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### RESEARCH ARTICLE

#### PURPOSE OF NURSES IN INFECTION CONTROL AND PREVENTION IN MEDICAL MANAGEMENT. A NEW APPRAISAL

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#### Abstract

Infection Control activity works in tandem with all healthcare disciplines to provide quality patient care through education and practical application of the principles of microbiology, epidemiology, and infection prevention and control. Infection prevention and control (IPC) is a practical, evidence-based approach that prevents patients and health workers from being harmed by avoidable infection as a result of antimicrobial resistance. No one should catch an infection while receiving health care, yet, these infections can spread through outbreaks and many regular care practices, affecting hundreds of millions of people across the world every year. Infection prevention and control is one of the first topics introduced in nursing programs, yet its main tenets are often lost or forgotten.

**Objectives:** The main objective of these guidelines is to prevent the health care workers and the environment from the transmission of infections. The specific objectives of these guidelines are to provide directions and information in relation to facilities, equipment, and procedures necessary to implement standard and additional (transmission-based) precautions for control of infections. Cleaning, disinfecting and reprocessing of reusable equipment, Waste management, Protection of health care workers from transmissible infections, Prevention of HAI in patients, Infection control practices in special situations.

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#### Introduction:-

Germs are a part of everyday life and are found in our air, soil, water, and in and on our bodies. Some germs are helpful, others are harmful. Many germs live in and on our bodies without causing harm and some even help us to stay healthy. Only a small portion of germs are known to cause infection. An infection happens when your body's immune system is unable to fight off bacteria, viruses, and other pathogens. A pathogen, commonly called a germ, causes illness. Your immune system is your body's way of fighting pathogens. It is a process that involves cells, organs, and proteins. When your immune system is working properly, white blood cells destroy harmful germs.

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When it is weak, your white blood cells have a harder time-fighting infection. Hospital-acquired infections, also known as healthcare-associated infections (HAI), are nosocomial acquired infections that are typically not present or might be incubating at the time of admission. These infections are usually acquired after hospitalization and manifest 48 hours after admission to the hospital. Transmission of pathogens in a healthcare environment is complex and can occur through direct contact with the healthcare workers or the surrounding contaminated environment.<sup>3</sup>

Healthcare-associated infections are major burdens for patients, society, and healthcare management. The emergence of life-threatening infections such as severe acute respiratory syndrome (SARS) and re-emerging infectious diseases like plague and tuberculosis have highlighted the need for efficient infection control programs in all healthcare settings and capacity building for healthcare workers so they can implement them. An infection control program is considered efficient which, when used appropriately, restricts the spread of infection among patients and staff in the hospital. A good infection control program also considerably reduces patients' morbidity and mortality, length of hospital stay, and cost associated with hospital stay. This is achieved by the prevention and management of infections through the application of research-based knowledge to practices.

### **What is Infection Control?**

Infection control is the practical discipline of preventing infections acquired in healthcare settings. Akin to a public health practice, infection control is an essential process of every healthcare organization. It addresses factors related to the spread of infections among patients, among staff, and between patients and staff. This includes preventive measures such as hand washing, cleaning, disinfecting, sterilizing, and vaccinating. Other aspects include monitoring and managing outbreaks of infection and investigating their causes.

### **What is an Infection Control Nurse?**

An infection control nurse is a registered nurse (RN) who implements best practices for halting the spread of viruses and bacteria and delivers top care to patients who have contracted infectious diseases. In this profession, it is critical to have strong attention to detail, the ability to work well under pressure, and excellent communication skills. Infection control nurses work not only with patients and physicians but also with scientists, public health experts, and government agencies to protect the health of individuals and the public. *Clostridioides difficile*, *Staphylococcus aureus* (staph), *Klebsiella*, and *Escherichia coli* (*E. coli*) are the most common pathogens causing hospital-acquired infections. Some responsibilities of infection control nurses include:

1. Gathering and analyzing infection data to make evidence-based decisions.
2. Educating medical and public health professionals on infection prevention protocols to facilitate emergency preparedness.
3. Isolating and treating infected individuals to contain the spread of infectious diseases.
4. Assisting with the development of action plans in case of a community or hospital outbreak to minimize the potentially devastating impact.
5. Collaborating with government agencies such as the CDC (Centers for Disease Control and Prevention) to ensure that infection control practices are implemented and enforced.
6. Studying pathogens to determine origin in order to prevent future outbreaks.
7. Assisting scientists and physicians with developing treatments and vaccines to ensure the health and safety of patients and the community.

