAL. OF. HOSPITAL. INFECTION. 56 Suppl. 2: S27-S39 (2004).

NOTES: Endoscopes are used frequently for the diagnosis and therapy of medical disorders. For example, greater than 10,000,000 gastrointestinal endoscopic procedures are performed each year in the United States. Failure to employ appropriate cleaning and disinfection/sterilization of endoscopes has been responsible for multiple nosocomial outbreaks and serious, sometimes life-threatening, infections. Flexible endoscopes, by virtue of the site of use, have a high bioburden of microorganisms after use. The bioburden found on flexible gastrointestinal endoscopes following use has ranged from 10^5 to 10^{10} CFU/ml, with the highest levels being found in the suction channels. Cleaning dramatically reduces the bioburden on endoscopes. Several investigators have shown a mean \log_{10} reduction factor of 4 (99.99%) in the microbial contaminants with cleaning alone. Cleaning should be done promptly following each use of an endoscope to prevent drying of secretions, allow removal of organic material, and decrease the number of microbial pathogens. Because the endoscope comes into intimate contact with mucous membranes, high-level disinfection is the reprocessing standard after each patient use. High-Level disinfection refers to the use of a disinfectant (e.g., FDA-cleared chemical sterilant or high-level disinfectant) that inactivates all microorganisms (i.e., bacteria, viruses, fungi,

mycobacteria) but not high levels of bacterial spores. The disinfection process requires immersion of the endoscope in the high-Level disinfectant and ensuring all channels are perfused for the approved contact time (e.g., for ortho-phthalaldehyde this is 12 min in the US). Following disinfection, the endoscope and channels are rinsed with sterile water, filtered water, or tapwater. The channels are then flushed with alcohol and dried using forced air. The endoscope should be stored in a manner that prevents recontamination. A protocol that describes the meticulous manual cleaning process, the appropriate training and evaluation of the reprocessing personnel, and a quality assurance program for endoscopes should be adopted and enforced by each unit performing endoscopic reprocessing

Salgado, C.D.; Giannetta, E.T.; Farr, B.M.: Failure to develop vancomycin-resistant Enterococcus with oral vancomycin treatment of Clostridium difficile. INFECTION. CONTROL AND HOSPITAL EPIDEMIOLOGY. 25: 413-417 (2004).

NOTES: OBJECTIVE: Oral vancomycin therapy has been a risk factor for turning culture positive for vancomycin-resistant Enterococcus (VRE). VRE colonization status was reviewed for all patients who received oral vancomycin and underwent prospective cultures. METHODS: Data were extracted from the medical records of all patients receiving oral vancomycin between August 1995 and February 2001 regarding history, hospital course, and perirectal VRE cultures. Hospital policy required contact isolation for patients receiving oral vancomycin until colonization with VRE was excluded. RESULTS: Twenty-six courses of oral vancomycin were given to 22 patients. VRE colonization status after completion of therapy was evaluated for 23 courses in 20 (91%) of these patients. None of these patients became VRE culture positive during a median follow-up of 15 days (range, 9 to 39 days), with a median duration of treatment of 10 days (range, 3 to 58 days), and with a median total dose of 6,500 mg (range, 1,250 to 29,000 mg). All patients received other antibiotics within 30 days prior to therapy with oral vancomycin, during therapy with oral vancomycin, or both; 95% had received anti-anaerobic therapy and 35% had received parenteral vancomycin. CONCLUSIONS: Even when other risk factors were present, no patient receiving oral vancomycin at our facility subsequently became Culture positive for VRE. This suggests that oral vancomycin therapy or other antibiotic use, including anti-anaerobic therapy, may not be a significant independent risk factor for turning culture positive for VRE among patients not Previously exposed to the microbe

Sharma, M.; Berriel Cass, D.; Baran, J.: Sternal surgical-site infection following coronary artery bypass graft: Prevalence, microbiology, and complications

during a 42-month period. INFECTION. CONTROL AND. HOSPITAL. EPIDEMIOLOGY. 25: 468-471 (2004).

