Disposable ECG Lead Wires Clinical Reference List

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Jancin B	Antibiotic –Resistant Pathogens Found on 77% of ECG Lead Wires	*Cardiology News. 2004 Mar;2(3):n.p.*
CHICAGO – Reusable ECG leads have come under scrutiny as reservoirs for multidrug-resistant bacterial pathogens that may potentially play an important role in serious nosocomial infections in hospitalized patients.		
Roberts R et al..	The Use of Economic Modeling to Determine the Hospital Costs Associated with Nosocomial Infections	*Clinical Infections Diseases. 2003 Jun 1;36(11):1424-32*
Abstract: Hospital-associated infection is well recognized as a patient safety concern requiring preventive interventions. However, hospitals are closely monitoring expenditures and need accurate estimates of potential cost savings from such prevention programs. We used a retrospective cohort design and economic modeling to determine the excess cost from the hospital perspective for hospital-associated infection in a random sample of adult medical patients. Study patients were classified as being not infected (n=139), having suspected infection (n=8), or having confirmed infection (n=17). Severity of illness and intensive unit care use were both independently associated with increased cost. After controlling for these confounding effects, we found an excess cost of $6767 for suspected infection and $15,275 for confirmed hospital-acquired infection. The economic model explained 56% of the total variability in cost among patients. Hospitals can use these data when evaluating potential cost savings from effective infection-control measures.		
Klevens R et al.	Estimating Health Care-Associated Infections and Deaths in U.S. Hospitals, 2002	*Public Health Report. 2007 Mar-Apr;122(2):160-6.*
Objective: The purpose of this study was to provide a national estimate of the number of healthcare-associated infections (HAI) and deaths in United States hospitals. Method: No single source of nationally representative data on HAIs is currently available. The authors used a multi-step approach and three data sources. The main source of data was the National Nosocomial Infections Surveillance (NNIS) system, data from 1990-2002, conducted by the Centers for Disease Control and Prevention. Data from the National Hospital Discharge Survey (for 2002) and the American Hospital Association Survey (for 2000) were used to supplement NNIS data. The percentage of patients with an HAI whose death was determined to be caused or associated with the HAI from NNIS data was used to estimate the number of deaths. Results: In 2002, the estimated number of HAIs in U.S. hospitals, adjusted to include federal facilities, was approximately 1.7 million: 33,269 HAIs among newborns in high-risk nurseries, 19,059 among newborns in well-baby nurseries, 417,946 among adults and children in ICUs, and 1,266,851 among adults and children outside of ICUs. The estimated deaths associated with HAIs in U.S. hospitals were 98,987: of these, 35,967 were for pneumonia, 30,665 for bloodstream infections, 13,088 for urinary tract infections, 8,205 for surgical site infections, and 11,062 for infections of other sites. Conclusion: HAIs in hospitals are a significant cause of morbidity and mortality in the United States. The method described for estimating the number of HAIs makes the best use of existing data at the national level.		