### **Essential Functions**

- Promote the mission, vision, and values of the organization.
- Must have strong computer and research skills to ensure they remain up to date with new developments, best practices, and standards of care within the field of healthcare.
- Will be required to establish standard methods of care, utilizing evidence-based practice and best practice standards.
- Will be required to establish and implement infection control and employee health orientation programs, alongside the departmental directors, throughout the facility.
- Responsible for policies and procedures within the organization related to infection control and employee health.
- Supports administration with employee health databases, and maintains complete and accurate employee health records.
- Ensures compliance with state and federal requirements, accreditation bodies (DNV), and RGH policies and clinical responsibilities.

- Participates as an integral team member, collaborating with various departments and colleagues, including Safety Officer, Human Resources, Quality Officer, and others as needed to advocate for employee health and safety.
- Coordinates the development and implementation of all employee health initiatives and programs.
- Will develop, alongside Human Resources, policies and procedures for pre-employment and onboarding processes for employees.
- Will be responsible for all pre-employment testing and vaccination processes, annual N95/TB/ Influenza testing and/or vaccinations, and the management of potential blood exposures, employee illnesses, and disease outbreaks.
- Responsible for coordinating the infection control program which includes surveillance; analysis of data; developing reports, policies, and procedures.
- Use epidemiological principles and statistical methods to design, implement and evaluate infection prevention and control strategies.
- Provides consultation and education to staff, physicians, and community leaders in respect to Infection Prevention & Control.
- Coordinate with the Infection Prevention and Control Committee to determine the direction of surveillance activities and actively evaluate the effectiveness of the Infection Prevention and Control Plan annually.
- Conduct risk assessments at least annually and as needed with consideration of served populations, regional vulnerabilities, relevant statistical data, and new and emerging infectious diseases.
- Notify the County and/or State Health Department of any reportable diseases, adhering to all internal county and state procedures.
- Develop and implement continuously improved patient care procedures and control mechanisms relating to quality, compliance, and infectious diseases.
- Participate in infection prevention and control education of all employees during orientation and annually thereafter, including classes in infection prevention and control practices and employee health.
- Ensure the infection prevention and control procedures meet CMS, DNV, county and state, APIC, and CDC regulations, standards, or guidelines.
- Organize Infection Prevention and Control Committee meetings and maintain all meeting minutes.

### **Role of Nurses in the health care setting to control and prevent infection**

As a nurse, you must know how to protect yourself and your patients from exposure to harmful pathogens by understanding your organization's infection control policies and following them. These include standard precautions (hand hygiene, PPE, injection safety, environmental cleaning, and respiratory hygiene/cough etiquette) and transmission-based precautions (contact, droplet, and airborne).<sup>4</sup>

#### **Standard precautions:**

Are guidelines that were established to break the chain of infection and reduce the risk of pathogen transmission in hospitals. Standard precautions apply to blood and body fluids, secretions and excretions (except sweat), and mucous membranes. Following standard precautions not only protects patients but also for healthcare workers.

Treating all patients in the health care facility with the same basic level of “standard” precautions involves work practices that are essential to provide a high level of protection to patients, health care workers, and visitors which include the following:

- Hand washing and antisepsis (hand hygiene).
- Use of personal protective equipment when handling blood, body substances, excretions, and secretions.
- Appropriate handling of patient care equipment and soiled linen.
- Prevention of needlestick /sharp injuries.
- Environmental cleaning and spills-management.
- Appropriate handling of waste.

#### **Hand hygiene:**

Is the number one weapon in preventing the spread of microorganisms and includes alcohol-based hand rubs and hand washing with soap and water. Alcohol-based hand rubs containing 60% to 95% alcohol are the preferred method for decontaminating hands, except when hands are visibly soiled or when a patient has infectious diarrhea. *C. difficile* and norovirus aren't affected by alcohol-based hand rubs; soap and water should be used in suspected or confirmed cases of infectious diarrhea. Hand hygiene should be performed before and after contact with a patient; immediately after touching blood, body fluids, mucous membranes, or contaminated items (even when gloves are worn during contact); and immediately after removing gloves. Hand hygiene should also be performed when

moving from contaminated body sites to clean body sites during patient care, before eating, after using the restroom, and after handling equipment in the vicinity of the patient. In addition to maintaining strict hand hygiene practices, patients and their family members should also be taught the importance of washing their hands. The CDC recommends scrubbing hands for at least 20 seconds, using soap, water, and friction, and paying special attention to the areas between fingers, the backs of hands, underneath fingernails, and the thumbs. Alcohol-based hand rubs should be rubbed into all surfaces of the hands until dry.

