THE INFECTIOUS OR CONTAMINATED PATIENT pdf

1: Infection Control In Healthcare | Hospital Infection Control

Healthcare personnel can be exposed to Ebola virus by touching a patient's body fluids, contaminated medical supplies and equipment, or contaminated environmental surfaces. Splashes to unprotected mucous membranes (for example, the eyes, nose, or mouth) are particularly hazardous.

The most important and frequent mode of transmission of nosocomial infections is by direct contact. Microorganisms carried in this manner can be dispersed widely by air currents and may become inhaled by a susceptible host within the same room or over a longer distance from the source patient, depending on environmental factors; therefore, special air-handling and ventilation are required to prevent airborne transmission. Microorganisms transmitted by airborne transmission include Legionella , Mycobacterium tuberculosis and the rubeola and varicella viruses. Common vehicle transmission This applies to microorganisms transmitted to the host by contaminated items, such as food, water, medications, devices, and equipment. This occurs when vectors such as mosquitoes, flies, rats, and other vermin transmit microorganisms. Contact transmission is divided into two subgroups: Routes of contact transmission Description Direct-contact transmission This involves a direct body surface-to-body surface contact and physical transfer of microorganisms between a susceptible host and an infected or colonized person, such as when a person turns a patient, gives a patient a bath, or performs other patient-care activities that require direct personal contact. Direct-contact transmission also can occur between two patients, with one serving as the source of the infectious microorganisms and the other as a susceptible host. Indirect-contact transmission This involves contact of a susceptible host with a contaminated intermediate object, usually inanimate, such as contaminated instruments, needles , or dressings, or contaminated gloves that are not changed between patients. In addition, the improper use of saline flush syringes, vials, and bags has been implicated in disease transmission in the US, even when healthcare workers had access to gloves, disposable needles, intravenous devices, and flushes. For those with ventilator-associated or hospital-acquired pneumonia, controlling and monitoring hospital indoor air quality needs to be on agenda in management, [8] whereas for nosocomial rotavirus infection, a hand hygiene protocol has to be enforced. Furthermore, patients are often prescribed antibiotics and other antimicrobial drugs to help treat illness; this may increase the selection pressure for the emergence of resistant strains. It kills all microorganisms on equipment and surfaces through exposure to chemicals, ionizing radiation, dry heat, or steam under pressure. Isolation health care Isolation is the implementation of isolating precautions designed to prevent transmission of microorganisms by common routes in hospitals. See Universal precautions and Transmission-based precautions. Because agent and host factors are more difficult to control, interruption of transfer of microorganisms is directed primarily at transmission for example isolation of infectious cases in special hospitals and isolation of patient with infected wounds in special rooms also isolation of joint transplantation patients on specific rooms. Handwashing[edit] Handwashing frequently is called the single most important measure to reduce the risks of transmitting skin microorganisms from one person to another or from one site to another on the same patient. Washing hands as promptly and thoroughly as possible between patient contacts and after contact with blood , body fluids , secretions , excretions , and equipment or articles contaminated by them is an important component of infection control and isolation precautions. The first is represented by the micro-organisms taken by workers from the environment, and the bacteria in it are capable of surviving on the human skin and sometimes to grow. The second group is represented by the permanent micro-organisms living on the skin surface on the stratum corneum or immediately under it. They are capable of surviving on the human skin and to grow freely on it. They have low pathogenicity and infection rate, and they create a kind of protection from the colonization from other more pathogenic bacteria. The skin of workers is colonized by 3. The microbes comprising the resident flora are: Staphylococcus epidermidis , S. The goal of hand hygiene is to eliminate the transient flora with a careful and proper performance of hand washing, using different kinds of soap, normal and antiseptic , and alcohol-based gels. The main problems found in the practice of hand hygiene is connected with the lack of available sinks and time-consuming performance of hand washing. An easy way to resolve this problem could be the use of alcohol-based hand rubs, because of faster application compared to correct hand-washing. Patients who are bed-bound often do not have as much access to clean their hands at mealtimes or after touching surfaces or handling waste such as tissues. By reinforcing the importance of handwashing and providing santizing gel or wipes within reach of the bed, nurses were directly able to reduce infection rates. A study published in demonstrated this by improving patient education on both proper hand-washing procedure and important times to use sanitizer and successfully reduced the rate of enterococci and "S. Moreover, multidrug-resistant infections can leave the hospital and become part of the community flora if steps are not taken to stop this transmission. It is unclear whether or not nail polish or rings affected surgical wound infection rates. Gloves are worn for three important reasons in hospitals. First, they are worn to provide a protective barrier for personnel, preventing large scale contamination of the hands when touching blood, body fluids, secretions, excretions, mucous membranes, and non-intact skin. In the United States, the Occupational Safety and Health Administration has mandated wearing gloves to reduce the risk of bloodborne pathogen infections. Third, they are worn to reduce the likelihood that the hands of personnel contaminated with micro-organisms from a patient or a fomite can transmit those micro-organisms to another patient. In this situation, gloves must be changed between patient contacts, and hands should be washed after gloves are removed. Wearing gloves does not replace the need for handwashing due to the possibility of contamination when gloves are replaced, or by damage to the glove. Doctors wearing the same gloves for multiple patient operations presents an infection control hazard. Use of hydrogen peroxide vapor has been clinically proven to reduce infection rates and risk of acquisition. Hydrogen peroxide is effective against endospore-forming bacteria, such as Clostridium difficile, where alcohol has been shown to be ineffective. Touch surfaces commonly found in hospital rooms, such as bed rails, call buttons, touch plates, chairs, door handles, light switches, grab rails, intravenous poles, dispensers alcohol gel, paper towel, soap , dressing trolleys, and counter and table tops are known to be contaminated with Staphylococcus , MRSA one of the most virulent strains of antibiotic-resistant bacteria and vancomycin-resistant Enterococcus VRE. This is why touch surfaces in hospital rooms can serve as sources, or reservoirs, for the spread of bacteria from the hands of healthcare workers and visitors to patients. A number of compounds can decrease the risk of bacteria growing on surfaces including: While antibiotic drugs to treat diseases caused by gram-positive MRSA are available, few effective drugs are available for Acinetobacter. Acinetobacter bacteria are evolving and becoming immune to existing antibiotics, so in many cases, polymyxin -type antibacterials need to be used. Their cell structures make them more difficult to attack with antibiotics than gram-positive organisms like MRSA. In some cases, antibiotic resistance is spreading to gram-negative bacteria that can infect people outside the hospital. The CDC estimates 2 million people in the United States are infected annually by hospital-acquired infections, resulting in 20, deaths. Belgium[edit] In Belgium the prevalence of nosocomial infections is about 6. Annually about , patients become infected by a nosocomial infection, resulting in almost deaths. Around , about 9, people died each year with a nosocomial infection, of which about 4, would have survived without this infection.

2: Preventing Health Careâ€“Associated Infections - Patient Safety and Quality - NCBI Bookshelf

Wear gloves when it can be reasonably anticipated that contact with blood or other potentially infectious materials, mucous membranes, nonintact skin, or potentially contaminated intact skin (e.g., of a patient incontinent of stool or urine) could occur.