NOTES: OBJECTIVE: Surgical-site infection (SSI) is a serious and costly complication following coronary artery bypass graft (CABG). We analyzed surgical factors, microbiology, and complications at a 608-bed community teaching hospital to identify opportunities for prevention. METHODS: All patients undergoing CABG procedures from June 1997 through December 2000 were analyzed. Hospital records and postdischarge surveillance data were reviewed for demographics, surgical information, timing and classification of infection, microbiology, and bacteremic events. RESULTS: Of 3,443 patients undergoing CABG, sternal SSI developed in 122 (3.5%); 71 (58.2%) were classified as superficial SSI and 51 (41.8%) as deep SSI. Surgical antimicrobial prophylaxis was employed in all cases. On average, infection occurred 21.5 days (range, 4 to 315) after CABG. Most cases were diagnosed on readmission (59%); 20 cases (16%) were identified by postdischarge surveillance. Microbiological data were positive in 109 (89.3%), with a single pathogen implicated in most (86.2%). Gram-positive cocci were most frequently recovered (81%); gram-negative bacilli (17%), gram-positive bacilli (1%), and yeast (1%) were less common. *Staphylococcus aureus* was the most frequently isolated pathogen (49%). Bacteremia was noted in 22 instances (18%). It was significantly associated with deep SSI ($P = .002$) and identified only in *S. aureus* cases. CONCLUSIONS: SSI complicated 3.5% of the procedures. *S. aureus* was implicated in most of the cases and was significantly associated with deep SSI. It was the only pathogen associated with secondary bacteremia. In addition to standard guidelines, targeted methods against *S. aureus* should help reduce the overall rate of SSI

Taylor, G.; Gravel, D.; Johnston, L.; Embil, J.; Holton, D.; Paton, S.: Incidence of bloodstream infection in multicenter inception cohorts of hemodialysis patients. AMERICAN. JOURNAL. OF. INFECTION. CONTROL 32: 155-160 (2004).

NOTES: Objective: To assess incidence of and identify risk factors for bloodstream infection in patients starting hemodialysis or starting a new means of vascular access for hemodialysis. Method: Two cohorts of patients, 1 initiating hemodialysis (new patients) and a 1:1 matching group of patients continuing hemodialysis but starting a new vascular access (continuing patients), were enrolled from 9 Canadian hemodialysis units and followed for 6 months. Bloodstream infection was defined using established criteria. A nested case-control study was carried out, using as cases those cohort patients diagnosed with infection. Each case was matched with a control having the same means of access and new or continuing status. Results: A total of 527 patients (258 new, 269 continuing), were recruited and

underwent 34,268 hemodialysis procedures during this 6-month follow-up. There were 96 bloodstream infections in 93 patients (11.97/10,000 days, 28.81/10,000 hemodialysis procedures), yielding a relative risk of infection of 3.33 (95% CI, 2.12-5.24) for patients with a previous bloodstream infection and 1.56 (95% CI, 1.02-2.38) for patients continuing hemodialysis by a new means of access. Survival analysis revealed that compared to arteriovenous fistula vascular access, the relative risk of bloodstream infection in patients was 1.47 (95% CI, 0.36-5.96) for arteriovenous grafts, 8.49 (95% CI, 3.03-23.78) for cuffed central venous catheters, and 9.87 (95% CI, 3.46-28.20) for uncuffed central venous catheters. The regression model of the case-control study identified earlier bloodstream infection (OR, 6.58), poor patient hygiene (OR, 3.48), and superficial access-site infection (OR, 4.36) as additional risk factors. Conclusion: During the first 6 months there is a high rate of bloodstream infection in patients starting hemodialysis either for the first time or by a new means of vascular access. Previous hemodialysis bloodstream infection and continuing hemodialysis by a new means of vascular access are markers for an increased risk of infection, as is poor patient hygiene. Central venous catheter vascular access, whether cuffed or uncuffed, has a much higher infection risk. In this study, there was no difference in infection rate between cuffed and uncuffed central catheters