Appropriate hand hygiene can minimize micro-organisms acquired on the hands during daily duties and when there is contact with blood, body fluids, secretions, excretions, and known and unknown contaminated equipment or surfaces. Hands can become contaminated with infectious agents through contact with a patient, patient surroundings, the environment, or other health care workers. Cross-contamination can occur from one site to another in the same patient, between health care worker and patient, between patient or health care worker and the environment, or between health care workers. Practicing hand hygiene before every episode of patient contact (including between caring for different patients and between different care activities for the same patient) and after any activity or contact that potentially results in hands becoming contaminated (such as the removal of gloves) reduces the risk of cross-contamination.

- ❖ Wash or decontaminate hands:
- ❖ After handling any blood, body fluids, secretions, excretions, and contaminated items.
- ❖ Between contact with different patients.
- ❖ Between tasks and procedures on the same patient to prevent cross-contamination between different body sites.
- ❖ Immediately after removing gloves.
- ❖ Using a plain soap, antimicrobial agent, such as an alcoholic hand rub or waterless antiseptic agent

The hospital setting is a good setting for communication about personal hygiene, such as informing visitors and the general public about hygiene rules such as washing hands. The World Health Organization developed the Moments for hand hygiene in 2009 to

- ✓ Protect patients against acquiring infectious agents from the hands of the healthcare worker.
- ✓ Help to protect patients from infectious agents (including their own) entering their bodies during procedures.
- ✓ Protect healthcare workers and the healthcare surroundings from acquiring patient's infectious agents.
- ✓ Few key factors in effective hand hygiene and maintaining skin integrity include:
- ❖ The duration of hand hygiene measures.
- ❖ The exposure of all surfaces of hands and wrists to the preparation used.
- ❖ The use of rubbing to create friction.
- ❖ Ensuring that hands are completely dry.



#### PPE:

(Personal Protective Equipment) includes gloves, gowns, masks, respirators, and eyewear that create barriers to protect skin, clothing, mucous membranes, and the respiratory tract from infectious organisms. The item selected depends on the infectious agent, the type of interaction, and the method of microorganism transmission. Gloves should be worn when touching blood, body fluids, mucous membranes, and contaminated items, and for any activities involving vascular access. A face shield or mask and goggles should be worn if you anticipate a splash or

spray of blood or body fluids that might come in contact with your nose, eyes, or mouth. If you expect your skin or clothing might be exposed to body fluids or blood, wear a gown. Knowing how to put on and remove PPE can help prevent cross-contamination (see Donning and doffing PPE). To promote injection safety, gloves should be worn when administering injections. Puncture-proof disposal systems are recommended to dispose of uncapped needles and sharps. Never recap needles following the administration of medication to reduce your risk of being stuck with an unclean needle. You should engage a needle safety device immediately after performing an injection.

