

Isolation Precautions Systems

Early isolation practices in hospitals

As early as **1877**, patients with infectious diseases were placed in separate facilities (infectious disease hospitals). This practice failed because infected patients were not separated according to their disease and few aseptic procedures were followed; this practice was modified later and a floor or ward was set aside for patients with similar diseases and introducing aseptic procedures.

In **1910**, the “barrier system”, designed to prevent transmission of pathogenic organisms to other patients and personnel began; personnel used separate gowns, washed their hands with antiseptic solutions after patient contact and disinfected objects contaminated by the patient. The cubicle system of isolation (multiple bed wards), an alternative to placing patients in infectious disease hospitals, was also introduced.

During the **1950s**, infectious disease hospitals, except those designated for tuberculosis, began to close.

In the **mid-60s**, tuberculosis hospitals began to close due to a preference for general hospital or outpatient treatment for patients with tuberculosis. The late 1960s placed patients with infectious diseases placed in wards in general hospitals.

Centers for Disease Control and Prevention (CDC) isolation systems.

In **1970**, CDC published “**Isolation Techniques for Use in Hospitals**”, isolation precautions for seven isolation categories (Strict Isolation, Respiratory Isolation, Protective Isolation, Enteric Precautions, Wound and Skin Precautions, Discharge Precautions, and Blood Precautions). Epidemiologic features of the diseases, primarily their routes of transmission, determined the precautions for each category. Some diseases in each category required fewer precautions and this resulted in over-isolation in some instances. There were a smaller number of categories and instructions for each category were printed on color-coded cards to be placed on the doors, beds and/or charts of patients on isolation precautions. By the **mid-1970s**, 93% of U.S. hospitals adopted this system.

By the **1980s**, due to emerging multi-drug resistant microorganisms and newly recognized pathogens, there was a need to direct attention to nosocomial transmission in special-care units rather than the intrahospital spread of infectious diseases acquired in the community, i.e., a need to tailor precautions to the modes of transmission for each infection and avoid the "overisolation" noted in the category-specific system.

From **1980 to 1983**, CDC Hospital Infections Program personnel, after consultation with infectious disease specialists, hospital epidemiologists, and Infection Control Practitioners, published the **CDC Guideline for Isolation Precautions in Hospitals**. Either **disease-specific** or **category-specific** isolation precautions could be used; it encouraged personnel choosing isolation precautions to make decisions about individuals (e.g., whether a patient’s age, mental status, or condition indicated that a private room was needed to prevent sharing of contaminated articles). The need to wear a mask, gown or gloves was based on the likelihood of exposure to infective material. The goal was to isolate the infection but not the patient and to reduce costs associated with unnecessary isolation precautions. The **category-specific** section of the guideline was modified, i.e., “Blood Precautions” (previously directed toward patients with chronic carriage of hepatitis B virus, was renamed “Blood and Body Fluid Precautions and expanded to include (1) patients with acquired immunodeficiency syndrome (AIDS) and (2) body fluids other than blood. The Protective Isolation category for the immunocompromised was deleted due to studies demonstrating lack of efficacy in general clinical practice. Categories were Strict Isolation, Contact Isolation, Respiratory Isolation, Tuberculosis Isolation, Enteric Precautions, Drainage and Secretion Precautions, and Blood and Body Fluid Precautions. Over-isolation of some patients still occurred.

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In the **disease-specific (diagnosis-driven)** guidelines, the epidemiology of each infectious disease was considered individually by advocating only those precautions (e.g., private room, mask, gown, and gloves) needed to interrupt the transmission of the infection. A chart (instead of color-coded cards) listed all diseases with checks in columns indicating which precautions were required for each. These precautions eliminated “over-isolation,” however, error could occur in applying precautions if the disease was not regularly seen in hospital, if there was a delay in diagnosis or there was a misdiagnosis. Incomplete knowledge of epidemiology of some diseases resulted in disagreement regarding placement of individuals, while others were controversial (e.g., measles in Respiratory Isolation and rubella and respiratory syncytial virus (RSV) infections in Contact Isolation). New epidemiologic data resulted in updating portions of the guideline.

Universal Precautions (UP)(1985) evolved because of the HIV epidemic and emphasis was placed on “**visibly bloody**” as a marker of infectious risk of certain body fluids and substances. UP was used to apply Blood and Body Fluid Precautions universally to all persons regardless of their presumed infection status. UP required that gloves, gowns, and masks be used, as well as, eye coverings and appropriate resuscitation devices to prevent mucous membrane exposures during certain procedures.

UP (1987) eliminated the need for the category of Blood and Body Fluid Precautions for patients known or suspected to be infected with blood-borne pathogens. The focus was preventing exposure to blood, body fluids (semen and vaginal secretions) and those containing visible blood, but **not** feces, nasal secretions, sputum, sweat, tears, urine, or vomitus unless they contained visible blood. These substances represented a potential source for nosocomial and community-acquired infections with other pathogens

Body Substance Isolation (BSI) was introduced in 1987 as an alternative to diagnosis-driven isolation systems. BSI focused on the isolation of all potentially infectious body substances (blood, feces, urine, sputum, saliva, wound drainage, and other body fluids). Clean gloves were to be put on just before contact with mucous membranes, nonintact skin, and for anticipated contact with moist body substances. A **Stop Sign Alert** instructed persons to check with the floor nurse who would determine whether a mask should be worn if a patient had a respiratory illness. Immunization of health care personnel for selected infectious diseases transmitted by the airborne or droplet routes (measles, mumps, rubella, and varicella) was required or they were not to enter the rooms housing patients with these diseases. Controversial aspects of BSI was that it did not contain adequate provisions to prevent (1) droplet transmission of serious infections in pediatrics (e.g., *H. influenzae*, *N. meningitidis meningitis*) (2) direct and indirect contact transmission of microorganisms from a patient or environmental sources (e.g. *C.difficile*), or (3) airborne transmission of infections by droplet nuclei. BSI did not require hand washing after glove removal, a reason for criticism by many. The efficacy of using gloves as a substitute for hand washing has not been demonstrated. In 1990, Tuberculosis Isolation was updated due to concerns about multi-drug resistant tuberculosis. These guidelines emphasized use of a private room with negative air pressure, and wearing a particulate respirator (U.S.) rather than standard surgical masks when sharing air space with an infectious tuberculosis patient.

During the 1990s, confusion about the best isolation method to use, lack of agreement about the importance of hand washing when gloves were used, and a need for additional precautions beyond BSI to prevent **airborne, droplet** and **contact transmission** was demonstrated. Clearly, recommendations for preventing the many infections that occur in hospitals through diverse modes of transmission were needed. The Hospital Infection Control Practices Advisory Committee (HICPAC) and the National Center of Infectious Diseases (CDC) began revising the Guideline for Isolation Precautions in Hospitals. The proposed **HICPAC isolation system** was published in the Federal Register in 1994 and in the American Journal of Infection Control in 1996. Because no single isolation system can address all the needs of all health care facilities potential users are advised to modify it according to what is possible, practical, and prudent. This system is described separately.