Thomas, C.; Cadwallader, H.L.; Riley, T.V.: Surgical-site infections after orthopedic surgery: statewide surveillance using linked administrative databases. *JOURNAL OF HOSPITAL INFECTION*. 57: 25-30 (2004).
NOTES: Prospective surveillance programmes to monitor the incidence of surgical-site infection (SSI) in patients who have had orthopaedic implant surgery can be difficult to implement due to limited human and technical resources. In addition, prolonged patient follow-up, up to one year, may be required. Traditional methods of surveillance can be enhanced by using administrative databases to assist in case finding and facilitate overall surveillance activities. The aim of this study was to identify the incidence of SSI in patients who had undergone total hip replacement (THR) or total knee replacement (TKR) surgery in all Western Australian (WA) hospitals during 1999 using the Western Australian Data Linkage System. The WA Data Linkage System links several population-based administrative health datasets within the state, including the Hospital Morbidity Data System (HMDS), containing International Classification of Disease-coded discharge information, and mortality records. A total of 1476 THR and 1875 TKR procedures was identified from 21 WA hospitals during 1999. The incidence of SSI after these procedures was 5% (95% CI 4.3-5.7) [THR (4.86%, 95% CI 3.77-5.95) and TKR (5.15%, 95% CI 4.15-6.15)]. The incidence was 33.72 infections per 1000 person-years. Patients aged over 80 years experienced a significantly higher rate of infection after THR compared with patients aged 80 or less (z-

test, $z = 2.56$, $P = 0.015$), but not for TKR. No patients with an SSI died during follow-up. The WA Data Linkage System provided a unique opportunity to review the incidence of SSIs in patients undergoing THR or TKR surgery in WA hospitals

Trautner, B.W.; Darouiche, R.O.: Role of biofilm in catheter-associated urinary tract infection. AMERICAN. JOURNAL. OF. INFECTION. CONTROL 32: 177-183 (2004).

NOTES: The predominant form of life for the majority of microorganisms in any hydrated biologic system is a cooperative community termed a "biofilm." A biofilm on an indwelling urinary catheter consists of adherent microorganisms, their extracellular products, and host components deposited on the catheter. The biofilm mode of life conveys a survival advantage to the microorganisms associated with it and, thus, biofilm on urinary catheters results in persistent infections that are resistant to antimicrobial therapy. Because chronic catheterization leads almost inevitably to bacteriuria, routine treatment of asymptomatic bacteriuria in persons who are catheterized is not recommended. When symptoms of a urinary tract infection develop in a person who is catheterized, changing the catheter before collecting urine improves the accuracy of urine culture results. Changing the catheter may also improve the response to antibiotic therapy by removing the biofilm that probably contains the infecting organisms and that can serve as a nidus for reinfection. Currently, no proven effective strategies exist for prevention of catheter-associated urinary tract infection in persons who are chronically catheterized

Turner, P.; Saeed, B.; Kelsey, M.C.: Dermal absorption of isopropyl alcohol from a commercial hand rub: implications for its use in hand decontamination. JOURNAL. OF. HOSPITAL. INFECTION. 56: 287-290 (2004).