The authors have declared that no competing interests exist. Conceived and designed the experiments: Received Apr 3; Accepted Sep This article has been cited by other articles in PMC. Abstract Objective This prospective study aims to identify and compare the incidence of bacterial contamination of hospital charts and the distribution of species responsible for chart contamination in different units of a tertiary hospital. Methods All beds in medical, surgical, pediatric, and obstetric-gynecologic general wards and those in corresponding special units including medical, surgical, pediatric intensive care units ICUs , the obstetric tocolytic unit and delivery room were surveyed for possible chart contamination. The outer surfaces of included charts were sampled by one experienced investigator with sterile cotton swabs rinsed with normal saline. Results For general wards and special units, the overall sampling rates were Except for obstetric-gynecologic charts, the incidence was significantly higher in each and in all ICUs than in corresponding wards. Coagulase-negative staphylococci was the most common contaminant in general wards Special units had a significantly higher incidence of bacterial contamination due to Staphylococcus aureus Logistic regression analysis revealed the incidence of chart contamination was 2- to 4-fold higher in special units than in general wards [odds ratios: Conclusions Noting that most hospital charts are contaminated, our study confirms that a hospital chart is not only a medical record but also an important source of potential infection. The plastic cover of the medical chart can harbor potential pathogens, thus acting as a vector of bacteria. Additionally, chart contamination is more common in ICUs. These findings highlight the importance of effective hand-washing before and after handling medical charts. However, managers and clinical staff should pay more attention to the issue and may consider some interventions. Introduction Reducing healthcare-associated infection HAI remains a critical issue for clinicians and managers in hospitals and healthcare institutions all over the world. Correct hand washing has been proved the most effective way to prevent HAIs [1] â€” [4]. Based on the WHO guidelines, good hand hygiene can lower the risk of hand transmission of microorganisms [1] , [5]. However, it is difficult to examine whether clinical staff conform to the guidelines in daily practice. Worrisomely, previous studies have showed that the compliance with hand hygiene guidelines is low and unsatisfactory among healthcare workers [6] â€” [9]. Most healthcare personnel do not wash their hands between handling medical charts and touching patients [9]. Despite many attempts to promote or measure the compliance of hand hygiene [5] , [8] , [10] â€” [13] , adherence remains questionable. In addition, detecting possible vectors of pathologic microorganisms in healthcare institutions is another important step in blocking the transmission or eradicating these pathogens. Although a number of methods, including hand washing, have been used to minimize the occurrence of related infections, there has not been much focus on the source of potential infection in the environment, particularly, the role of hospital medical charts as a possible vector of pathogens. It was previously shown that stethoscopes, white coats, keyboards, faucets, mobile phones, writing pens, case notes, medical charts, and even wrist watches can be contaminated by environmental or pathologic microorganisms such as methicillin-resistant Staphylococcus aureus MRSA , vancomycin-resistant enterococci VRE , Pseudomonas aeruginosa, and Klebsiella pneumoniae [14] â€” [27]. Such opportunistic or causative pathogens can be found on the surfaces of these personal belongings and facilities within the wards [14] , [16] , [20] , [22] , [26]. However, there are few studies on bacterial contamination of hospital medical charts, and two of these reports are a brief report and a letter, respectively [23] â€” [25]. As pioneers, these pilot studies have been exploratory and were conducted with relatively small sample sizes in selected wards. Furthermore, in some studies, the objects of potential contamination were sampled by means of purposive sampling rather than a general survey, which inevitably affects the results of these studies. In addition, excessively short or long hospitalizations may be major confounders of sampling medical charts, and failure to consider the average hospital stay would confound the results of these studies. In this prospective study, we aimed to identify and compare the incidence of bacterial contamination of hospital charts as well as the distribution of species responsible for chart contamination between different units of a tertiary hospital, while considering the influence of confounders. Using a general survey, all qualified medical, surgical, pediatric, and obstetric and gynecologic Obs-Gyn charts were sampled using strict exclusion criteria in order to reach a reliable conclusion. Methods Study Design and Sample This prospective study was conducted between January 1, , and December 31, , at a 1,bed tertiary hospital in Taipei, Taiwan. Certain hospital units were excluded from evaluation. Additionally, medical charts in the nursery were excluded because in the nursery of our hospital, the medical staff use case notes without a plastic cover, instead of medical charts. Otherwise, medical charts in general wards including medical, surgical, pediatric, and Obs-Gyn wards as well as charts in corresponding special units including medical, surgical, pediatric intensive care units MICU, SICU, PICU , and obstetric units including the tocolytic unit and the delivery room were surveyed for possible contamination. The sampling time was from 9 a. In the study, basic information including hospital stay of the patients and also classification of the beds in general wards and special units were obtained from the department of medical affairs. Consequently, we did not have access to the patients, and the written informed consents of the patients from adults or from kin or caretakers on behalf of the children were not available. Medical Charts In our hospital, medical charts are handled and recorded mainly by the physicans and nursing staff. Due to different characteristics in different units, it is not clear how many times per day the charts are handled in each unit. We only know that the nurses in general wards and those in ICUs have the same frequency of shifts eight hours per shift; three shifts per day. Also, the physicians in general wards and those in ICUs have the same frequency of shifts two shifts per day. All physicians and nurses need to handle the medical charts at least once per shift to finish the medical record. Medical charts in general wards and in ICUs are kept on the chart rack at the nursing station, where the charting is done. All the medical charts throughout the hospital are identical and are replaced every 5 years. Basically, medical charts are not specially wiped down unless there are extra instructions or changes of hospital policy. Exclusion Criteria Considering the differences in frequencies of handling the charts, medical charts of patients who were not hospitalized were excluded in order to avoid selection bias. Furthermore, both of excessively short and long hospitalizations may be major confounders for sampling the medical charts. Since a longer hospital stay may increase the chance of contamination of medical charts, charts of patients who had been in hospital for more than two weeks were excluded. This is because in Taiwan, many minor surgeries or laparoscopic surgeries are performed on patients with a subsequent hospitalization for one or two days based on payment or insurance considerations. In such cases, the physicians and nursing staff often complete all their records including admission, progress and discharge notes at one time and medical charts are handled with low frequency. In order to avoid inter-investigator bias and inadequate sampling of the medical charts measuring bias , only one experienced investigator was responsible for sampling all included charts. Finally, considering the possible effect of time or seasons on organisms, charts in general wards and their corresponding special units i.

THE INFECTIOUS OR CONTAMINATED PATIENT pdf

3: Infection - Wikipedia

By Kelly M. Pyrek. As you may recall several years ago, a significant number of infections associated with contaminated bronchoscopes in a short time prompted the Food and Drug Administration (FDA) to issue a Safety Communication about microbial transmission and infection associated with bronchoscopes.

Print The Case A year-old man with type 2 diabetes mellitus, chronic kidney disease, and a history of ventricular tachycardia with an automated implantable cardiac defibrillator AICD came to his primary care physician PCP with symptoms of shaking, weakness, and vomiting. The physical examination was unremarkable except for the presence of chronic peripheral neuropathy. The physician ordered routine blood tests and 2 peripheral blood cultures, diagnosed the patient with a nonspecific viral syndrome, and sent him home. The routine laboratory tests done that day revealed only a normocytic anemia. However, 5 days later, the PCP was notified that both sets of blood cultures were growing Corynebacterium spp. Uncertain of how to interpret the result as this bacteria may represent contaminated blood cultures rather than a true cause of disease , the PCP contacted an infectious disease specialist, who recommended hospitalization. The patient was hospitalized, seen by a different infectious disease specialist, and started on IV antibiotics. Repeat blood cultures drawn before antibiotics were begun remained negative. The patient was clinically stable, so the antibiotics were stopped and the patient was discharged to home. The physicians assumed that the Corynebacterium was a contaminant from the skin. One month later, the patient presented to the emergency department ED with nausea and vomiting. His physical examination and laboratory test results were unremarkable. His symptoms improved with IV fluids, and he was discharged after an hour stay. Two days later, 2 out of 2 blood cultures drawn at that ED visit started growing Corynebacterium spp. That evening, the results were reported to a covering physician who was unfamiliar with the patient or previous culture results. The physician assumed that the blood cultures were contaminated from the skin and took no action. Three weeks later, the patient was readmitted after being shocked by his defibrillator AICD. A transesophageal echocardiogram TEE revealed a tricuspid vegetation and blood cultures again showed Corynebacterium spp. Diagnosed with subacute bacterial endocarditis and treated with IV vancomycin, the patient made a full recovery. The Commentary The case history that forms the basis for this commentary illustrates several of the important complexities and inefficiencies of modern medicine, some of which resulted in medical errors. A patient with multiple underlying medical problems that predispose to infection; Isolation of a microorganism from blood cultures that in most circumstances would represent contamination but, in this instance, represented a clinically important pathogen that caused a potentially life-threatening infection; Misinterpretation of the clinical significance of the positive blood culture result; Failure of the primary and covering physicians to communicate effectively, ultimately resulting in delayed diagnosis and increased patient morbidity. Although each needs to be appropriately addressed to prevent similar errors, this commentary will focus primarily on the interpretation and potential misinterpretation of positive blood cultures. Blood Culture Contamination Physicians and clinical microbiologists have long appreciated that blood cultures are perhaps the most important laboratory tests to diagnose serious infections. In recent years, it has also become apparent that contaminated i. Perhaps the most important factor is the failure of the health care worker HCW to use strict aseptic technique when obtaining the blood specimen. Studies have shown that trained phlebotomists or blood culture teams have fewer contaminated blood cultures than other HCWs. In recent years, there has been a trend toward obtaining blood cultures from existing indwelling intravenous catheters or other access devices e. However, blood cultures obtained in this fashion are contaminated more frequently than those obtained by peripheral venipuncture. In the pre-HIV era, the needle used to obtain the blood culture was removed and a second sterile needle was placed on the syringe for inoculation of the blood culture bottles. To reduce the risk of needlestick injury associated with changing needles, the standard culture method now employs a single needle that is used for obtaining blood and inoculating the culture vial. Although several studies initially showed that the single needle technique was not associated with increased contamination rates, a subsequent meta-analysis showed a contamination rate of 3. Obviously, the presence of predisposing factors and a consistent clinical presentation can help clinicians interpret test results. The identity of the microorganism also provides important information Table , and a predictive model has confirmed this. In contrast, coagulase-negative staphylococci CoNS , Corynebacterium species, Bacillus species other than anthracis, and P. Isolation of the latter microorganisms, mostly commonly with CoNS but also with corynebacteria as in the case presented here , may confuse clinicians. Corynebacterium species are part of the normal human skin flora, so they typically do not cause true invasive disease. But Corynebacterium can cause clinically significant infections in the presence of medical devices such as joint prostheses, catheters, ports, vascular grafts, prosthetic heart valves, pacemakers, and AICDs as in this case. The number of blood culture sets that grow a particular microorganism, especially when measured as a function of the total number of blood cultures obtained, has proved to be a very useful aid in interpreting the clinical significance of positive blood cultures Figure. As the Figure illustrates and this statement implies, this diagnostic maxim has no utility if only a single blood culture is obtained. The value of multiple cultures largely flows from probability considerations: It follows, then, that the probability of recovering the same microorganism in 2 culture sets from a patient, and of that organism being a contaminant, is less than 1 in 0. The clinician can be quite confident, then, that 2 out of 2 blood cultures positive with the same pathogen, even one that is commonly a contaminant, represents real disease, assuming that the 2 blood cultures were obtained from separate venipunctures or catheter draws. Reducing Contamination We cannot eliminate blood culture contamination entirely, but it is possible for institutions to reduce contamination rates. One step is to use more efficacious antiseptic preparations. Povidone iodine preparations iodophors require 1. Although the evidence-base has limitations, 20 the Clinical and Laboratory Standards Institute, a consensus organization that publishes guidelines based on best available data, recommends tincture of iodine, chlorine peroxide, and chlorhexidine gluconate over povidone-iodine and further states that iodine tincture and chlorhexidine gluconate are probably equivalent. However, available data are limited, and I believe that no firm recommendations regarding these prepackaged kits can be made at this time. Hospitals may also be able to reduce blood culture contamination rates by utilizing trained phlebotomists or blood culture teams to obtain blood for culture rather than using random nursing personnel, nondegree nursing assistants, medical students, and resident physicians to obtain these specimens. Because approximately half of all positive blood cultures in most institutions represent contamination, laboratories should develop policies and procedures to limit the evaluation of likely contaminants. Microorganisms that are most often contaminants can, in the right clinical setting, be clinically significant pathogens. The initial management of this patientâ€”deeming the initial positive blood cultures to be significantâ€”was reasonable in my judgment. When both the imaging studies and repeat blood cultures prior to antibiotics were negative, treatment was stopped and the patient was observed. However, 1 month later, the patient again had 2 of 2 blood cultures positive for Corynebacterium spp. No action was taken by the covering physician, even though the probability of contamination was less than 1 in I believe that this represented an interpretation error. Apparently, the PCP was not made aware of this event a communication error , and no medical intervention occurred, leading to delayed diagnosis and treatment of the patient. Fortunately, the patient suffered no permanent harm, but patient morbidity and cost to the health care system could have been prevented had these errors not occurred. Take-Home Points Blood culture contamination is common, constituting up to half of all positive blood cultures at some institutions. The identity of the organism isolated can help in determining if the culture is contaminated, as some organisms rarely cause BSIs. The number of blood cultures that yield a particular organism can help predict true infections. For example, if 2 sets of blood cultures obtained by separate venipunctures in the same time frame are positive with the same organism, the probability of contamination is less than 1 in Institutions can reduce blood culture contamination by using the most effective antiseptic agents and utilizing dedicated personal to draw blood cultures. Minimizing the workup of blood culture contaminants: The clinical significance of positive blood cultures in the s: Contaminant blood cultures and resource utilization. The true consequences of false-positive results. Doing it right the first time: Phlebotomy teams reduce blood-culture contamination rate and save money. Clin Perform Qual Health Care. A randomized trial of povidone-iodine compared with iodine tincture for venipuncture site disinfection: Chlorhexidine compared with povidone-iodine as skin preparation before blood culture: Effect of iodophor vs. Clinical and Laboratory Standards Institute; Reliability of blood cultures collected from intravascular catheter versus venipuncture. Am J Clin Pathol. Clinical utility of blood cultures drawn from indwelling central venous catheters in hospitalized patients with cancer. Contamination of catheter-drawn blood cultures. The significance of changing needles when inoculating blood cultures: Rapid classification of positive blood cultures. Prospective validation of a multivariate algorithm. Evaluation of positive blood cultures. Guidelines for early differentiation of contaminated from valid positive cultures. The clinical significance of positive blood cultures: Laboratory and epidemiologic observations. An evaluation of iodophors as skin antiseptics. Review of clinical trials of skin antiseptic agents used to reduce blood culture contamination. Infect Control Hosp Epidemiol. Schifman RB, Pindur A. The effect of skin disinfection materials on reducing blood culture contamination.

