



## ISOLATION PROCEDURES AND PREVENTION OF CONTAMINATION ROLE OF INFECTION CONTROL; REVIEW

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### **Abstract:**

Keeping the spread of infections from sick patients under control, also known as source control, is essential in order to prevent transmission to contacts who are not protected. When a patient is identified as a carrier of bacteria that exhibits resistance to antibiotics, virulence traits, and/or epidemic potential, isolation precautions are used in addition to routine precautions. In situations when the viral and/or bacterial condition of a patient is unclear, it is imperative that all guidelines for hand cleanliness and conventional precautions be adhered to in their entirety. As a result, it is essential for modern infection control to take into account the many modes of transmission, the importance of personal protective equipment, and the importance of maintaining proper hygiene habits. It is necessary to take isolation precautions against airborne, droplet, and/or contact cross-contamination routes when dealing with particular microorganisms. When it comes to isolation precautions, contact precautions are the most commonly recommended since they reduce the likelihood of contamination from germs that are associated with cutaneous or gastrointestinal diseases, as well as the transmission of bacteria that are resistant to several antibiotic prescriptions.

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**Introduction:**

One definition of infection control describes it as a collection of actions that are taken in healthcare settings with the intention of preventing or halting the spread of infections. Epidemiologic and statistical principles are utilized in the field of infection prevention and control, which is a science that aims to prevent or reduce the incidence and prevalence of infections [1]. The fundamental objective of an infection prevention and control program, also known as an IPCP, is to lessen the likelihood of acquiring a hospital-acquired infection. This is important because it safeguards both patients and staff members against unfavorable outcomes that are associated with infections. The required infrastructure and institutional support, both material and administrative, must be made available to hospital epidemiology staff in order to guarantee the success of an infection control program. This is necessary in order to ensure that the program works effectively. The functions and organizational structure of an epidemiology program in a hospital may differ from one institution to another [2].

Monitoring identifiable events (such surgical site infections) in a specific group should be the goal of hospital infection surveillance, which should be a procedure that is both systematic and ongoing. In the beginning, a risk stratification will be necessary in order to ascertain which targets of surveillance should be considered the most important. Local or federal bodies, such as the Centers for Disease Control and Prevention (CDC), the American Hospital Association, and the regulatory efforts of the Joint Commission (TJC), will be responsible for mandating a significant number of surveillance operations in the United States of America and other industrialized countries. Other surveillance activities will differ from one institution to another, depending on how well one understands the epidemiology and risk of that particular establishment. For instance, conducting surveillance for invasive aspergillosis in an institution that is undergoing new construction and has a large host population that is compromised might be rated as a higher priority than conducting long-term monitoring of Legionella in an institution where Legionella has not been discovered for years. It is necessary for every hospital to customize its surveillance activities in accordance with the risk assessment of the community as well as the resources that are contained within the infection control team and the hospital itself. 'Targeted' surveillance of this kind ought to be designed for each individual hospital [3].

Different types of isolation began to emerge in the late 1870s, beginning with isolation huts and progressing to isolation cubicles in hospitals by the year 1910. In this more stringent and efficient method of infection control, patients in multiple bed wards were, for the very first time, managed as though they were in a room of their own. Additionally, hospital staff used separate gowns, practiced antiseptic handwashing after patient contact, and disinfected contaminated equipment. All of these measures were taken into consideration. Barrier nursing is a term that was coined to describe the nursing practices and procedures that were utilized during this time period in conjunction with the cubicle system. These practices and procedures were designed to prevent the transfer of infectious organisms to other patients and personnel. Barrier nursing became the major infection prevention management procedure in hospitals in the United Kingdom. It provided an alternative to the transfer of any number of patients to institutions that specialize in infectious disease [4].

By the middle of the 1960s, isolation hospitals, which included hospitals for tuberculosis (TB), were being removed from operation. A improved understanding of infection control contributed to the fact that patients with communicable diseases and tuberculosis were being managed and treated in ordinary hospital settings. This was one of the reasons why this occurred. Isolation was used for longer periods of time within hospitals beginning in the 1960s. Initially, it was used for the purpose of providing protective isolation to severely immunocompromised patients. Subsequently, it was used to prevent cross-transmission from patients who had multiple drug-resistant organisms (MDROs), primarily methicillin-resistant Staphylococcus aureus (MRSA) [4,5].