NOTES: Isopropyl alcohol-containing hand rubs are widely used in healthcare for hand decontamination. Ten healthy adult volunteers applied a commercially available isopropyl alcohol-containing hand rub to their hands every 10 min over a 4 h period. Blood isopropyl alcohol levels were measured at the beginning and end of the study. At the end of the study, measurable blood isopropyl alcohol levels (range 0.5-1.8 mg/l) were recorded in nine subjects. We confirmed that isopropyl alcohol could be absorbed through the intact skin of adult humans. The social and medical implications are discussed

Wertheim, H.F.L.; Vos, M.C.; Boelens, H.A.M.; Voss, A.; Vandenbroucke Grauls, C.M.J.E.; Meester, M.H.M.; Kluytmans, J.A.J.W.; van Keulen, P.H.J.; Verbrugh, H.A.: Low prevalence of methicillin-resistant Staphylococcus aureus (MRSA) at hospital admission in the Netherlands: the value of search and destroy and

restrictive antibiotic use. JOURNAL. OF. HOSPITAL. INFECTION. 56: 321-325 (2004).

NOTES: In the Netherlands, less than 1% of clinical isolates of *Staphylococcus aureus* are methicillin-resistant (MRSA). A national search and destroy policy prevents MRSA from becoming endemic. Some MRSA outbreaks cannot be related to patients at risk for MRSA carriage. This study was designed to measure the prevalence of MRSA among patients without risk factors for MRSA carriage at the time of admission to the hospital. In four Dutch hospitals, patients admitted to non-surgical departments in the period 1999 - 2000 were screened for MRSA nasal carriage. Nasal swabs were streaked on 5% sheep blood agar (BA), submerged in a selective broth, and incubated for two to three days at 35 degreesC. Colonies suspected of being *S. aureus* were identified with an agglutination test. Susceptibility testing was performed by an automated system and additional oxacillin disk diffusion. Methicillin resistance was confirmed by a DNA hybridization test and *mecA* PCR. MRSA strains were genotyped by pulsed-field gel electrophoresis (PFGE). Twenty-four percent (2332/9859) of the patients were *S. aureus* nasal carriers. Only three (0.03%) patients were MRSA carriers. These patients were not repatriated, nor known to be MRSA carriers before screening. Genotyping revealed that the strains were not clonally related and were not related to MRSA outbreaks in the hospital where the patients were admitted. We conclude that at routine admission to a Dutch hospital (excluding high-risk foreign admissions) the MRSA prevalence is low (0.03%), due to the Dutch search and destroy policy and restrictive antibiotic prescribing

Wisplinghoff, H.; Bischoff, T.; Tallent, S.M.; Seifert, H.; Wenzel, R.P.; Edmond, M.B.: Nosocomial bloodstream infections in US hospitals: Analysis of 24,179 cases from a prospective nationwide surveillance study. CLINICAL. INFECTIOUS. DISEASES. 39: 309-317 (2004).

NOTES: Background. Nosocomial bloodstream infections (BSIs) are important causes of morbidity and mortality in the United States. Methods. Data from a nationwide, concurrent surveillance study (Surveillance and Control of Pathogens of Epidemiological Importance [SCOPE]) were used to examine the secular trends in the epidemiology and microbiology of nosocomial BSIs. Results. Our study detected 24,179 cases of nosocomial BSI in 49 US hospitals over a 7-year period from March 1995 through September 2002 (60 cases per 10,000 hospital admissions). Eighty-seven percent of BSIs were monomicrobial. Gram-positive organisms caused 65% of these BSIs, gram-negative organisms caused 25%, and fungi caused 9.5%. The crude mortality rate was 27%. The most-common organisms causing BSIs were coagulase-negative staphylococci (CoNS) (31% of isolates), *Staphylococcus aureus* (20%), enterococci (9%), and *Candida* species (9%). The mean

interval between admission and infection was 13 days for infection with *Escherichia coli*, 16 days for *S. aureus*, 22 days for *Candida* species and *Klebsiella* species, 23 days for enterococci, and 26 days for *Acinetobacter* species. CoNS, *Pseudomonas* species, *Enterobacter* species, *Serratia* species, and *Acinetobacter* species were more likely to cause infections in patients in intensive care units ($P < .001$). In neutropenic patients, infections with *Candida* species, enterococci, and viridans group streptococci were significantly more common. The proportion of *S. aureus* isolates with methicillin resistance increased from 22% in 1995 to 57% in 2001 ($P < .001$, trend analysis). Vancomycin resistance was seen in 2% of *Enterococcus faecalis* isolates and in 60% of *Enterococcus faecium* isolates. Conclusion. In this study, one of the largest multicenter studies performed to date, we found that the proportion of nosocomial BSIs due to antibiotic-resistant organisms is increasing in US hospitals