4: 15 Steps for Protecting Patients â€“ Reduce Infection Deaths

Further work is required to evaluate the benefit of such interventions on MCD contamination and to determine whether a link exists between contamination and subsequent patient infection." Ulger, et al. () sought to determine the contamination rate of the healthcare workers' mobile phones and hands in operating room and ICU.

Advanced Search Abstract Despite documentation that the inanimate hospital environment e. Pathogens for which there is more-compelling evidence of survival in environmental reservoirs include Clostridium difficile, vancomycin-resistant enterococci, and methicillin-resistant Staphylococcus aureus, and pathogens for which there is evidence of probable survival in environmental reservoirs include norovirus, influenza virus, severe acute respiratory syndromeâ€"associated coronavirus, and Candida species. Strategies to reduce the rates of nosocomial infection with these pathogens should conform to established guidelines, with an emphasis on thorough environmental cleaning and use of Environmental Protection Agencyâ€"approved detergent-disinfectants. The role of the inanimate hospital environment e. Although contamination of the inanimate environment by microorganisms has long been recognized, its significance is unclear. For example, for one medical center, the decrease in environmental contamination that occurred after a move to a new hospital was not associated with any change in nosocomial infection rates [1]. Discrepancies between studies regarding the degree and impact of environmental contamination may reflect a complex epidemiology, differences in measurement between studies, or the variable quality of institutional cleaning, which is an important and frequently unmeasured confounder. In addition, the finding of pathogens in the hospital environment, although necessary, is not sufficient to prove a causal role in the pathogenesis of nosocomial infection. Last, observations from uncontrolled studies that outbreaks end following the implementation of improved environmental cleaning must be viewed critically, because the use of multiple infection-control measures may obscure the importance of specific infection-control activities. The quality of the evidence that examines the contamination of the inanimate environment should be judged according to whether the following 4 factors have been measured: The best studies of cross-colonization of patients from the inanimate environment use molecular epidemiologic techniques to identify pathogens, measure the quality of environmental cleaning and hand hygiene over time, and link contaminated surfaces and cross-colonization events in geographic and temporal dimensions. Environmental cleaning is an important part of infection-control strategies for influenza, parainfluenza, enteric viruses, hepatitis B virus, and severe acute respiratory syndrome SARS -associated coronavirus. Table 1 Summary of nosocomial pathogens and environmental contamination. Table 1 View large Download slide Summary of nosocomial pathogens and environmental contamination. Influenza virus is generally spread through large respiratory droplets and, possibly, through airborne droplet nuclei. Classic studies have shown that influenza virus can contaminate the environment, persist after drying, and become re-aerosolized during floor sweeping. Influenza virus can survive for 24â€"48 h on nonporous surfaces, and viable virus can be spread to the skin, suggesting that environmental contamination can lead to cross-infection of patients via the hands of health care workers [3]. Human enteric viruses contaminate the inanimate environment and can cause institutional outbreaks [38â€"40]. Rotavirus is a well-known cause of outbreaks in day care centers and health care settings, extensively contaminates and survives on surfaces, and may spread after contamination of toys shared among children [38]. Norovirus has been the cause of outbreaks on cruise ships, in hospitals, and in hotels [7 , 8 , 39 , 40]. In , a total of 9 outbreaks of norovirus on cruise ships were reported [40], and outbreaks occurred on consecutive cruises, despite attempts to disinfect the ships. For 3 of 5 ships on which the outbreaks occurred, discontinuation of service and aggressive cleaning and sanitation of the ship were required to stop the outbreaks. Although no conclusive proof exists of environment-to-person transmission of norovirus, the virus has been cultured extensively from samples obtained from the inanimate environment during outbreaks [8 , 39], and indirect evidence supports the idea that aerosolization of the virus can occur following emesis [8]. Individuals without immunity to hepatitis B virus HBV should be considered to be at risk for infection from contaminated environmental sources. Blood from infected individuals with active viral replication i. Outbreaks of hepatitis B that have involved fomites have been traced to contaminated electroencephalographic electrodes [10] and to lancets used in the monitoring of glucose levels [11]. SARS-associated coronavirus is believed to be spread mainly via respiratory droplets, although fecal-oral transmission and transmission via surface contamination may also occur. Current infection-control recommendations for hospitals include the use of precautions against contact, droplet, and airborne transmission [14]. The virus has been found to survive for 24â€”72 h on plastered walls, plastic laminate surfaces e. An outbreak in an apartment complex in Hong Kong may have been the result of fecal-oral transmission combined with environmental contamination [15], although the results of a modeling approach suggested an airborne mode of transmission [41]. Cleaning likely reduces surface contamination; an outbreak of cases in an emergency department in Taiwan was reported in which positive results of cultures of environmental samples obtained during the outbreak became negative after the emergency department was cleaned and the patients were isolated [12]. Fungi Although the majority of Candida infections are likely due to endogenous sources i. Surfaces may be durably contaminated, because experimental inoculation of dry surfaces shows that C. Epidemic spread of Candida infection has occurred in which environmental sources e. Evidence of an environmental reservoir of endemic C. The strain types of Candida isolates acquired by patients were identical to those found on the hospital surfaces of rooms where the patients were housed, prior to patient acquisition of infection [16]. Aspergillus and Zygomycetes species are causes of nosocomial skin infection that result from contaminated fomites. Infections have been associated with the use of arm boards or bandages by patients who have intravascular catheters, as well as with elasticized surgical bandages, hospital construction activity, and postoperative wounds [43]. Contamination of the inanimate environment by C. The organism has been found in low numbers on shoes and on stethoscopes [20], and hospital floors have remained contaminated with C. The density of contamination is increased by the presence of colonized patients and patients with diarrhea [18 , 20]. Molecular techniques provide the most concrete evidence of transmission of C. The findings of a study of endemic C. Among colonized patients, a single, predominant isolate was found and was more likely to contaminate the environment than were isolates that sporadically colonized patients. This finding was reproduced in a study in which 1 despite endemicity of C. These data suggest that environmental surfaces serve as a reservoir that permits the cross-colonization of patients after they have had contact with a health care worker and that, in environments in which C. Enteric gram-negative bacilli are not commonly spread to patients from the dry inanimate environment; they are generally not viable after drying, lasting 7 h or less after desiccation [22]. Infection with these organisms is thought to occur because of endogenous spread or cross-infection between patients via the hands of health care workers. However, Pseudomonas aeruginosa and Acinetobacter baumannii are strongly associated with environmental contamination. Many studies have documented the contamination of sinks and sink drains by P. Whether the use of sinks leads to the nosocomial spread of P. In a study that examined cultures of samples of endogenous flora obtained from patients and samples obtained from the inanimate environment, results suggested that most infections with P. Therefore, environmental surfaces may be of variable significance in the spread of P. In the past decade, A. The organism has been isolated throughout the inanimate environmentâ€”on the beds of colonized patients and on nearby surfaces e. Acinetobacter species are found in soil and water and may have adapted to survive for long periods, with reports of survival of up to 3 years in hospitals [26]. Strain types of A. Some studies have found no strains of A. However, the levels of hand hygiene and environmental cleaning are not commonly reported in outbreak investigations, and it is possible that the importance of environmental contamination is confounded by other interventions. The major reservoirs for methicillin-resistant Staphylococcus aureus MRSA are colonized or infected patients and, occasionally, personnel in the hospital [47], and the major mechanism of spread is via the unwashed hands of health care workers. The role of the inanimate environment is controversial; proof of environment-to-patient transmission is not strong, the inanimate environment is variably contaminated, and the phage types of environmental isolates have not always matched the phage types isolated from colonized patients [31 , 48]. The inanimate environment of burn units tends to be more heavily contaminated than that of nonburn units: Hydrotherapy rooms associated with burn units have a particularly high contamination rate [47]. Rates of environmental contamination also vary on the basis of the site of infection in source patients:

Similar to other organisms i. Moist mattress padding and leaks in mattress covers are common findings during outbreaks [49]. Other sites that have yielded MRSA include mops [50] and the gowns and gloves worn by health care workers [28]. Both MRSA and methicillin-susceptible Staphylococcus aureus have been found to be viable for as long as 9 weeks, despite drying, and have been found to survive on plastic laminate surfaces for up to 2 days under experimental conditions [29 , 30]. Little evidence exists that proves that decreasing environmental contamination with MRSA leads to decreases in rates of patient infections. Other studies have shown that cleaning the inanimate environment or isolating patients caused cessation of outbreaks of MRSA, but interpretation is limited because of the use of multiple interventions [51 , 52]. The fact that VRE contaminates the inanimate environment has been well established. Environmental sites with VRE involvement have included the gowns worn by patients and health care workers, medical equipment, microsphere beds, and environmental surfaces [34]. Enterococcus species can survive for up to 58 days on experimentally inoculated countertops [35]; however, vancomycin resistance does not confer an additional advantage for survival, and routine disinfectants, heat sterilization processes, and laundry procedures all eradicate the organism [32 , 53 , 54].

