Microbes, Transmission and Protection

14

Abstract

This chapter is a short survey—in table form—concerning clinical types of infections, the most important microbes in medicine, recommended methods to isolate patients with infections and recommended use of personal protective equipment.

Keywords

Microbial agents · Symptoms · Transmission · Protection · Healthcare personnel Control

14.1 Isolation at Risk of Spread of Infection

Infection type		Isolation type	Personal protective equipment—PPE	
1.	All gastroenteritis cases	CA	Gloves	Gown, mask, cap[a,b]
	Clostridium difficile[a]	C(A)	Gloves	Gown, mask, cap[a,b]
	Salmonella, *Shigella*, *Yersinia*, *Campylobacter*	C(A)	Gloves	Gown, mask, cap[a,b]
	Campylobacter, *Cholerae*, intestinal-pathogenic *E. coli*	C(A)	Gloves	Gown, mask, cap[a,b]
	Entero-haemorrhagic *E. coli*—EHEC	C + A	Gloves	Gown, mask, cap[a,b]
	Virus gastroenteritis (Noro, Rota, sapo, etc.)[a,b]	C + A	Gloves	Gown, mask, cap[a,b]
2.	Hepatitis A or E	C + B	Gloves	Gown[b]

(continued)

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Infection type		Isolation type	Personal protective equipment—PPE	
3.	Staphylococcus aureus in wounds or eczema	C	Gloves	Gown[b]
4.	*Streptococcus* group A in the throat, skin or wounds	C	Gloves	Gown[b]
5.	Skin and wound infections, moderate secretion	C	Gloves	Gown[b]
6.	Gram-negative *Bacilli* with copious secretion from respiratory tract or wounds	C	Gloves	Gown[b]
7.	*Corynebacterium jeikeium*, *Staphylococcus haemolyticus* (only during nosocomial epidemics)	C	Gloves	Gown[b]
8.	Poliomyelitis	C(A)	Gloves	Gown[b]
9.	Untreated scab and lice	C	Gloves	Gown[b]
10.	Other diseases which are transmitted through contact (e.g. tuberculosis in the intestines, urinary tract or in wounds or fistula)	C	Gloves	Gown[b]
11.	HIV/AIDS uncomplicated and other blood-borne infectious viruses such as HTLV I and II and parvovirus B19	B + C(wound/ mucosa)	Gloves	Gown[b]
12.	Hepatitis, acute (unknown cause)	C + B	Gloves	Gown[b]
	Hepatitis, chronic (unknown cause)	B	Gloves	Gown[b]
	Hepatitis A, B, C, D, E, G	B + C	Gloves	Gown[b]
13.	Malaria falciparum, *Brucella*, yellow fever	B	Gloves	Gown[b]
14.	Suspected active pulmonary tuberculosis	A + C	Gloves	Gown,[b] resp., cap, shoes[a]
15.	Ornithosis, tularemi	A + C	Gloves	Gown[b], resp., cap, goggles/ visor
16.	Pneumonia caused by *Staphylococcus aureus*	A + C	Gloves	Gown,[b] mask, cap
17.	RSV, influenza and other airborne viruses	A + C	Gloves	Gown,[b] mask, cap
18.	Varicella-zoster, measles, parotitis, rubella, pertussis	A + C	Gloves	Gown,[b] resp., cap
19.	Herpes simplex in newborns, in child and maternity wards	A + C	Gloves	Gown,[b] mask, cap
20.	Systemic infection with: Meningococci, group A *Streptococci*, *Pneumococci*; first 24 hours after initial effective treatment	A + C	Gloves	Gown,[b] mask, cap
21.	Imported patients[c] (suspected MRSA or other resistant microbes until test results are negative)[c]	A + C	Gloves	Gown,[b] mask, cap
22.	Methicillin-resistant *Staphylococcus aureus*—MRSA (recently or in the last year)	A + C	Gloves	Gown,[b] mask, cap

