

# The Emerging Pathogens Initiative

Research is needed for an effective review of reinforcing efforts to control of the spread of pathogens by adding engineering measures. The VA healthcare system used a multidisciplinary approach to controlling TB. One might describe the effort by saying a lot of people did a lot of things, however the VA experienced a dramatic reduction in the number of new cases of multiple drug resistant TB, more so than generally experienced in American healthcare. Based in part on the success of the multidisciplinary approach to TB VA healthcare is undertaking a multidisciplinary approach to pathogen control.

Part of the VA's Emerging Pathogen Initiative is about providing engineering support for antisepsis in healthcare. Part of the initiative is about conserving the efficacy of antibiotics and part of the initiative is about putting our organization's collective wisdom to its best use. It is about reducing the incidence of nosocomial disease and suffering and death associated with it as well as reducing the costs of healthcare by reducing the incidence of expensive episodes of nosocomial disease. The cost benefit of the initiative becomes more obvious when one compares the cost of the installation of a Hand wash Facility (HWF) (more than just a sink) to the cost of several days of extended hospital stay.

A real issue with emerging pathogens is in the everyday operation of healthcare systems that remain dependent on the absolute effectiveness of readily available antibiotics. The same antibiotics that have become less effective against what are increasingly common pathogens.

Nosocomial infections affect approximately 2 million patients annually in Acute care facilities in the United States at a direct annual patient care Cost of approximately \$3.5 billion.

Studies indicate that one-third of nosocomial infections can be prevented by well-organized infection control programs.

Numerous studies indicate that emphasis on infection control can have significant results in reducing nosocomial infection but are dependent on supervisory pressure on health care professionals to be more careful. The effects tend to be short lived. Part of this effort is to make changes in the facilities to make proper infection control practice the easy and obvious way to do things.

There are basically three main methods for prevention of transmission of nosocomial pathogens in the health care setting.

- 1) Work practice controls
- 2) Personal protective equipment
- 3) Engineering controls

These approaches follow the industrial model typically used by OSHA in protecting workers from the spread of disease. Work practice controls include modification of work

related administrative functions that decrease the probability of contamination and transmission of disease among workers and patients. The major limitation of work practice controls is that they are employee and patient dependent and require ongoing training. This dependence on people's actions makes them very difficult to enforce and often fraught with implementation inconsistencies and sporadic use. Personal protective equipment such as respirators and gloves are fraught with the same difficulties as noted above with work practice controls in that they are entirely dependent on employees or patients to implement. With regard to such items as gloves, it has been shown that hand contamination can occur in up to 13% of exposures even with the use of gloves that appear to be intact. Therefore, the risk of spread of nosocomial pathogens by either contaminated gloves or skin after gloves are removed remains a potential problem. Therefore, hand washing by employees prior to patient contact remains necessary. Engineering controls usually are the most reliable since they do not depend on the patients or the employees to follow rules or regulations in a consistent and rigorous manner. In addition, engineering controls can make a major difference in implementation of the first two methods since ease of use and convenience may be an engineering issue in performing such functions as hand washing between patients. Therefore, in terms of strategies for the prevention of nosocomial infection, engineering controls may be the most reliable and useful component.

Plumbing appurtenances in use today were designed in the previous century, heating, ventilating and air conditioning codes and standards are based primarily on comfort and economy issues. Plumbing, architectural features and building mechanical equipment are positively cheap compared to the cost of healthcare.

Human waste (HW) disposal systems in hospitals particularly bedpans offer ample opportunity for spread of pathogens. Effective cleaning systems or disposable systems are needed. The HW disposal system needs to reduce the number of people exposed to pathogens from bedpans. Patient dignity, privacy and comfort need improvement in this area.

Plumbing system controls are a repository for pathogens since they generally are touched both before and after use. Plumbing systems do not serve the patient well. Improvements are needed to reduce patient dependence on bedpan systems. Systems that improve comfort and while using or accessing commodes with reduced mobility and balance are needed. Practical systems to aid safe transport or aid ambulatory patients are needed. Systems that promote regular patient hand washing may help prevent self-infection.

Possibly due to the ready availability of inexpensive, effective antibiotics infection control measures to prevent the spread of pathogens have received little attention. Infection control work practices have fallen in priority and development. Refinement of engineering support for infection control work practice measures has not become prominent.

Studies are needed. While there are numerous studies concerning hand washing and pathogen control there appears to be little research in human waste disposal systems and pathogen control. Even within the subject of hand washing there seems to be little research concerning the effectiveness of various plumbing appurtenances and architectural arrangements in achieving pathogen control. There appear to be few studies of pathogen control systems incorporated into building systems and their effectiveness. The role and methods of cleaning appear similarly to have few studies. Surface materials and the effect on pathogen control also appear to have few studies. The actual path of transmission of nosocomial infection needs study.

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