5: Contamination of Medical Charts: An Important Source of Potential Infection in Hospitals

Possible contamination of nearby hospital surfaces by Nipah patients with infectious bodily secretions, coupled with a lack of infection control measures in low-income hospitals, puts healthcare workers, caregivers, visitors, and other patients in the ward at risk for NiV infection by contaminated hospital surfaces.

Wash hands with soap and water: When hands are visibly dirty After known or suspected exposure to Clostridium difficile After known or suspected exposure to patients with infectious diarrhea during norovirus outbreaks If exposure to Bacillus anthracis is suspected or proven Before eating Use an alcohol-based hand sanitizer for everything else. Perform hand hygiene in the following clinical situations: Lotions and creams can prevent and decrease healthcare provider skin dryness related to frequent hand hygiene. Use only hand lotions approved by the healthcare facility so as to avoid interfering with hand sanitizing products. CDC recommendations regarding nail care state: Healthcare providers should not wear artificial fingernails or extensions when having direct contact with patients at high risk e. An organizational policy should be in place regarding wearing of non-natural nails by healthcare personnel who have direct contact with patients outside of the groups specified above. Studies are inconclusive at this time regarding the wearing of rings as a source of contamination. CDC, g Evidence and guidelines support not wearing artificial nails and either not using nail polish or ensuring the polish is intact. Newer gel polish products are widely available, but very few studies have been done regarding them, and evidence does not support their safe use. The Association of periOperative Registered Nurses states: Hand Cleansing Techniques Both the CDC and the World Health Organization provide guidelines in the technique of handwashing as well as handrub cleansing using an alcohol hand sanitizer. Technique for handwashing with soap and water WHO, Handrub technique using alcohol hand sanitizer WHO, Apply a palmful of the product in a cupped hand. Rub hands palm to palm. Rub palm over left dorsum with interlaced fingers and vice versa. Rub palm to palm with fingers interlaced. Rub backs of fingers to opposing palms with fingers interlocked. Rub left thumb rotationally clasped in right palm and vice versa with right thumb in left palm. Rub clasped fingers of right hand rotationally, backwards, and forwards in left palm and vice versa with left fingers in right palm. Once dry, hands are safe. For surgical hand antisepsis: Remove rings, watches, and bracelets before beginning to scrub. Clean under nails using a nail cleaner under running water. When using antimicrobial soap, scrub hands and forearms for 2 to 6 minutes. Long scrub times e. When using an alcohol-based surgical hand-scrub, prewash hands and forearms with a non-antimicrobial soap and dry hands and forearms completely before applying. Allow product to dry thoroughly before donning sterile gloves. Double gloving is advised during invasive procedures that pose an increased risk of exposure to blood. Steps for glove use: Choose the right size and type of gloves for the task. Wear disposable medical examination gloves for providing direct patient care. Wear disposable medical examination gloves or reusable utility gloves for cleaning the environment or medical equipment. Change gloves during patient care if the hands will move from a contaminated body site e. Clean hands before putting on gloves for a sterile procedure. Change gloves between tasks and procedures on the same patient after contact with material that may contain a high concentration of microorganisms. Remove gloves promptly after use and perform hand hygiene immediately before touching noncontaminated items and environmental surfaces and before going to another patient. Do not reuse or wash gloves except for utility gloves after being properly cleaned. Do not use nonapproved hand lotions. Do not use gloves if they are damaged. Do not touch your face when wearing gloves. Do not wear gloves in the hall. Wear a mask and eye protection or a face shield to protect mucous membranes of the eyes, nose, and mouth during activities that are likely to generate splashes or sprays of blood or body fluids, secretions, and excretions. Select masks, goggles, face shields, and combinations of each according to the need anticipated by the task. During procedures that generate aerosols e. A face shield that fully covers the front and sides of the face A mask with attached shield A mask and goggles CDC, g GOWNS Wear a gown that is appropriate to the task to protect skin and prevent soiling or contamination of clothing during procedures and patient-care activities when contact with blood, body fluids, secretions, or excretions is anticipated. Wear a gown for direct patient contact if the patient has uncontained secretions or excretions. Do not reuse gowns, even for repeated contacts with the same patient. Routine donning of gowns upon entrance into a high-risk unit e. Her assignment for the night includes three patients. As her shift begins, Sharon must first check in on her patient who is intubated and perform tracheotomy care and suctioning. Considering which level of Standard Precautions to apply, she dons appropriate PPE, which includes a gown, gloves, mask, and goggles. After caring for the patient, she disposes properly of all PPE and washes her hands prior to moving on to care for her next patient. Educate healthcare workers on the importance of source-control methods to contain respiratory secretions, especially during outbreaks of respiratory illness such as influenza. Post signs at entrances and in strategic places, such as elevators and cafeterias, in both ambulatory and inpatient settings in languages appropriate to the population served, with instructions to patients and other persons with symptoms of respiratory infection to: Provide resources and instructions for performing hand hygiene in or near waiting areas; provide conveniently located dispensers of alcohol-based handrubs and, where sinks are available, supplies for handwashing. During periods of increased prevalence of respiratory infections in the community, offer masks to coughing patients and other symptomatic persons upon entry into the facility or medical office and encourage them to maintain a separation, ideally of at least 3 feet in common waiting areas. Clean and disinfect surfaces likely to be contaminated with pathogens, including those in close proximity to the patient e. Use EPA-registered disinfectants that have microbicidal activity against the pathogens most likely to contaminate the patient-care environment. Review the effectiveness of disinfectants being used when evidence of continuing transmission of a pathogen, such as C. Change to a more effective disinfectant as indicated. In facilities providing healthcare to pediatric patients or that have waiting areas with child play toys, establish policies and procedures for cleaning and disinfecting toys at regular intervals using the following principles: Select play toys that can easily be cleaned and disinfected and avoid use of stuffed, furry toys if they will be shared. Clean and disinfect large stationary toys e. If toys are likely to be put in the mouth, rinse with water after disinfection; alternatively, wash in a dishwasher. When a toy requires cleaning and disinfection, do so immediately or store in a designated labeled container separate from toys that are clean and ready for use. Include multi-use electronic equipment for preventing contamination and for cleaning and disinfection, especially those items used by patients, those used during delivery of patient care, and mobile devices that are moved in and out of patient rooms frequently e. If laundry chutes are used, ensure they are properly designed, maintained, and used so as to minimize dispersion of aerosols from contaminated laundry. Place patients who pose a risk for transmission to others in a single-patient room when available e. Determine patient placement based on the following principles: Route s of transmission of known or suspected pathogen Risk factors for transmission in the infected patient Risk factors for adverse outcomes resulting from an HAI in other patients in the area or room being considered for patient placement Availability of single-patient rooms Patient options for room sharing e. Use aseptic technique to avoid contamination of sterile injection equipment. Do not administer medications from a syringe to multiple patients. Needles, cannulas, and syringes are single-patient-use items. Use IV bags, tubing, and connectors for one patient only. Do not use bags or bottles of intravenous solution as common source of supply for multiple patients. Use single-dose vials whenever possible. Do not use one single-dose vial or ampule for several patients or combine contents of several vials. Do not keep multidose vials in the immediate patient-care areas. Store as recommended by the manufacturer and discard if sterility is compromised. Transmission-Based Precautions In addition to Standard Precautions, which are used with all patients, some patients require additional precautions known as transmission-based precautions. There are three types of transmission-based precautions: Contact, Droplet, and Airborne. CDC Contact Precautions are summarized below: Patient Placement In acute care hospitals, place the patient in a single-patient room when available. When a single-patient room is not available: Prioritize patients with conditions that may facilitate transmission e. Place together in the same room cohort patients who are infected or colonized with the same pathogen. If necessary to place the patient in a room with a patient who is not infected or colonized with the same pathogen: Avoid placement in rooms with patients whose conditions increase risk of adverse outcome or that may facilitate transmission e. Ensure physical separation of greater than 3 feet. Draw privacy curtain between beds. Change protective attire and perform hand hygiene between contacts with patients in the same room. In long-term care and other residential settings, make decisions about placement on a case-by-case basis, balancing risk factors and potential adverse psychological impact on infected or colonized patient. In ambulatory settings, place patients in an examination room or cubicle as soon as possible. Use of Personal Protective Equipment Put gloves on upon entry into the room or cubicle. Don a gown upon entry and remove and perform hand hygiene before leaving the patient-care area.

6: NPR Choice page

-as water flows through this hand piece, air water syringe, and ultra sonic scaler (this dental unit), a patient can swallow the contaminated water The BBP standard requires The dentist/employer provides training in infection control and safety issues to all personel who may come in contact with blood, saliva, or contaminated instruments or.