**Review:**

Healthcare-associated infections (HAIs), which pose a significant risk to the well-being of both patients and healthcare staff, are one of the most significant challenges that are commonly encountered in healthcare systems and organizations. HAIs have the potential to have a detrimental effect on a person's quality of life, lead to a reduction in their life span, and ultimately result in a significant financial burden for the individual [6]. The World Health Organization (WHO) reports that there has been an overall increase in the rates of healthcare-associated infections (HAIs) over the world, with an annual average prevalence of approximately 5–10% among patients. This increase has occurred in both developed and developing countries. There are

currently around 1.4 million persons around the world who are affected by HAIs on an annual basis [4]. It has been observed that impoverished countries have a risk of contracting HAIs that is twenty-five percent higher than the risk that affluent countries have [5]. As an illustration, a study that was carried out earlier [6] demonstrates that healthcare workers (HCWs) may exhibit a low degree of understanding regarding infection prevention and control (IPC) procedures [6].

Knowledge, education and training, experience, a lack of supplies (alcohol hand rub, a nearby sink, soap, or paper towels), working in an intensive care unit or surgical ward, working at a public, secondary, or tertiary hospital, and providing care to a patient who has been exposed to blood or body fluid are some of the factors that may influence a healthcare worker's ability to comply with the IPC measures in healthcare settings [7]. It is possible for compliance with IPC to be hampered by factors such as an excessive workload, a lack of time, and an inadequate ratio of patients to nurses. A diverse strategy for IPC improvement intervention strategies has been shown to reduce the number of healthcare-associated infections (HAIs) and raise the compliance of healthcare workers [7].

In order to effectively treat healthcare-associated infections (HAIs), it is necessary for IPC interventions to acknowledge and address the interaction that exists between the host, the pathogen, healthcare staff, and healthcare institutions [7]. The work that is done by appropriate healthcare institutions takes place in a complex environment in which they are required to meet social demands, adhere to cultural norms, aims, and values, and respond to policy and politics in the face of ongoing economic and financial challenges [8]. As a consequence of this, the variability of institutional climates and organizational cultures is likely to have an effect on the capacity of an organization to carry out reform projects, adapt to new circumstances, and continue existing [9].

When it comes to public health, antimicrobial resistance (AMR) is a major cause for concern. Immunity of germs to a pharmacological treatment that kills or hinders the growth of microbes is referred to as antimicrobial resistance (AMR). Examples of such agents include antibiotics, antibacterial agents, antiviral agents, antifungal agents, and antiparasitic agents. The effectiveness of antimicrobials in the treatment of illnesses is jeopardized by antimicrobial resistance (AMR). Therefore, antimicrobial resistance is likely to occur as a consequence of excessive intake of antimicrobials, increased frequency of their use, and negligent use of these drugs [10]. Antibiotic

resistance is a key worry that the World Health Organization (WHO) has brought up since it can impede efficient infection management. The prevalence of bacteria that are resistant to antibiotics, the complexity of treatment, and the ageing of the population are all factors that contribute to an increased likelihood of healthcare-associated infections (HAIs) [10].

There are a number of reasons that have been linked to non-compliance with infection control procedures on a global scale. One of these concerns is the confusion that healthcare workers have regarding infection prevention-related issues. These issues include monitoring and reporting standards, preparedness and competence to implement policies, and the ability to combat outbreaks [11].

It has been discovered that the implementation of IPC rules and guidelines can improve the experiences of professional nurses as well as their comprehension of infection control procedures. Acquiring an understanding of HCWs is necessary for effective IPC. IPC compliance is limited by a lack of knowledge of the suggested procedures, as well as awareness of preventative reasons throughout routine patient care and the potential dangers of transmitting germs to patients. In addition, there is a lack of awareness of the potential dangers of passing germs to patients. Ignorance regarding the appropriateness, efficiency, and execution of IPC protocols is the root cause of poor compliance. For the purpose of overcoming these challenges, training and education are the cornerstones of improving IPC practices [12]. The power of knowledge is something that healthcare workers need to be aware of. Because of this, having knowledge of and education on IPC measures is a crucial factor in the prevention of infection among healthcare workers [12].

Topics such as hand washing, wearing private protective equipment, vaccination for the prevention of infectious diseases, methods of spreading infection, identifying infections among patients, decontaminating medical devices, the ability to handle hazardous material, and safety regulations regarding needle sticks and sharps should be included in the knowledge that healthcare workers have. IPC precautions, procedures, and approaches must be adhered to by healthcare workers in order to guarantee a reduction in the number of healthcare-associated infections (HAIs) that occur in hospital settings [13]. In one trial, a qualitative study was carried out with the purpose of gaining an understanding of and providing an explanation for behaviors that are seen in the course of everyday infection control practice from the

point of view of healthcare workers. In order to evaluate behaviors that were associated with IPC, the study utilized vignettes that were constructed from the accounts of practice provided by nurses. As a result of their focus on organizational characteristics, workplace policies and infection monitoring have been found to improve professionals' perceptions of infection prevention and control procedures [13]. This is because these policies and monitoring programs focus on creating a favorable compliance orientation and developing IPC process techniques that are long-lasting.