Brown DQ	Disposable vs reusable electrocardiography leads in development of and cross-contamination by resistant bacteria.	*Critical Care Nurse. 2011 Jun;31(3):62-8.*
Abstract: Hospital-acquired infections caused by antibacterial-resistant microorganisms are associated with high mortality and morbidity rates and markedly affect hospital economics. The expense became greater in 2008 when reimbursement for treatment of hospital-acquired infections was no longer provided by Medicare. Infections caused by cross-contamination with resistant bacteria can be eliminated by 3 methods: kill the bacteria before resistance develops, stop bacteria from communicating and acquiring resistance, and eliminate the pathway from one patient to another. Because electrocardiography wires cannot be completely disinfected 100% of the time, they may be contributing to the growth of resistant bacteria. The many pathways provided by reusable wires for cross-contamination with resistant bacteria increase the risk for hospital-acquired infection when these wires are used. Disposable electrocardiography leads eliminate risk of infection through these pathways. Adoption of disposable electrocardiography leads as an adjunct to an overall infection control program can decrease infection rates in acute health care facilities.		
Goldmann DA et al.	Strategies to Prevent and Control the Emergence and Spread of Antimicrobial-Resistant Microorganisms in Hospitals. A challenge to hospital leadership.	*JAMA. 1996 Jan 17;275(3):234-40.*
Objective: To provide hospital leaders with strategic goals or actions likely to have a significant impact on antimicrobial resistance, outline outcome and process measures for evaluating progress toward each goal, describe potential barriers to success, and suggest countermeasures and novel improvement strategies. Participants: A multidisciplinary group of experts was drawn from the following areas: hospital epidemiology and infection control, infectious diseases (including graduate training programs), clinical practice (including nursing, surgery, internal medicine, and pediatrics), pharmacy, administration, quality improvement, appropriateness evaluation, behavior modification, practice guideline development, medical informatics, and outcomes research. Representatives from appropriate federal agencies, the Joint Commission on Accreditation of Healthcare Organizations, and the pharmaceutical industry also participated. Evidence: Published literature, guidelines, expert opinion, and practical experience regarding efforts to improve antibiotic utilization and prevent and control the emergence and dissemination of antimicrobial-resistant microorganisms in hospitals. Consensus Process: Participants were divided into two quality improvement teams: one focusing on improving antimicrobial usage and the other on preventing and controlling transmission of resistant microorganisms. The teams modeled the process a hospital might use to develop and implement a strategic plan to combat antimicrobial resistance. Conclusions: Ten strategic goals and related process and outcome measures were agreed on. The five strategic goals to optimize antimicrobial use were as follows: optimizing antimicrobial prophylaxis for operative procedures; optimizing choice and duration of empiric therapy; improving antimicrobial prescribing by educational and administrative means;		

monitoring and providing feedback regarding antibiotic resistance; and defining and implementing health care delivery system guidelines for important types of antimicrobial use. The five strategic goals to detect, report, and prevent transmission of antimicrobial resistant organisms were as follows: to develop a system to recognize and report trends in antimicrobial resistance within the institution; develop a system to rapidly detect and report resistant microorganisms in individual patients and ensure a rapid response by caregivers; increase adherence to basic infection control policies and procedures; incorporate the detection, prevention, and control of antimicrobial resistance into institutional strategic goals and provide the required resources; and develop a plan for identifying, transferring, discharging, and readmitting patients colonized with specific antimicrobial-resistant pathogens.		
Haley RW et al.	The efficacy of infection surveillance and control programs in preventing nosocomial infections in US hospitals.	*American Journal of Epidemiology. 1985 Feb;121(2):182-205.*
Abstract: In a representative sample of US general hospitals, the authors found that the establishment of intensive infection surveillance and control programs was strongly associated with reductions in rates of nosocomial urinary tract infection, surgical wound infection, pneumonia, and bacteremia between 1970 and 1975-1976, after controlling for other characteristics of the hospitals and their patients. Essential components of effective programs included conducting organized surveillance and control activities and having a trained, effectual infection control physician, an infection control nurse per 250 beds, and a system for reporting infection rates to practicing surgeons. Programs with these components reduced their hospitals' infection rates by 32%. Since relatively few hospitals had very effective programs, however, only 6% of the nation's approximately 2 million nosocomial infections were being prevented in the mid-1970s, leaving another 26% to be prevented by universal adoption of these programs. Among hospitals without effective programs, the overall infection rate increased by 18% from 1970 to 1976.		
Kohn, Corrigan, and Donaldson, Editors	To Err is Human: Building A Safer Health System	Committee on Quality of Health Care in America, Institute of Medicine (2000) Washington, DC: National Academies Press.
Excerpt: Experts estimate that as many as 98,000 people die in any given year from medical errors that occur in hospitals. That's more than die from motor vehicle accidents, breast cancer, or AIDS--three causes that receive far more public attention. Indeed, more people die annually from medication errors than from workplace injuries. Add the financial cost to the human tragedy, and medical error easily rises to the top ranks of urgent, widespread public problems. **To Err Is Human** breaks the silence that has surrounded medical errors and their consequence--but not by pointing fingers at caring health care professionals who make honest mistakes. After all, to err is human. Instead, this book sets forth a national agenda--with state and local implications--for reducing medical errors and improving patient safety through the design of a safer health system. This volume reveals the often startling statistics of medical error and the disparity between the incidence of error and public perception of it, given many patients' expectations that the medical profession always performs perfectly. A careful examination is made of how the surrounding forces of legislation, regulation, and market activity influence the quality of care provided by health care organizations and then looks at their handling of medical mistakes. Using a detailed case study, the book reviews the current understanding of why these mistakes		

