Infection Control Guidelines for Intermediate Long Term Care Centres (ILTCs)

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Basic Infection Control Practices

Prevention of transmission of significant pathogens to patients and healthcare workers (HCWs) is the major goal of isolation within the health care system. The high prevalence of risk factors for infection among long term care facilities residents, the high colonization rate of multi-drug resistant organisms (MDROs) and the frequent reports of intermediate long-term care centres (ILTC) infectious disease outbreaks support the need for appropriate infection control in this setting. An ILTC is defined as an institution that provides health care to people who are unable to manage independently in the community. This includes chronic care management or short term rehabilitative services. A unique infection control challenge for the ILTC is the mobile resident, who may be confused or incontinent and serves as possible vector for infectious diseases. There are real concerns of MDROs in the ILTC as it has implications beyond the individual community hospitals and nursing homes.

As patients or residents of community hospital and long term care facilities are hospitalized frequently, pathogens can transfer between ILTCs and receiving hospitals; transfer of patients colonized with MDROs between hospitals and ILTCs has been well documented.

ILTC patients tend to remain in the nursing home for extended periods of time, and the ILTC is functionally their home. These create an atmosphere of community and residents share common eating and living areas and also participate in various activities.

Transmission of Infection

Transmission of infectious agent requires three elements.

- Source (reservoir) of infectious agents
- Susceptible host

- Portal of entry and mode of transmission for the agent

This guideline describes the interrelationship of these elements in the epidemiology of healthcare associated infections (HAIs) in the long term care setting.

Source of infectious agents

Infectious agents transmitted in healthcare are primarily from human sources and inanimate environment. Human reservoirs include patients, healthcare personnel as well as visitors. These individuals may have active infections with either symptomatic or asymptomatic infection or they are in incubation period of an infectious disease. The individuals may be transiently or chronically colonized with pathogenic microorganisms particularly in the respiratory and gastrointestinal tracts. It is important to know that patients' endogenous flora (e.g. bacteria in the respiratory or gastrointestinal tract) can also be the source of HAIs.

Susceptible hosts

The susceptible host is any person who is at risk of infection. The host is the final and most important link in the chain of transmission. ILTCs are different from other healthcare settings in that elderly patients at increased risk for infection are brought together in one setting and remain in the facility for extended periods of time; for most residents, it is their home.

Risk factors for infection are prevalent among the ILTC residents. Age-related declines in immunity may affect responses to immunizations for influenza and other infectious agents, and increase susceptibility to tuberculosis.

In addition, immobility, incontinence, dysphagia, poor functional status, underlying chronic diseases, and age-related skin changes increase susceptibility to urinary respiratory

and cutaneous and soft tissue infections, while malnutrition can impair wound healing. These elderly, if with other illnesses such as diabetes mellitus, respiratory diseases, cancer, weakened immune system, breaks in the skin and poor nutrition are factors that further increase the risk of acquiring an infection. Residents of ILTC need to be assessed on the risk factors for acquiring infections.

Mode of transmission

Infection control practices will include Standard Precautions and transmission-based precautions where the former is applied to all patients regardless of conditions. Transmission-based precautions refer to Contact Precautions, Airborne Infection Isolation Precautions, Droplet Precautions, and Protective Environment. Standard Precautions are to be adopted at all times. Standard Precautions are based on the principle that all blood and body fluids, secretions, excretions except sweat, non-intact skin and mucous membranes may contain transmissible infectious agents. It includes a group of infection prevention measures that apply to all patients, regardless of suspected or confirmed infection status.

Standard Precautions include:

1) Hand hygiene

   Hand hygiene likely remains the most important infection control measure in the ILTC as well as in the community hospital and in other hospital. Poor compliance with hand hygiene recommendations has been noted in ILTCs, as in other settings. Health care provider hand contamination is usually transient and amenable to hand hygiene, frequent hand hygiene would be expected to lower ILTC infection rates, and the availability of alcohol-based hand sanitizer dispensers enhances access to hand sanitizing agents. Center of Disease Control, USA (CDC), the Healthcare Infection Control Practices Advisory Committee (HICPAC), World Health Organization (WHO) and others had published a comprehensive hand hygiene guideline which includes choice of antiseptic agents. The guidelines recommend

the use of liquid soap when hands are visibly dirty or contaminated with proteinaceous material or visibly soiled with blood or other body fluids. Refer to Appendix A for steps in hand hygiene.