A global worry has arisen as a result of the epidemic of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection, which started in Wuhan, China. The World Health Organization (WHO) has declared that the risk assessment of the coronavirus illness (COVID-19) is extremely high on a worldwide scale. At the present time, COVID-19 is classified as a pandemic. Concerns have been raised regarding the possibility that SARS-CoV-2 is transmitted not only through direct contact with droplets but also through environmental contamination or airborne transmission in certain circumstances, such as during aerosol-generating procedures (AGPs) [14]. In addition to being transmitted in the community, SARS-CoV-2 has also been responsible for outbreaks that have been associated with healthcare in hospitals. After conducting research on the Middle East respiratory syndrome coronavirus (MERS-CoV), researchers found that a MERS outbreak unit had a significant amount of live virus contamination in both the air and the environment. For the purpose of infection prevention and control in hospitals, as well as for the protection of healthcare personnel, it is vital to determine the precise level of environmental contamination and the accompanying potential risk of viral transmission. Despite the fact that new guidelines urge the use of extended personal protection equipment (PPE), the advice is not particularly strong, and the safety of this protective gear has not been well investigated [14]. Furthermore, because the clinical manifestations of SARS-CoV-2 infection can range from asymptomatic infection to acute respiratory distress syndrome (ARDS) that requires mechanical ventilation, the degree of contamination in the air and environment may vary depending on the severity of the disease and the treatment that is administered.

The isolation rooms of COVID-19 patients have been the subject of multiple reports where environmental contamination has been found. The individuals who participated in these research displayed a wide range of disease severity, from minor symptoms to severe disease that required

urgent care. Furthermore, there were reports that indicated an increased risk of environmental contamination in the intensive care unit (ICU) [15].

As was indicated earlier, isolation policies in healthcare settings have shifted over the course of the last century to place a greater emphasis on the interruption of recognized pathways of possible transmission among patients who have known or symptomatic infections. Dedicated isolation facilities, often known as isolation wards, have been phased down in the United Kingdom, and now, patients are being transferred to normal wards where they are isolated in single rooms. When it comes to illnesses that are transmitted through the airborne, droplet, or contact pathways, it is considered to be an essential component of transmission-based precautions (TBPs) to isolate the patient in a single room. The term "standard precautions" refers to the minimal precautions that are required to decrease the risk associated with the transmission of microorganisms for both recognized and unrecognized sources. These microorganisms may be present in blood, other physiological fluids, secretions, excretions, skin that is not intact, and mucosal membranes. In order to prevent the spread of infectious diseases and organisms that are considered to be of significant epidemiological importance, such as MRSA, *Clostridium difficile*, norovirus, and Ebola virus, TBPs are utilized in addition to the conventional precautions that are taken. These precautions include the placement of patients (including the use of single-room isolation), the use of personal protective equipment (PPE) to limit transmission and to protect healthcare workers from exposure to potentially infectious material, the practice of hand hygiene, the appropriate management of linen and waste, the decontamination of equipment and the environment, and the prevention of occupational exposures to infectious diseases and pathogens through activities such as the availability of immunisations. Furthermore, it is believed that the physical barrier of a single room serves as a psychological cue or reminder to the healthcare practitioner to carry out the appropriate processes that constitute the practice of isolation [16].

### Conclusion:

In the context of initiatives aimed at preventing healthcare-associated infections (HCAs), lowering the risk of infections caused by antibiotic resistance, and responding to new and emerging infectious disease threats on a global scale, isolation practices and procedures are an essential component. Regarding the implementation of IPC protocols, there are a number of obstacles to



overcome. Both professional opinion and anecdotal evidence are supported by research, which demonstrate that rules are not adopted into daily routines and practices. It is commonly acknowledged that putting policy into practice is a challenging endeavor. At first glance, the concept of isolation may appear to be straightforward; nevertheless, in actuality, it is quite complicated, and the implementation of IPC processes presents a number of obstacles. The care that is provided to isolated patients may differ depending on the structure of the organization, the resources that are available, and the ever-changing epidemiology of the healthcare-associated infections (HCAI). In order to achieve success, healthcare workers, and on occasion patients and visitors, must adhere to stringent protocols regarding the observance of the requirements of isolation, the correct use of personal protective equipment (PPE), the performance of appropriate hand hygiene, and the cleaning of equipment and the environment, all without jeopardizing the safety of the patients.

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