happen. A key theme is that legitimate liability concerns discourage reporting of errors--which begs the question, "How can we learn from our mistakes?" Balancing regulatory versus market-based initiatives and public versus private efforts, the Institute of Medicine presents wide-ranging recommendations for improving patient safety, in the areas of leadership, improved data collection and analysis, and development of effective systems at the level of direct patient care. **To Err Is Human** asserts that the problem is not bad people in health care--it is that good people are working in bad systems that need to be made safer. Comprehensive and straightforward, this book offers a clear prescription for raising the level of patient safety in American health care. It also explains how patients themselves can influence the quality of care that they receive once they check into the hospital. This book will be vitally important to federal, state, and local health policy makers and regulators, health professional licensing officials, hospital administrators, medical educators and students, health caregivers, health journalists, patient advocates--as well as patients themselves.		
Carter S	How to Evaluate and Justify the Implementation of Disposable Products in Your Facility	*Infection Control Today. 2009 May 27:1-2*
Using disposable products to prevent cross-contamination is a no-brainer; after all you are protecting your patients and your staff members from infection, while saving your facility thousands of dollars from healthcare-acquired infections (HAIs). However, evaluating and implementing potential disposable products can sometimes be a complex task that has a lot of variables.		
Lestari T et al.	Microbial contamination of manually reprocesses, ready to use ECG lead wire in intensive care units	*GMS Hygiene and Infection Control 2013, Vol. 8(1):1-7*
Abstract Background: A number of studies have shown that non-critical medical devices can be contaminated with pathogens, including those resistant to antibiotics and thus become a potential vector for transmission. Electrocardiography (ECG) lead wire are non-critical medical device which are always attached on patient skin during their stay in intensive care unit (ICU). In view of the patient's critical conditions and exposure to invasive procedures, identification and prevention of possible risks are important to prevent infection in ICUs. Objective: The objective of this study was to determine the presence of bacterial and fungal contamination on cleaned and disinfected reusable ECG lead wires in intensive care units in a hospital. Methods: A total of 408 cleaned ECG lead wires from 93 bed-side ECG devices and 43 ECG lead wires from 5 portable ECG devices from 4 intensive care units (ICUs) and 1 post-anaesthesia care unit (PACU) were sampled. ECG lead wires were stirred in 0.89% NaCl with added neutralizer for 30 seconds. Samples of the solutions were cultured directly on blood agar. The remaining solution was cultured on blood agar after sterile filtration. The number of colony forming units (CFUs) was counted and the microorganisms were identified. Results: More than half of examined ECG lead wires (n=232; 51.4%) were contaminated with >30 CFUs/mL sample of bacteria or with risk pathogens. Gram-positive bacteria were the most frequently isolated organisms; particularly, *coagulase negative staphylococci* (96%) and aerobic spore forming bacteria (71.2%). Compared to ICUs, PACU had significantly lower proportion of contaminated ECG lead wires ($p<0.05$). The proportion of contaminated ECG lead wires, as well as mean number of cfus per ECG lead wire, was also significantly lower among multi-wire ECG leads compared		

to single-wire ECG leads.

Conclusions: Manually cleaned ECG lead wires may serve as a vector for transmission of nosocomial pathogens. The current reprocessing technique for ECG lead wires needs to be improved.

Reusable electrocardiogram (ECG) lead wires can be a significant source of infection. One medical center near Richmond, VA, began using a disposable ECG lead wire set and wireless transceiver system and subsequently experienced a 40% decrease in SSIs. Download full-text PDF. Source.Â Antibiotic-resistant pathogens found on 77% of ECG lead wires Jancin et al. Cardiol News 2004. The impact of surgical site infections in the 1990s: attributable mortality, excess length of hospitalization, and extra costs Kirkland et al. Reusable electrocardiogram (ECG) lead wires can be a significant source of infection. One medical center near Richmond, VA, began using a disposable ECG lead wire set and wireless transceiver system and subsequently experienced a 40% decrease in SSIs.Â B. Jancin. Cardiol News. 2004. View 3 excerpts. Highly influential. Data show scourge of hospital infections. C. Connolly.