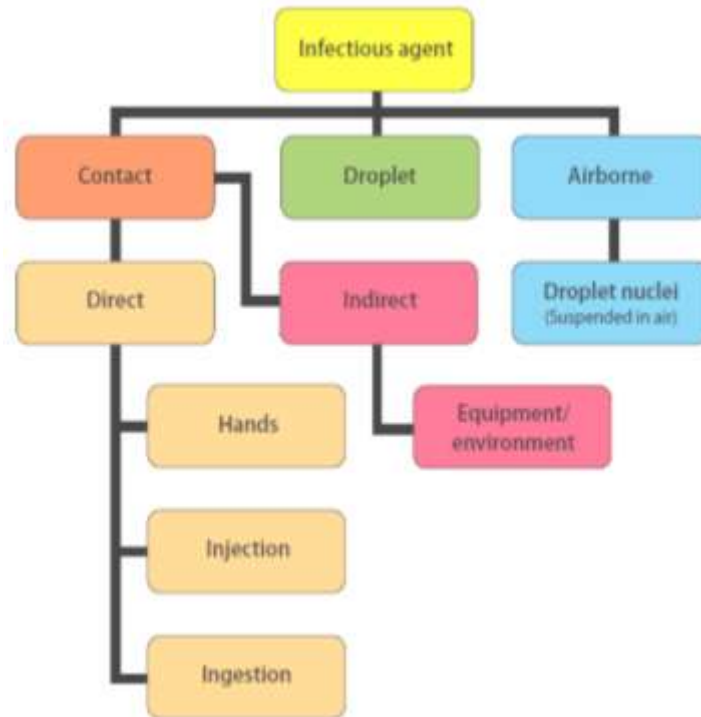
### **Where to wear PPE**

PPE is designed and issued for a particular purpose in a protected environment and should not be worn outside that area. Protective clothing provided for staff in areas where there is a high risk of contamination (e.g. operating suite/room) must be removed before leaving the area. Even where there is a lower risk of contamination, clothing that has been in contact with patients should not be worn outside the patient-care area. Inappropriate wearing of PPE (e.g. wearing operating suite/room attire in the public areas of a hospital or wearing such attire outside the facility) may also lead to a public perception of poor practice within the facility. Using personal protective equipment provides a physical barrier between microorganisms and the wearer. It offers protection by helping to prevent microorganisms from contaminating hands, eyes, clothing, hair, and shoes and being transmitted to other patients and staff. Personal protective equipment includes-gloves, protective eyewear (goggles), mask, apron, gown, boots/shoe covers, and cap/hair cover.<sup>2</sup>

### **Principles for use of personal protective equipment**

Personal protective equipment reduces but does not completely eliminate the risk of acquiring an infection. It is important that it is used effectively, correctly, and at all times where contact with the blood and body fluids of patients may occur. Continuous availability of personal protective equipment and adequate training for its proper use is essential. Staff must also be aware that the use of personal protective equipment does not replace the need to follow basic infection control measures such as hand hygiene. The following principles guide the use of personal protective equipment-

- ✚ Personal protective equipment should be chosen according to the risk of exposure. The healthcare worker should assess whether they are at risk of exposure to blood, body fluids, excretions, or secretions and choose their items of personal protective equipment according to this risk.
- ✚ Avoid any contact between contaminated (used) personal protective equipment and surfaces, clothing, or people outside the patient care area. Discard the used personal protective equipment in appropriate disposal bags, and dispose of it as per the policy of the hospital.
- ✚ Do not share personal protective equipment.
- ✚ Change personal protective equipment completely and thoroughly wash hands each time you leave a patient to attend to another patient or another duty.



#### Transmission-based infection sources.

##### Environmental cleaning:

Includes medical equipment and environmental surfaces. Any reusable equipment, including stethoscopes, bandage scissors, and hemostats, that's used on multiple patients must be cleaned between each patient contact, following organizational policy, with a broad-spectrum antimicrobial agent such as chlorhexidine—a commonly used antimicrobial agent for disinfecting topical and hard surfaces in healthcare agencies. It's effective against Gram-positive and Gram-negative bacteria and fungi. Nursing staff should work closely with environmental services to ensure that rooms are thoroughly cleaned and disinfected between patients to prevent the spread of infection through inanimate objects.

##### Respiratory hygiene and cough etiquette:

Are infection control measures that should be implemented when contact is made with a patient who might have an upper respiratory infection. Patients with signs and symptoms of respiratory infection should be taught to cover their mouth and nose with a tissue when coughing or sneezing and dispose of the tissue in the nearest trash container as soon as possible. These patients should also perform hand hygiene with alcohol-based rubs, soap, and water, or an antiseptic hand wash after being exposed to respiratory secretions or contaminated materials or objects. Healthcare facilities should ensure adequate and readily accessible supplies of tissues and hand hygiene stations. Visual alerts should be posted in facility entrances to remind patients and visitors to inform healthcare professionals of respiratory signs and symptoms. Patients with respiratory symptoms should be masked to contain respiratory secretions.

##### Transmission-based precautions:

Use transmission-based precautions in addition to standard precautions when the standard precautions aren't enough to protect you from communicable disease transmission. There are three types of transmission-based precautions: contact, droplet, and airborne.

##### Contact precautions:

Are used in addition to standard precautions when caring for patients with known or suspected diseases that are spread by direct or indirect contact. Contact precautions include gloving and gowning when in contact with the patient, objects, and surfaces within the patient's environment. All reusable items should be cleaned and disinfected according to organizational policy, and disposable items should be thrown away immediately after being used.<sup>1</sup>

**Droplet precautions:**

Require the use of a surgical mask in addition to standard precautions when you're within 3 ft (6 ft for smallpox) of a patient known to have or suspected of having a disease spread by droplets. These include influenza, pertussis, and meningococcal disease. Healthcare personnel should observe droplet precautions when examining a patient with respiratory symptoms, especially if the patient has a fever. These precautions should remain in effect until it's determined that the symptoms aren't caused by an infection that requires droplet precautions.