Yip, S.K.; Fung, K.; Pang, M.W.; Leung, P.; Chan, D.; Sahota, D.: A study of female urinary tract infection caused by urodynamic investigation. AMERICAN JOURNAL OF OBSTETRICS AND GYNECOLOGY. 1234-1240 (190).

NOTES: Objective: The purpose of this study was to assess the prevalence of female urinary tract infection before and after urodynamic investigation and to identify the risk factors for urinary tract infection after urodynamic investigation. Study design: Eight hundred twenty-two consecutive incontinent women were recruited. All women were "double-screened" and treated for urinary tract infection before urodynamic investigation: first by mid stream urine culture 4 to 6 weeks before investigation and then by reagent strips for urine leukocytes and nitrites at the time of investigation. The investigation was postponed until the urinary tract infection had been treated. All women then received a standard urodynamic investigation. Results: The prevalence of urinary tract infection before urodynamic investigation was 5.1% (95% CI, 3.6-6.6), and the prevalence after the investigation was 8.4% (95% CI, 6.5-10.3). Three independent risk factors were identified: age ≥ 70 years (odds ratio, 1.99; 95% CI, 1.14-3.48), previous continence surgery (odds ratio, 1.90; 95% CI, 1.05-3.43), and urinary tract infection before urodynamic investigation (odds ratio, 3.13; 95% CI, 1.43-6.83). The 3 most common uropathogens in the urinary tract infections after the urodynamic investigation were *Escherichia coli* (46.3%), *Enterococcus* spp (16.4%), and *Enterococcus faecalis* (11.9%). Conclusion: Despite a stringent screen-and-treat protocol before urodynamic investigation, patients still experienced urinary tract infection

Zurcher, M.; Tramer, M.R.; Walder, B.: Colonization and bloodstream infection with single-versus multi-lumen central venous catheters: A quantitative systematic review. ANESTHESIA AND ANALGESIA. 99: 177-182 (2004).

NOTES: There is a controversy as to whether the number of lumens in the central venous catheters may impact the incidence of catheter-related bloodstream infection. We performed a systematic search (MEDLINE, PREMEDLINE, Cochrane Library, EMBASE, BIOSIS Previews, CINAHL, HealthSTAR/Ovid healthstar, bibliographies, any language, to April, 2003) for full reports on randomized comparisons of single-lumen and multi-lumen catheters. Trials had to report on dichotomous data of catheter colonization or bloodstream infection. Meta-analyses were performed using a fixed effect model. Data were expressed as odds ratio (OR) and number-needed-to-treat (NNT) with 95% confidence interval (CI). Five randomized trials (1987-1995) with data on 255 single-lumen and 275 multi-lumen catheters were analyzed. Average insertion times were 8 to 21 days with multi-lumen catheters and 9 to 24 days with single-lumen catheters. In 4 trials, 23 of 176 (13.1%) multi-lumen and 26 of 177 (14.7%) single-lumen catheters were colonized (OR, 0.92; 95% CI, 0.49-1.72). In 5 trials, bloodstream infection occurred with 23 of 275 (8.4%) multi-lumen and with 8 of 255 (3.1%) single-lumen catheters (OR, 2.58; 95% CI, 1.24-5.37; NNT, 19; 95% CI, 11-75). For every 20 single-lumen catheters inserted, one bloodstream infection will be avoided that would have occurred had multi-lumen catheters been used. The risk of catheter colonization is not decreased. Although these conclusions are based on limited data, single-lumen catheters should be used whenever feasible