The use of soap and water or Chlorhexidine is recommended for hands that are potentially contaminated by *C. difficile*, as alcohol handrub is not effective in the destruction of the spores. Hands should always be decontaminated after the removal of gloves. Hand hygiene with an antiseptic agent or alcohol-based rub is recommended before donning sterile gloves for performing invasive procedures such as placement of a urinary catheter or intravenous catheter. Hand hygiene compliance should be monitored by the facility and educational campaign on hand hygiene should be conducted on a regular basis.

Before an aseptic task, surgical hand rub of duration 3 mins is recommended (see Appendix B).

2) Appropriate use of gloves, gown, mask, eye protection, or face shield

   i) Equipment or items in the patient environment likely to be contaminated with infectious body fluids that must be handled in a manner to prevent transmission of infectious agents (e.g. wearing gloves for direct contact, contain heavily soiled equipment, properly clean and disinfect or sterilize reusable equipment before use on another patient).

   ii) Applying Standard Precautions during patient care must be determined by the nature of the HCW-patient interaction and the extent of anticipated blood, body fluid, or pathogen exposure. In some instances, only gloves may be needed for performing venipuncture; whereas gloves, gowns and face shield or mask and goggles is necessary for intubation procedure.

3) Needlestick or sharps injury prevention

Inappropriate handling of sharps is a major cause of accidental exposure to blood-borne viruses in health care settings. To minimise the risk of a needlestick or sharps injury, needles, sharps and clinical waste should be handled carefully at all times. Specifically, clinicians and other health care workers should:

- Minimise their handling of needles, sharps and clinical waste
- Not bend or recap needles or remove needles from disposable syringes
- Use safe needle-handling systems including rigid containers for disposal
- Ensure 'sharps' containers are available at the point of use or in close proximity to work sites to aid easy and immediate disposal Importantly, the person who has used a sharp instrument or needle must be responsible for the immediate and safe disposal

4. Safe Injection Practices

The investigation of four large outbreaks of HBV and HCV among patients was attributed to breaches in infection control practice. They were caused by reinsertion of used needles into a multiple-dose vial or solution container (e.g., saline bag), use of a single needle/syringe to administer intravenous medication to multiple patients, and preparation of medications in the same workspace where used needle/syringes were dismantled. Strict adherence to basic principles of aseptic technique for the preparation and administration of parenteral medications, use of sterile, single-use, disposable needle and syringe for each injection, and prevention of contamination of injection equipment and medication can prevention an outbreak. Whenever possible, use of single-dose is preferred especially when medications will be administered to multiple patients. Principles of infection control and septic technique need to be reinforced in training programs and incorporated into institutional policies.

5) Respiratory Hygiene/Cough Etiquette

To prevent the transmission of all respiratory infections in healthcare settings, including influenza, the following infection control measures should be implemented at the first point of contact with a potentially infected person. This should be incorporated into infection control practices as one component of Standard Precautions. Provide Visual Alerts at appropriate location (see Appendix D).

A. Cover the nose/mouth when coughing or sneezing;

B. Use tissues to contain respiratory secretions and dispose of them in the nearest waste receptacle after use;

C. Perform hand hygiene (e.g., hand washing with non-antimicrobial soap and water, alcohol-based hand rub, or antiseptic handwash) after having contact with respiratory secretions and contaminated objects/materials.

The transmission mode varies by type of organism. Some infectious agents may have more than one route. Some are transmitted by direct or indirect contact, (e.g. *Staphylococcus aureus*, respiratory syncytial virus (RSV)), or by droplet, (e.g. influenza virus, *B. pertussis* or airborne routes (e.g. *M. tuberculosis*). Other infectious agents are rarely transmitted in healthcare settings via percutaneous or mucous membrane exposure. Examples are hepatitis B (HBV) and hepatitis C viruses (HCV) and human immunodeficiency virus (HIV). Not all infectious agents are transmitted from person to person. The three main routes of transmission are contact, airborne and droplet.