Pathophysiology[edit] There is a general chain of events that applies to infections. Each of the links must be present in a chronological order for an infection to develop. Understanding these steps helps health care workers target the infection and prevent it from occurring in the first place. Infection begins when an organism successfully enters the body, grows and multiplies. This is referred to as colonization. Most humans are not easily infected. Those who are weak, sick, malnourished, have cancer or are diabetic have increased susceptibility to chronic or persistent infections. Individuals who have a suppressed immune system are particularly susceptible to opportunistic infections. Entrance to the host at host-pathogen interface , generally occurs through the mucosa in orifices like the oral cavity , nose, eyes, genitalia, anus, or the microbe can enter through open wounds. While a few organisms can grow at the initial site of entry, many migrate and cause systemic infection in different organs. Some pathogens grow within the host cells intracellular whereas others grow freely in bodily fluids. Wound colonization refers to nonreplicating microorganisms within the wound, while in infected wounds, replicating organisms exist and tissue is injured. All multicellular organisms are colonized to some degree by extrinsic organisms, and the vast majority of these exist in either a mutualistic or commensal relationship with the host. An example of the former is the anaerobic bacteria species, which colonizes the mammalian colon , and an example of the latter are the various species of staphylococcus that exist on human skin. Neither of these colonizations are considered infections. The difference between an infection and a colonization is often only a matter of circumstance. Non-pathogenic organisms can become pathogenic given specific conditions, and even the most virulent organism requires certain circumstances to cause a compromising infection. Some colonizing bacteria, such as Corynebacteria sp. The variables involved in the outcome of a host becoming inoculated by a pathogen and the ultimate outcome include: An interesting fact that gas chromatographyâ€"mass spectrometry , 16S ribosomal RNA analysis, omics , and other advanced technologies have made more apparent to humans in recent decades is that microbial colonization is very common even in environments that humans think of as being nearly sterile. Because it is normal to have bacterial colonization, it is difficult to know which chronic wounds can be classified as infected and how much risk of progression exists. Despite the huge number of wounds seen in clinical practice, there are limited quality data for evaluated symptoms and signs. Microorganisms can cause tissue damage by releasing a variety of toxins or destructive enzymes. For example, Clostridium tetani releases a toxin that paralyzes muscles, and staphylococcus releases toxins that produce shock and sepsis. Not all infectious agents cause disease in all hosts. The prion causing mad cow disease and Creutzfeldtâ€"Jakob disease invariably kills all animals and people that are infected. Persistent infections occur because the body is unable to clear the organism after the initial infection. Persistent infections are characterized by the continual presence of the infectious organism, often as latent infection with occasional recurrent relapses of active infection. There are some viruses that can maintain a persistent infection by infecting different cells of the body. Some viruses once acquired never leave the body. A typical example is the herpes virus, which tends to hide in nerves and become reactivated when specific circumstances arise. Persistent infections cause millions of deaths globally each year. Transmission medicine For infecting organisms to survive and repeat the infection cycle in other hosts, they or their progeny must leave an existing reservoir and cause infection elsewhere. Infection transmission can take place via many potential routes: Droplet contact, also known as the respiratory route, and the resultant infection can be termed airborne disease. If an infected person coughs or sneezes on another person the microorganisms, suspended in warm, moist droplets, may enter the body through the nose, mouth or eye surfaces. Fecal-oral transmission, wherein foodstuffs or water become contaminated by people not washing their hands before preparing food, or untreated sewage being released into a drinking water supply and the people who eat and drink them become infected. Common fecal-oral transmitted pathogens include

Vibrio cholerae , Giardia species, rotaviruses , Entameba histolytica , Escherichia coli , and tape worms. Sexual transmission, with the resulting disease being called sexually transmitted disease Oral transmission, Diseases that are transmitted primarily by oral means may be caught through direct oral contact such as kissing , or by indirect contact such as by sharing a drinking glass or a cigarette. It can occur when the mother gets an infection as an intercurrent disease in pregnancy. Iatrogenic transmission, due to medical procedures such as injection or transplantation of infected material. Culex mosquitos Culex quinquefasciatus shown are biological vectors that transmit West Nile Virus. Vector-borne transmission, transmitted by a vector , which is an organism that does not cause disease itself but that transmits infection by conveying pathogens from one host to another. Diagnosis[edit] Diagnosis of infectious disease sometimes involves identifying an infectious agent either directly or indirectly. In practice most minor infectious diseases such as warts , cutaneous abscesses , respiratory system infections and diarrheal diseases are diagnosed by their clinical presentation and treated without knowledge of the specific causative agent. Conclusions about the cause of the disease are based upon the likelihood that a patient came in contact with a particular agent, the presence of a microbe in a community, and other epidemiological considerations. Given sufficient effort, all known infectious agents can be specifically identified. The benefits of identification, however, are often greatly outweighed by the cost, as often there is no specific treatment, the cause is obvious, or the outcome of an infection is benign. Diagnosis of infectious disease is nearly always initiated by medical history and physical examination. More detailed identification techniques involve the culture of infectious agents isolated from a patient. Culture allows identification of infectious organisms by examining their microscopic features, by detecting the presence of substances produced by pathogens, and by directly identifying an organism by its genotype. The images are useful in detection of, for example, a bone abscess or a spongiform encephalopathy produced by a prion. Symptomatic diagnostics[edit] The diagnosis is aided by the presenting symptoms in any individual with an infectious disease, yet it usually needs additional diagnostic techniques to confirm the suspicion. Some signs are specifically characteristic and indicative of a disease and are called pathognomonic signs; but these are rare. Not all infections are symptomatic. Microbiological culture is a principal tool used to diagnose infectious disease. In a microbial culture, a growth medium is provided for a specific agent. A sample taken from potentially diseased tissue or fluid is then tested for the presence of an infectious agent able to grow within that medium. Most pathogenic bacteria are easily grown on nutrient agar , a form of solid medium that supplies carbohydrates and proteins necessary for growth of a bacterium , along with copious amounts of water. A single bacterium will grow into a visible mound on the surface of the plate called a colony , which may be separated from other colonies or melded together into a "lawn". The size, color, shape and form of a colony is characteristic of the bacterial species, its specific genetic makeup its strain , and the environment that supports its growth. Other ingredients are often added to the plate to aid in identification. Plates may contain substances that permit the growth of some bacteria and not others, or that change color in response to certain bacteria and not others. Bacteriological plates such as these are commonly used in the clinical identification of infectious bacterium. Microbial culture may also be used in the identification of viruses: In the case of viral identification, a region of dead cells results from viral growth, and is called a "plaque". Eukaryotic parasites may also be grown in culture as a means of identifying a particular agent. In the absence of suitable plate culture techniques, some microbes require culture within live animals. Bacteria such as Mycobacterium leprae and Treponema pallidum can be grown in animals, although serological and microscopic techniques make the use of live animals unnecessary. Viruses are also usually identified using alternatives to growth in culture or animals. Some viruses may be grown in embryonated eggs. Another useful identification method is Xenodiagnosis, or the use of a vector to support the growth of an infectious agent. Chagas disease is the most significant example, because it is difficult to directly demonstrate the presence of the causative agent, Trypanosoma cruzi in a patient, which therefore makes it difficult to definitively make a diagnosis. In this case, xenodiagnosis involves the use of the vector of the Chagas agent T. The bug is later inspected for growth of T. Microscopy[edit] Another principal tool in the diagnosis of infectious disease is microscopy. Virtually all of the culture techniques discussed above rely, at some point, on microscopic examination for definitive identification of the infectious agent. Microscopy may be carried out with simple instruments, such as the compound light microscope , or with instruments as complex as an electron microscope. Samples obtained from patients may be viewed directly under the light microscope, and can often rapidly lead to identification. Microscopy is often also used in conjunction with biochemical staining techniques, and can be made exquisitely specific when used in combination with antibody based techniques. For example, the use of antibodies made artificially fluorescent fluorescently labeled antibodies can be directed to bind to and identify a specific antigens present on a pathogen. A fluorescence microscope is then used to detect fluorescently labeled antibodies bound to internalized antigens within clinical samples or cultured cells. This technique is especially useful in the diagnosis of viral diseases, where the light microscope is incapable of identifying a virus directly. Other microscopic procedures may also aid in identifying infectious agents. Almost all cells readily stain with a number of basic dyes due to the electrostatic attraction between negatively charged cellular molecules and the positive charge on the dye. A cell is normally transparent under a microscope, and using a stain increases the contrast of a cell with its background. Staining a cell with a dye such as Giemsa stain or crystal violet allows a microscopist to describe its size, shape, internal and external components and its associations with other cells. The response of bacteria to different staining procedures is used in the taxonomic classification of microbes as well. Two methods, the Gram stain and the acid-fast stain, are the standard approaches used to classify bacteria and to diagnosis of disease. The Gram stain identifies the bacterial groups Firmicutes and Actinobacteria , both of which contain many significant human pathogens. The acid-fast staining procedure identifies the Actinobacterial genera Mycobacterium and Nocardia. Biochemical tests[edit] Biochemical tests used in the identification of infectious agents include the detection of metabolic or enzymatic products characteristic of a particular infectious agent. Since bacteria ferment carbohydrates in patterns characteristic of their genus and species , the detection of fermentation products is commonly used in bacterial identification. Acids , alcohols and gases are usually detected in these tests when bacteria are grown in selective liquid or solid media. The isolation of enzymes from infected tissue can also provide the basis of a biochemical diagnosis of an infectious disease. For example, humans can make neither RNA replicases nor reverse transcriptase , and the presence of these enzymes are characteristic of specific types of viral infections. The ability of the viral protein hemagglutinin to bind red blood cells together into a detectable matrix may also be characterized as a biochemical test for viral infection, although strictly speaking hemagglutinin is not an enzyme and has no metabolic function. Serological methods are highly sensitive, specific and often extremely rapid tests used to identify microorganisms. These tests are based upon the ability of an antibody to bind specifically to an antigen.