Infection type		Isolation type	Personal protective equipment—PPE	
23.	Other multiresistant bacteria (penicillin-resistant pneumococci, multiresistant enterococci, some multiresistant, gram-negative bacteria: *Acinetobacter*, *Burkholderia cepacia*, ESBL—*E. coli* mm). Airborne transmission isolation is determined in relation to the infection type and symptoms[d]	A[d]+C	Gloves	Gown,[b] mask, cap
24.	Multidrug-resistant tuberculosis, open cavern and expectoration (first 14 days after initial treatment and on resistance—3 months or more)	SI	Gloves	Microbe impermeable gown,[b] resp., cap, shoes[a]
25.	Rare severe diseases (diphtheria, rabies, plague, anthrax, viral haemorrhagic fever, SARS, MERS, avian influenza—See also special guidelines)	SI	Gloves	Microbe impermeable gown,[b] resp., cap, hood, goggles, shoes[a]
	Any other contagious and very serious diseases that may be transmitted by contact and air (including droplet)			PPE—Emergency box[e]

NB. Contact infection control personnel in case of suspicion or questions

[a]Room-bound shoes are recommended; changed in the sluice, washed in a special shoe-washing machine or use single-use shoe or shoe-leg covers

[b]When risk of splashing, vomiting, cough, blood splatter and uncontrolled secretion, evaluate the use of cap, mask and visor or goggles, regardless of the type of isolation

[c]Imported patients from abroad or in other ways may be exposed to resistant microbes

[d]Airborne transmission may be dependent on symptoms of the patient and viability of the bacteria in the environment. The choice between use of surgical mask and respirator may depend on microbial agent, transmission rate, severity and symptoms

[e]PPE—emergency box; see PPE

14.1.1 Isolation Type (See Also Separate Regimes)

C = contact isolation; isolate or single room.

B = blood-borne and tissue transmission; single room preferred.

A = airborne transmission, including droplets and contact transmission. (A) may be airborne in certain situations with excessive spills, vomiting, uncontrolled secretion, etc. Isolate with sluice and a separate bathroom (entrance from the patients room) with decontaminator machine. Defined and controlled negative air pressure—separate air supply and hepafiltered exhaust. If shortage: a single room with anteroom and a separate bathroom.

SI = strict isolation; air + droplets + contact + blood. Isolate with sluice and a separate bathroom (entrance from the patient's room) with decontaminator or autoclave (throughput). Defined and controlled negative pressure relative to the corridor, separate air supply and hepafiltered exhaust.

14.1.2 PPE:—Most Used—with Different Combinations, According To Isolation Type

- *Gloves*: high-quality gloves with long "cuff" to cover the wrists (often use of double).
- *Gown* with cuff (water preventing coat) *or* microbe impermeable, waterproof gown *or* coverall with hood (barrier against most bacteria and virus and water impermeable for a defined period).
- *Cap*- surgical cap that covers hair and ears; always use cap if wearing mask/respirator.
- *Mask*—surgical; always use together with cap.
- *Visor*—large (against direct splatter); always use together with cap.
- *Respirator—resp. mask*: P3, N95, waterproof, with hepafilter against airborne and droplet transmission.
- *Shoe/leg covers* or room-bound waterproof shoes (that can be decontaminated at 85 °C or autoclaved or single use).
- *Goggles*: large (tight-sitting); placed outside the surgical cap or the hood (can be decontaminated).
- *Hood*—microbe impermeable that covers the surgical cap and the respirator mask on place and covers the neck down to shoulders (P3 level).

P3—level of protection: tight-fitting, waterproof respirator mask with hepafilter, eventually portable respirator and PPE corresponding to the isolation type.

PPE—emergency box: equipment for two to eight persons, stored at certain acute-care areas.

The box is pre-packed and contains respirator mask (P3), cap, hood, gown with cuffs (or coveralls with hoods), large goggles, waterproof shoe covers/overshoes and two pairs of high-quality gloves with long cuffs. Use only after consultation with hospital infection control personnel. Regular control and upgrading of the boxes, see chapters concerning high-risk infectious disease preparedness.

Prion disease is not included—see separate section Chap. 55.