Diseases, which are transmitted by this route, include pneumonia, pertussis, diphtheria, influenza type B, mumps, and meningitis. Droplet transmission occurs when there is adequate contact between the mucous membranes of the nose and mouth or conjunctivae of a susceptible person and large particle droplets (> 5 microns). Droplets are usually generated from the infected person during coughing, sneezing, talking, or when healthcare workers undertake procedures such as tracheal suctioning. The following precautions need to be taken:

1. Implement standard precautions.
2. Place the patient in a single room (or in a room with another patient infected by the same pathogen).
3. Wear a surgical mask when working within 1-2 meters of the patient.
4. Place a surgical mask on the patient if transport is necessary.
5. Special air handling and ventilation are not required to prevent droplet transmission of infection.<sup>6</sup>

**Placement of patients on droplet precautions**

Placing patients on droplet precautions in a single-patient room reduces the risk of patient-to-patient transmission. When single-patient rooms are in short supply, the following principles apply in decision-making on patient placement:

1. Prioritise patients who have excessive cough and sputum production for single-patient room placement.
2. Place together in the same room (cohort) patients who are infected with the same pathogen and are suitable roommates.
3. If it becomes necessary to place patients who require droplet precautions in a room with a patient who does not have the same infection:
4. Avoid placing patients on droplet precautions in the same room with patients who have conditions that may increase the risk of adverse outcomes from infection or that may facilitate transmission (e.g. those who are immunocompromised, have anticipated prolonged lengths of stay, have cystic fibrosis, cardiac conditions or muscular dystrophy).
5. Ensure that patients are physically separated (> 1 meter apart) from each other and draw the privacy curtain between beds to minimize opportunities for close contact.
6. In all cases, the importance of respiratory hygiene and cough etiquette should be explained to patients on droplet precautions. In primary care and other office-based practice, examples of appropriate implementation of droplet precautions include segregation in waiting rooms for patients with violent or frequent coughing, and the availability of tissues, alcohol-based hand rub, and a waste bin so that patients can practice respiratory hygiene and cough etiquette.

**Airborne precautions:**

Are used in addition to standard precautions when in contact with patients with known or suspected diseases spread by fine particles transmitted by air currents, such as tuberculosis, measles, and severe acute respiratory syndrome. You must wear a National Institute for Occupational Safety and Health certified, fit-tested N-95 respirator just before entry into an area shared with a patient suspected or known to have one of these diseases. Because there are several sizes of N-95 respirators, healthcare personnel must be fit-tested according to organizational policy or at least every 2 years to be sure you're using the correct size. If eye protection is needed, wear goggles or a face shield during all contact with the patient, not just if you predict splashes or sprays.

**Conclusion:-**

Infection prevention and control is the responsibility of all health professionals. Nurses and midwives play a central role in breaking the chain of infection: they are in contact with people all the time and therefore, have the opportunity to prevent infections at every contact and intervention. Almost half the health and social care workforce is made up of nurses or midwives and can therefore have a significant impact on infection prevention. By understanding the chain of infection, the portals of exit and entry, and the modes of transmission, nurses, and midwives are in a unique position to influence breaking the chain of infection.

**References:-**

1. Infection Prevention and Control by WHO. Available at: [www.who.int/health-topics/infection- prevention-and-control](http://www.who.int/health-topics/infection-prevention-and-control).
2. Centers for Diseases Control and Prevention. Available at [www.cdc.gov/infection control](http://www.cdc.gov/infection control).
3. Shaw K. Prevention by breaking the chain of infection. *Nursing Times* 2016;112(39, 40):12-14.
4. Patterson, Chris E, *Basic Principles of Infection Control Nursing Made Incredibly Easy!* 2015;13(3):28-37
5. Alberto F Monegro, VijayadershanMuppidi, HariharanRegunath. *Hospital Acquired Infections*. Available at: <https://www.ncbi.nlm.nih.gov>
6. What is the Role of an Infection Control Nurse? Available at: <https://www.usa.edu/blog/infection-control-nurse>.