7: Infection Control Training Course | Wild Iris Medical Education

The most common sources of infectious agents causing HAI, described in a scientific review of 1, outbreak investigations, 20 are (listed in decreasing frequency) the individual patient, medical equipment or devices, the hospital environment, the health care personnel, contaminated drugs, contaminated food, and contaminated patient care.

Highlight and copy the desired format. Emerging Infectious Diseases, 24 1 , Abstract Nipah virus NiV has been transmitted from patient to caregivers in Bangladesh presumably through oral secretions. We aimed to detect whether NiV-infected patients contaminate hospital surfaces with the virus. We identified 16 Nipah patients; 12 cases were laboratory-confirmed and 4 probable. To reduce the risk for fomite transmission of NiV, infection control should target hospital surfaces. Nipah virus NiV is a batborne paramyxovirus 1 , 2 that causes encephalitis in humans. The 2 primary pathways of NiV transmission in Bangladesh are drinking raw date palm sap contaminated with excretions from Pteropus spp. Nearly one third of identified Nipah patients in Bangladesh were infected through person-to-person transmission 8 ; most of these were family caregivers who provided hands-on care to Nipah patients at home and in hospital 3 , 6 , 9 , Transmission of NiV in hospital settings was first identified in during an outbreak in Siliguri, India, and in several outbreaks in Bangladesh since 6 , 9 , 11 â€" In Bangladesh, during the â€" Nipah outbreak, 2 hospital staff 1 physician, 1 hospital cleaner were infected 12 , The floor is often soiled with bodily secretions, and a median of 5 uncovered coughs or sneezes per 10 m2 per hour has been observed Most wards have intermittent water supply, lack functioning handwashing stations, and have an inadequate number of toilets 16 , Hospital staff and family caregivers can acquire infections through direct patient contact or contaminated fomites 18 , Possible contamination of nearby hospital surfaces by Nipah patients with infectious bodily secretions, coupled with a lack of infection control measures in low-income hospitals, puts healthcare workers, caregivers, visitors, and other patients in the ward at risk for NiV infection by contaminated hospital surfaces. Propagation of a highly fatal pathogen with the capacity for person-to-person transmission within resource-constrained healthcare settings increases the risk for broader outbreaks 11 , In Bangladesh, resources for infection control in hospitals are severely limited 16 , and we have limited knowledge about where to focus infection control to optimize use of scarce resources. Identification of fomites for possible NiV transmission would help design interventions prioritizing the area of hospital wards for disinfection to reduce surface contamination and possible risk for fomite transmission. Our objective was to identify whether Nipah patients contaminate nearby hospital surfaces with NiV RNA and, if so, which hospital surfaces are most commonly contaminated and which patients are most likely to contaminate their environment. Because of resource constraints, surface sampling for all encephalitis cases was not possible; therefore, a research assistant swabbed hospital surfaces near encephalitis patients with a history of consuming raw date palm sap, contact with another encephalitis patient, or both Occasionally, physicians from other nearby hospitals reported suspected Nipah case-patients to public health authorities. These patients also had biological samples collected for laboratory testing but were not included in the surface sampling study. From each patient, 1 oral swab was collected in 1 mL of nucleic acid extraction lysis buffer every consecutive day for 7 days, until hospital discharge or death, whichever occurred first. A research assistant collected 1 swab sample from up to 5 areas near each patient: The research assistant collected surface swab samples at least 12 hours after the patient was admitted to the hospital. Not all patients had a wall or bed rail near them because some patients were cared for on the floor and some were away from the walls. The following primers were used for detecting the NiV N gene: Community Investigation An investigation team visited the communities of encephalitis patients identified at surveillance hospitals who had NiV IgM in serum to identify any other associated encephalitis cases. The team interviewed identified encephalitis patients and their caregivers using a structured questionnaire. Identified patients were asked about the nature of their contact with hospitalized patients i. The team also collected blood from the encephalitis patients identified in the community investigation. Classification of Cases We classified an encephalitis case as laboratory-confirmed Nipah in a patient with NiV IgM in serum and a probable Nipah case as a case with an epidemiologic link with a laboratory-confirmed

Nipah case in a person who died before blood could be collected for testing. We defined a Nipah spreader as a person with a probable or confirmed case who had close contact with at least 1 person in whom Nipah illness developed 5â€”15 days after contact 5. Statistical Analysis We summarized the data using frequency and percentages. Ethical Consideration Study participants or their legal guardian provided informed written consent. Results Figure 1 Figure 1. Number of blood samples, oral swab samples, and surface swab samples collected and tested from encephalitis patients identified in hospitals, Bangladesh, December â€”April Surveillance physicians identified encephalitis cases in the 3 surveillance hospitals. One encephalitis case was reported from a nearby hospital, and we identified an additional 2 encephalitis cases from the community investigations. All 3 case-patients identified during community investigations were hospitalized at nonsurveillance hospitals, and all had detectable NiV IgM Figure 1. Through the community investigation, we identified an additional 4 probable Nipah case-patients who died before specimens could be collected. Thus, we identified a total of 16 Nipah cases from hospital and community investigations. Four cases occurred in isolation, but 12 clustered in 4 outbreaks. The 4 clusters comprised 8 laboratory-confirmed and 4 probable cases. Two of the 4 clusters involved person-to-person transmission Technical Appendix. Figure 2 Figure 2. Timing of Nipah virus detection in oral swab and surface swab samples in relation to illness onset for 12 patients with laboratory-confirmed Nipah identified in hospitals, Bangladesh, December â€”April We collected 19 oral swab samples from these 10 case-patients; all 19 samples had evidence of NiV RNA. Of the 49 patients identified in surveillance hospitals for whom surface swab samples were collected, 6 had laboratory-confirmed Nipah Table 1. We did not collect nearby surface swab samples from the other laboratory-confirmed Nipah patients with detectable NiV RNA in oral swab samples because during hospital admission they reported no history of consuming raw date palm sap or contact with other encephalitis patients. Of the 5 patients who contaminated nearby hospital surfaces, 4 contaminated their towels, 3 contaminated their bed sheets, and 1 contaminated the bed rail. Our investigation identified 3 Nipah patients who were infected through person-to-person transmission. Two of these patients were infected by 1 probable case-patient who died before specimens were collected. The third case-patient had close contact with 2 laboratory-confirmed case-patients over the same time period, but we were unable to determine the source of infection. Both possible sources had evidence of NiV RNA in oral swabs; however, only 1 of the possible infectors contaminated the hospital surfaces and therefore might be more likely to be the infector Technical Appendix Table 2, Figure 1. Discussion Nipah patients frequently contaminated hospital surfaces near them with detectable NiV RNA, posing a risk for fomiteborne Nipah transmission. The most commonly contaminated surfaces were the bed sheets and the towels used by caregivers for patient care. In Bangladesh, family caregivers, rather than trained healthcare workers, provide hour hands-on care to hospitalized patients 17 , Most Nipah patients in Bangladesh are unconscious when they are brought in for care and have cough and difficulty breathing 21 , requiring close attention and care. Nipah patients often dribble frothy oral secretions, soiling themselves and contaminating their bed sheets. Caregivers frequently use a towel brought from home to clean patient oral secretions 17 and often use the same towel throughout the hospital stay. They also frequently use the same towel for cleaning their own hands and face. The lack of running water in healthcare settings in Bangladesh makes it difficult for caregivers to wash their hands or wash the items used for patient care One Nipah patient we identified was infected after caring for 2 other patients, 1 of whom had a towel contaminated with detectable NiV RNA, highlighting the possibility of this fomite as a vehicle of NiV transmission from patient to caregiver. The caregiver also contaminated nearby surfaces during his illness, including the towel, although no further transmission was evident. We also found that the walls were the surfaces farthest from the patient and for this reason might have been less frequently contaminated with oral secretions. Transmission of NiV through fomites is plausible. Many paramyxoviruses, including respiratory syncytial virus, parainfluenza viruses 1â€”4, and human metapneumoviruses, have been identified on hospital surfaces, and fomiteborne transmission of these pathogens has been reported 26 â€” Past studies have indicated that other paramyxoviruses can survive on surfaces for up to 10 hours and be a source of infection for patients, healthcare workers, and hospital visitors 26 , 31 â€” Animal experiments with NiV in a hamster model also showed that NiV can be transmitted through fomites Although it is not known how long NiV remains infectious in the environment, we hypothesize that surfaces might play an important role in NiV transmission for several reasons: During our 5-month study, we identified 16 Nipah patients and 2 likely spreaders. The 2 spreaders we identified both infected their primary caregivers Technical Appendix Table 2, Figure 1. This finding provides additional evidence that exposure to contaminated oral secretions drives person-to-person transmission of NiV. Caregivers can be exposed to oral secretions through direct patient contact, contaminated surfaces, or both. Family care providers maintained close physical contact with Nipah patients, including sharing eating utensils and drinking glasses, sleeping in the same bed, and hugging and kissing near the time of death, which highlights that contact transmission might play a major role in NiV transmission Our investigation showed similar patterns of caregiving practices in this outbreak Technical Appendix Table 2. Reports from earlier outbreaks also demonstrated that Nipah patients who had respiratory involvement difficulty breathing and cough were more likely to become Nipah spreaders 5 , 6 , 9 , However, our current understanding is limited about why some Nipah patients shed NiV in their oral secretions and for how long they shed but others do not. Virus replication in the respiratory epithelium of hamsters infected with a high dose of NiV was 2 logs higher than in those infected with a low dose, suggesting dose of exposure might affect viral shedding in respiratory secretions A better understanding of the factors that determine variations of viral shedding between Nipah patients might explain the drivers of person-to-person transmission of NiV. Given limited resources for infection control in low-income settings, early identification of patients who shed NiV could help focus resources to reduce subsequent transmission of NiV from person to person. NiV surveillance in Bangladesh relies on a central laboratory located in the capital city; thus, confirming a diagnosis can take several days or weeks and limits the ability for an early intervention. A rapid diagnostic test that could quickly identify NiV patients at the bedside could be a powerful tool in the early identification of potential NiV spreaders, formulating early intervention and thereby preventing NiV transmission in hospitals. Our study had limited power to detect a significant difference in characteristics of patients with and without detectable NiV RNA in oral swabs because of the small number of laboratory-confirmed Nipah patients we identified. However, despite low power and small number of observations, we found a significant association between having detectable NiV RNA in an oral swab sample and dying from illness. In addition, although we identified NiV RNA on various surfaces, the presence of nucleic acid does not confirm contamination with a viable virus nor does it indicate that fomites are important for NiV transmission. However, laboratory evidence suggests that paramyxoviruses can survive on surfaces and have been a source of transmission in healthcare settings 26 , Previous studies suggest that persons at highest risk for infection from patients with NiV are family caregivers who provide continuous care, even during hospitalizations 9 , 10 , Therefore, even if the virus remains viable for only a short time, it still could pose a major risk for these caregivers. Efforts to reduce the risk for person-to-person NiV transmission in healthcare settings should target patient caregiving practices related to the use of towels. Also, hospitals could provide low-cost disinfectants, such as 0. Hassan is a medical graduate working with the Programme for Emerging Infections, Infectious Diseases Division at the icddr,b. His research interests include infectious disease epidemiology, healthcare-associated infections, and control and prevention of emerging infections in resource-limited settings. Top Acknowledgments We thank all the study participants and their family members for their support during the investigation. We also thank the hospital authority for its permission and cooperation and the study physicians, field staff, and laboratory staff for their contributions. We are indebted to Diana Diaz-Granados for reviewing and editing this manuscript. Transmission of human infection with Nipah virus. Recurrent zoonotic transmission of Nipah virus into humans, Bangladesh,

