

Health care-related infections.
Infection control system.

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The costs of nosocomial (hospital-acquired) infections are great. It is estimated that nosocomial infections affect more than 2 million patients, cost \$4.5 billion, and contribute to 88,000 deaths in U.S. hospitals annually.

Efforts to lower infection risks have been challenged by the growing numbers of immunocompromised patients, antibiotic-resistant bacteria, fungal and viral superinfections, and invasive devices and procedures.

Nevertheless, evidence-based guidelines for prevention and control are now available; according to some estimates, the consistent application of these guidelines may reduce the risk of nosocomial infection by more than one-third.

EPIDEMIOLOGIC BASIS AND GENERAL MEASURES FOR PREVENTION AND CONTROL

Nosocomial infections follow basic epidemiologic patterns that can help to direct prevention and control measures.

Nosocomial pathogens have reservoirs, are transmitted by predictable routes, and require susceptible hosts.

Reservoirs and sources exist in the inanimate environment (e.g., tap water contaminated with *Legionella*) and in the animate environment (e.g., infected or colonized health care workers, patients, and hospital visitors).

The mode of transmission most often is either cross-infection (e.g., indirect spread of pathogens from one patient to another on the inadequately cleaned hands of hospital personnel) or autoinoculation (e.g., aspiration of oropharyngeal flora into the lung along an endotracheal tube).

EPIDEMIOLOGIC BASIS AND GENERAL MEASURES FOR PREVENTION AND CONTROL

Occasionally, pathogens (e.g., group A streptococci and many respiratory viruses) are spread indirectly from person to person via infectious droplets released by coughing or sneezing. Much less common—but often devastating in terms of epidemic risk—is true airborne spread of droplet nuclei (as in nosocomial chickenpox) or common-source spread by contaminated materials (e.g., iodophors contaminated with *Pseudomonas*). Factors that increase host susceptibility include underlying conditions and the many medical/surgical interventions and procedures that bypass or compromise normal host defenses.

Through its program, the hospital's infection-control committee must determine the general and specific measures used to control infections and must review and recommend specific antiseptics and disinfectants for hospital use. Given the prominence of cross-infection, hand hygiene is the single most important preventive measure in hospitals. Health care workers' rates of adherence to hand-hygiene recommendations are abysmally low (<50%).

EPIDEMIOLOGIC BASIS AND GENERAL MEASURES FOR PREVENTION AND CONTROL

Reasons cited include inconvenience, time pressures, and skin damage from frequent washing.

Sinkless alcohol rubs are quick and highly effective and actually improve hand condition since they contain emollients and allow the retention of natural protective oils that are removed with repeated rinsing.

Use of alcohol hand rubs between patient contacts is now recommended for all health care workers except when the hands are visibly soiled, in which case washing with soap and water is still required.

NOSOCOMIAL AND DEVICE-RELATED INFECTIONS

The fact that 25 to 50% of nosocomial infections are due to the combined effect of the patient's own flora and invasive devices highlights the importance of improvements in the use and design of such devices.

Intensive educational programs can be associated with at least a temporary reduction in infection rates through improved asepsis in handling and earlier removal of invasive devices, but the maintenance of such gains is often difficult.

Of particular note, shortages of trained personnel jeopardize safe and effective patient care and have been associated with increased rates of infection and death among patients.

EMPLOYEE HEALTH SERVICE ISSUES

An institution's employee health service is a critical component of its infection-control efforts.

New employees should be processed through the service, where a contagious disease history can be taken; evidence of immunity to a variety of diseases, such as hepatitis B, chickenpox, measles, and rubella, can be sought; immunizations for hepatitis B, measles, rubella, and varicella can be given as needed and a reminder about the need for yearly influenza immunization can be imparted; baseline and "booster" purified protein derivative of tuberculin skin-testing can be performed; and education about personal responsibility for infection control can be initiated. Evaluations of employees should be codified to meet the requirements of accrediting and regulatory agencies.

EMPLOYEE HEALTH SERVICE ISSUES

The employee health service must have protocols for dealing with workers who have been exposed to contagious diseases, such as those percutaneously or mucosally exposed to the blood of patients infected with HIV or hepatitis B or C virus.

For example, postexposure HIV prophylaxis with a combination of two or three antiretroviral agents is recommended; free consultation is available from the CDC PEPLine (1-888-HIV-4911).

Protocols are also needed for dealing with caregivers who have common contagious diseases, such as chickenpox, group A streptococcal infections, respiratory infections, and infectious diarrhea, and for those who have less common but high-visibility public health problems, such as chronic hepatitis B or C or HIV infection, for which exposure-control guidelines have been published by the CDC and by the Society for Healthcare Epidemiology of America.