8: Infectious diseases - Symptoms and causes - Mayo Clinic

Rates of environmental contamination also vary on the basis of the site of infection in source patients: contamination is more common in the rooms of patients with infected urine or wounds than it is in the rooms of patients with bacteremia only.

Highlight and copy the desired format. Emerging Infectious Diseases, 23 7 , Abstract In May , an outbreak of Shiga toxinâ€"producing Escherichia coli O infections occurred among children who had played in a stream flowing through a park. We describe an outbreak of STEC O infections among children exposed to a contaminated stream in northern California, USA, and provide laboratory evidence establishing wildlife as the source of water contamination. In May , four cases of Shiga toxin Stx 1â€" and 2â€"producing E. Exposure of the case-patients to the stream occurred on 3 separate days spanning a 2-week period. Two case-patients are known to have ingested water while playing in the stream. Two case-patients were siblings. All case-patients had diarrhea and abdominal cramps; bloody diarrhea was reported for 3. One case-patient was hospitalized with hemolytic uremic syndrome. The land upstream is not used for agricultural activities such as livestock production. The community is serviced by a public sewer system; inspection of sewer lines indicated no breach to the system. Water samples were collected from the exposure site 7 days after the last case-patient was exposed and weekly thereafter for 17 weeks; samples were tested quantitatively for fecal indicator organisms. Throughout the study period, all water samples exceeded recreational water quality limits for E. Stx1- and Stx2-producing E. Additionally, an Stx2-producing E. Enrichment broth cultures of water samples were also positive by PCR for stx1 and stx2 for the first 4 weeks of sampling. Thereafter, both stx1 and stx2, or stx2 only, were intermittently detected in enrichment broth cultures for 9 additional weeks. In the absence of an obvious source e. Of the 13 scat specimens, 8 originated from deer, 2 from raccoon, and 1 each from coyote, turkey, and river otter. Six scat specimens 4 deer, 1 coyote, 1 river otter were positive for stx1 and stx2 or for stx2 by PCR Technical Appendix. The animal origin of the coyote and river otter scat specimens were definitively identified by partial DNA sequencing of mitochondrial cytochrome b 4. A dendrogram displaying PFGE pattern similarity is shown at left. This study provides laboratory evidence linking STEC O infections with the ingestion of recreational water that was probably contaminated by wildlife scat. Wild ruminants, including deer and elk, are known carriers of STEC and have been connected to outbreaks of human infections 6 â€" 9. One of these specimens, found 1. These findings support the likelihood that feces from deer carrying STEC were the source of water contamination or, at the very least, contributed to the persistence of STEC in the water. It is unknown whether the STEC detected in coyote and river otter scat represents carriage or transitory colonization within these animals. The common risk factor among the case-patients in this STEC O outbreak was exposure to a natural stream within a city park. After the outbreak was recognized, signs warning of bacterial contamination were posted along the stream. His research interests focus on the development of molecular diagnostic tools for the detection of infectious agents. Escherichia coli O outbreaks in the United States, â€" Recreational water quality criteria. Office of Water Fâ€" [cited Apr 13]. Isolation and identification of an Enterobacter cloacae strain producing a novel subtype of Shiga toxin type 1. Species identification by means of the cytochrome b gene. Int J Legal Med. Multilaboratory validation study of standardized multiple-locus variable-number tandem repeat analysis protocol for Shiga toxinâ€"producing Escherichia coli O Experimental and field studies of Escherichia coli O H7 in white-tailed deer. An outbreak of Escherichia coli O H7 infections traced to jerky made from deer meat. Non-O Shiga toxinâ€"producing Escherichia coli associated with venison. H7 infections associated with consumption of locally grown strawberries contaminated by deer.

9: Hospital-acquired infection - Wikipedia

And others are acquired by ingesting contaminated food or water or being exposed to organisms in the environment. Signs and symptoms vary depending on the organism causing the infection, but often include fever and fatigue.

The occurrence of HAIs continues to escalate at an alarming rate. HAIs originally referred to those infections associated with admission in an acute-care hospital formerly called a nosocomial infection , but the term now applies to infections acquired in the continuum of settings where persons receive health care e. HAIs are considered an undesirable outcome, and as some are preventable, they are considered an indicator of the quality of patient care, an adverse event, and a patient safety issue. Patient safety studies published in reveal the most frequent types of adverse events affecting hospitalized patients are adverse drug events, nosocomial infections, and surgical complications. The disturbing fact is that the average duration of inpatient admissions has decreased while the frequency of HAIs has increased. For example, between 12 percent and 84 percent of surgical site infections are detected after patients are discharged from the hospital, and most become evident within 21 days after the surgical operation. The reporting systems are not as well networked as those in acute care facilities, and reporting mechanisms are not directly linked back to the acute care setting to document the suspected origin of some infections. Since the early s HAI surveillance has monitored ongoing trends of infection in health care facilities. These changing trends can be influenced by factors such as increasing inpatient acuity of illness, inadequate nurse-patient staffing ratios, unavailability of system resources, and other demands that have challenged health care providers to consistently apply evidence-based recommendations to maximize prevention efforts. Despite these demands on health care workers and resources, reducing preventable HAIs remains an imperative mission and is a continuous opportunity to improve and maximize patient safety. Another factor emerging to motivate health care facilities to maximize HAI prevention efforts is the growing public pressure on State legislators to enact laws requiring hospitals to disclose hospital-specific morbidity and mortality rates. A recent Institute of Medicine report identified HAIs as a patient safety concern and recommended immediate and strong mandatory reporting of other adverse health events, suggesting that public monitoring may hold health care facilities more accountable to improve the quality of medical care and to reduce the incidence of infections. Some hospital reporting is intended for use solely by the State health department for generating confidential reports that are returned to each facility for their internal quality improvement efforts. Other intentions to utilize public reporting may be aimed at comparing rates of HAI and subsequent morbidity and mortality outcomes between different hospitals. This approach is problematic as there is currently a lack of scientifically validated methods for risk adjusting multiple variations e. To assist with generating meaningful data, process and outcome measures for patient safety practices have been proposed. Process measures should reflect common practices, apply to a variety of health care settings, and have appropriate inclusion and exclusion criteria. Examples include insertion practices for central intravenous catheters, appropriate timing of antibiotic prophylaxis in surgical patients, and rates of influenza vaccination for health care workers and patients. Outcome measures should be chosen based on the frequency, severity, and preventability of the outcome events. Examples include intravascular catheter-related blood stream infection rates and surgical-site infections in selected operations. Although these occur at relatively low frequency, the severity is highâ€"these infections are associated with substantial morbidity, mortality, and excess health care costsâ€"and there are evidence-based prevention strategies available. Some hospitals use these definitions exactly as written; other hospitals may use some but not all of the CDC definitions; and other health care facilities may need to modify or develop their own definitions. Whatever definition is used, it should be consistent within the institution and be the same or similar to those developed by CDC or those used by other investigators. Patient Risk Factors for Health Careâ€"Associated Infections Transmission of infection within a health care setting requires three elements: Source of Microorganisms During the delivery of health care, patients can be exposed to a variety of exogenous microorganisms bacteria, viruses, fungi, and protozoa from other patients, health care personnel, or visitors. The most common sources of infectious agents causing HAI, described in a scientific review of 1, outbreak investigations, 20 are listed in decreasing frequency the individual patient, medical equipment or devices, the hospital environment, the health care personnel, contaminated drugs, contaminated food, and contaminated patient care equipment. Host Susceptibility Patients have varying susceptibility to develop an infection after exposure to a pathogenic organism. Some people have innate protective mechanisms and will never develop symptomatic disease because they can resist increasing microbial growth or have immunity to specific microbial virulence properties. Others exposed to the same microorganism may establish a commensal relationship and retain the organisms as an asymptomatic carrier colonization or develop an active disease process. Intrinsic risk factors predispose patients to HAIs. Patients with alterations in cellular immune function, cellular phagocytosis, or humoral immune response are at increased risk of infection and the ability to combat infection. A person with a primary immunodeficiency e. HAI rates in adult and pediatric ICUs are approximately three times higher than elsewhere in hospitals. According to one review article, at least 90 percent of infections were associated with invasive devices. Infection risk associated with these extrinsic factors can be decreased with the knowledge and application of evidence-based infection control practices. These patients are also more susceptible to rapid microbial colonization as a consequence of the severity of the underlying disease, depending on the function of host defenses and the presence of risk factors e. Exposure to these colonizing microorganisms is from such sources as 1 endemic pathogens from an endogenous source, 2 hospital flora in the health care environment, and 3 hands of health care workers. A study related to length of hospitalization examining adverse events in medical care indicated that the likelihood of experiencing an adverse event increased approximately 6 percent for each day of hospital stay. The highest proportion of adverse events Vectorborne transmissions from mosquitoes, fleas, and other vermin are atypical routes in U. Contact transmission This is the most important and frequent mode of transmission in the health care setting. Organisms are transferred through direct contact between an infected or colonized patient and a susceptible health care worker or another person. Patient organisms can be transiently transferred to the intact skin of a health care worker not causing infection and then transferred to a susceptible patient who develops an infection from that organismâ€”this demonstrates an indirect contact route of transmission from one patient to another. An infected patient touching and contaminating a doorknob, which is subsequently touched by a health care worker and carried to another patient, is another example of indirect contact. Microorganisms that can be spread by contact include those associated with impetigo, abscess, diarrheal diseases, scabies, and antibiotic-resistant organisms e. Respiratory droplets Droplet-size body fluids containing microorganisms can be generated during coughing, sneezing, talking, suctioning, and bronchoscopy. They are propelled a short distance before settling quickly onto a surface. Examples of diseases where microorganisms can be spread by droplet transmission are pharyngitis, meningitis, and pneumonia. Airborne spread When small-particle-size microorganisms e. The CDC has described an approach to reduce transmission of microorganisms through airborne spread in its Guideline for Isolation Precautions in Hospitals. Personal protective equipment also protects the health care worker from exposure to microorganisms in the health care setting. Common Vehicle Common vehicle common source transmission applies when multiple people are exposed to and become ill from a common inanimate vehicle of contaminated food, water, medications, solutions, devices, or equipment. Bacteria can multiply in a common vehicle but viral replication can not occur. Examples include improperly processed food items that become contaminated with bacteria, waterborne shigellosis, bacteremia resulting from use of intravenous fluids contaminated with a gram-negative organism, contaminated multi-dose medication vials, or contaminated bronchoscopes. Common vehicle transmission is likely associated with a unique outbreak setting and will not be discussed further in this document. These programmatic components have remained consistent over time and are adopted in the infection control standards of the Joint Commission formerly the Joint Commission on Accreditation of Healthcare Organizations, JCAHO. The evolving responsibility for operating and maintaining a facility-wide effective infection control program lies within many domains. Both hospital administrators and health care workers are tasked to demonstrate effectiveness of infection control programs, assure adequate staff training in infection control, assure that surveillance results are linked to performance measurement improvements, evaluate changing priorities based on ongoing risk assessments, ensure adequate numbers of competent infection control practitioners, and perform program evaluations using quality improvement tools as indicated. Infection Control Personnel It has been demonstrated that infection control personnel play an important role in preventing patient and health care worker infections and preventing medical errors. An infection control practitioner 27 ICP is typically assigned to perform ongoing surveillance of infections for specific wards, calculate infection rates and report these data to essential personnel, perform staff education and training, respond to and implement outbreak control measures, and consult on employee health issues. This specialty practitioner gains expertise through education involving infection surveillance, infection control, and epidemiology from current scientific publications and basic training courses offered by professional organizations or health care institutions. The expanding scope of ICP responsibilities being performed with limited time and shrinking resources has created an imbalance in meeting all tasks, leading to regular completion of only essential functions and completing less essential functions when time permits. In a ICP survey examining resource allocations, the activity consuming the greatest amount of mean estimated time was surveillance, followed by education, prevention strategies to control transmission, infection control program communication, and outbreak control. In examining the tasks and the time allocations necessary to complete essential infection control responsibilities, a recent expert review panel recommended new and safer staffing allocations: Further staffing levels and recommendations are included for different types of health care facilities by bed size. Although training in preventing bloodborne pathogen exposures is required annually by the Occupational Safety and Health Administration, clinical nurses registered nurses, licensed practical nurses, and certified nursing assistants and other health care staff should receive additional infection control training and periodic evaluations of aseptic care as a planned patient safety activity. Nurses have the unique opportunity to directly reduce health careâ€”associated infections through recognizing and applying evidence-based procedures to prevent HAIs among patients and protecting the health of the staff. Clinical care nurses directly prevent infections by performing, monitoring, and assuring compliance with aseptic work practices; providing knowledgeable collaborative oversight on environmental decontamination to prevent transmission of microorganisms from patient to patient; and serve as the primary resource to identify and refer ill visitors or staff. Prevention Strategies Multiple factors influence the development of HAIs, including patient variables e. Although HAIs are commonly attributed to patient variables and provider care, researchers have also demonstrated that other institutional influences may contribute to adverse outcomes. Adherence to these principles will demonstrate that you H. This acronym is used to introduce the following key concepts to reduce the incidence of health careâ€”associated infections. It emphasizes the compassion and dedication of nurses where their efforts contribute to reduce morbidity and mortality from health careâ€”associated infections. Hand Hygiene â€¦so they shall wash their hands and their feet, that they die not: Epidemiologic studies continue to demonstrate the favorable cost-benefit ratio and positive effects of simple hand washing for preventing transmission of pathogens in health care facilities. Even though the clear benefits of hand washing have been proven in multiple settings, the lack of consistent hand-washing practices remains a worldwide issue. In a resource-poor area of Pakistan, a recent household hand-washing campaign demonstrated a 50 percent lower incidence of pneumonia in children younger than 5 years compared to households that did not practice hand washing. Children under 15 years in hand-washing households had a 53 percent lower incidence of diarrhea and a 34 percent lower incidence of impetigo. Hand washing with plain soap prevented the majority of illnesses causing the largest number of childhood deaths globally. Hand hygiene is the first focus in this worldwide initiative. Understaffing and hand hygiene Hospitals with low nurse staffing levels and patient overcrowding leading to poor adherence to hand hygiene have been associated with higher adverse outcome rates and hospital outbreak investigations. In a neonatal ICU outbreak, 45 the daily census was above the maximum capacity 25 neonates in a unit designed for 15 , and the number of assigned staff members was fewer than the number necessitated by the workload, which resulted in relaxed attention to basic infection-control measures use of multidose vials and hand hygiene. During the highest workload demands, staff washed their hands before contacting devices only 25 percent of the time, but hand washing increased to 70 percent after the end of the understaffing and overcrowding period. Ongoing surveillance determined that being hospitalized during this period was associated with a fourfold increased risk of acquiring an HAI. These studies illustrate an association between staffing workload, infections, and microbial transmission from poor adherence to hand hygiene policies. Time demands A perceived obstacle is that time to complete patient care duties competes with time needed for hand washing, particularly in technically intense settings such as an ICU. Hospital observational studies demonstrate that the frequency of hand washing varies between hospital wards and occurs an average of 5 to 30 times per shift, with more hand washing opportunities in an ICU. Two studies demonstrated the use of multidisciplinary interventions to change the organizational culture on frequency of hand washing that resulted in sustained improvements during a longer followup time period. These theories illustrate the influence of the individual intention to perform hand washing and organizational influences that affect the outcome behavior. Monitoring compliance Although standards for hand hygiene practices have been published with an evidence-based guideline 44 and professional collaborations have produced the How-to-Guide: Improving Hand Hygiene, 54 there is no standardized method or tool for measuring adherence to institutional policy. Varying quality improvement methodologies and a lack of consensus on how to measure hand hygiene compliance have made it difficult to determine the effectiveness of hand hygiene expectations within and across health care settings. The Joint Commission has instituted a partnership with major infection control leadership organizations in the United States and abroad to identify best approaches for measuring compliance with hand hygiene guidelines in health care organizations though its Consensus Measurement in Hand Hygiene CMHH project. The final product of this project, due to be completed in early , will be an educational monograph that recommends best practices for measuring hand hygiene compliance. Methods used to promote improved hand hygiene require multidisciplinary participation to identify individual beliefs, adherence factors, and perceived barriers. Program successes have been summarized and should be reviewed to establish improved hand hygiene as a priority program at your facility. Key Points The practice of appropriate hand hygiene and glove usage is a major contributor to patient safety and reduction in HAIs. It is more cost effective than the treatment costs involved in a health careâ€”associated infection. Joint Commission infection control standards include hand washing and HAI sentinel event review, which are applicable to ambulatory care, behavioral health care, home care, hospitals, laboratories, and long-term care organizations accredited by the Joint Commission.

THE INFECTIOUS OR CONTAMINATED PATIENT pdf

One Hundred Home-brewed Wines Entopy and Partial Differential Equations John Maddens Pro Football Annual, 1989 Life insurance marketing strategies Spiritual devices Exceeding expectations Solutions to Coastal Disasters 02: Conference Proceedings : February 24-27, 2002 Loophole or How to Rob a Bank Watercolor Work-Out Biographical index and bibliography (p. 279-319) BALLADE OF GENTEEL DISSIMULATION United States relations with Belgium and the Congo, 1940-1960 Critical nostalgia Caribbean migration Fearfully and wonderfully made : brain chemistry and depression Respectable in its ruins : Achaemenid Persia, ancient and modern Thomas Harrison Quiara alegria hudes water by the spoonful full Transfers of partnership interests : making the assignment Live as if there are no secrets Chicken external nesting box plans Trasferire su ipad senza itunes Give them the remote Philebus [EasyRead Large Edition] Congress and the news media University physics 13th edition textbook Very small insurance policy Reflections on Marriage and Spiritual Growth The prayers of Erasmus Fools enchantment. Simultaneous linear equations in two variables worksheet Xbox apocalypse: video games, interactivity, and revelatory literature OCP Instructors Guide for Oracle DBA Certification Introduction: Transforming people from passive to active Ford f 350 6.0 repair manual How To Salsa in a Sari Estimating the welfare effects of policies affecting input markets Flowering and Foliage House Plants Bioanalytical chemistry for life and health sciences Albertas petroleum industry and the Conservation Board College physics knight Likeable social media