1. Contact Transmission

Contact transmission is the most common mode of transmission. It is divided into two subgroups:

- Direct contact
- Indirect contact

1a. Direct contact transmission

This occurs when microorganisms are transferred from an infected person to another person without a contaminated intermediate object or person. Examples of contact transmission between patients and healthcare personnel include the following:

- Healthcare worker acquires herpetic whitlow on a finger after contact with herpes simplex virus (HSV) when providing oral care to a patient without using gloves or the patient acquire herpetic whitlow from an ungloved hand of a healthcare worker.
- An ungloved healthcare worker is infected with mites from a scabies-infested patient

1b. Indirect contact transmission

Indirect transmission involves the transfer of an infectious agent through a contaminated intermediate object or person. Contaminated hands of healthcare personnel are commonly known to contribute to indirect contact. Examples of indirect contact transmission are:

- Hands of healthcare workers (HCWs) may transmit pathogens after contacting a colonized or infected patient body site or contaminated inanimate object if hand hygiene is not performed before contacting another patient.
- Contaminated patient care devices (e.g. glucose monitoring devices, electronic thermometers) are shared between patients without cleaning and disinfecting between patients.
- Contaminated instruments that are inadequately cleaned between patients before disinfection or sterilization. (e.g. surgical instruments)

Contact Precautions

Contact Precautions are intended to prevent transmission or microorganisms which are spread by direct or indirect contact with the patient or the patient's environment. It is applied to patients infected or colonized with MDRO, or patients with excessive drainage wound, fecal incontinence, or other discharges from the body that has increased potential for extensive environmental contamination and risk transmission.

Single room is preferred for patients who require contact precautions. When single room is not available, consult infection control personnel on cohorting patient with same infection or with an existing room mate. In multi-patient rooms, ≧1 meter spatial separation between beds is advised. When caring for such patients, gowns and gloves should be worn when there is potential contact with the patient or potentially contaminated areas in the patient's environment. Donning PPE upon room entry and discarding before exiting patient room is practiced to contain pathogens that can be transmitted through environmental contamination (e.g. VRE, *C. difficile*, noroviruses and other intestinal tract pathogens, RSV)

2. Airborne Transmission

Airborne transmission can occur with a few infectious agents that can travel on tiny respiratory particles called droplet nuclei, which can be carried through the air. These infectious agents can remain infective over time and distance (e.g. spores of *Aspergillus* spp, and *Mycobacterium tuberculosis)*. MTB may be carried on dust particles and through ventilation systems occurs by dissemination of either airborne droplet nuclei or small particles in the can occur. Tuberculosis may be droplet spread or airborne spread, as can rubeola virus (measles) and varicella–zoster virus (chickenpox). Certain other respiratory infectious agents, such as influenza and rhinovirus and even some gastrointestinal viruses (e.g. norovirus and rotavirus) there is some evidence that the pathogen may be transmitted via small-particle aerosols, under natural and experimental

conditions. Such transmission has occurred over distances longer than 1 meter but within a defined airspace (e.g. patient room) suggesting that it is unlikely that these agents remain viable on air currents that travel long distances.

Airborne Precautions

Airborne Precautions prevent transmission of infectious agents that remain infectious over long distances when suspended in the air (e.g. rubeola virus [measles], varicella virus [chickenpox], *M tuberculosis*. Preferably patient is placed in airborne infection isolation room. A single patient room equipped with special air handling and ventilation. A respiratory protection program on the use of respirators, fit-testing and seal check is recommended. In setting where Airborne Precautions cannot be implemented due to limited engineering resources, the patient is placed in a private room with door closed and N95 masks are provided for the healthcare personnel. Whenever possible, non-immune HCWs should not care for patients with vaccine-preventable airborne diseases (e.g. measles, chickenpox).

3. Droplet transmission

Droplet transmission involves contact of the conjunctivae or the mucous membranes of the nose or mouth of a susceptible person with large-particle droplets (larger than 5 micron in size) containing microorganisms generated from a person who is infected. Droplets are generated when an infected person coughs, sneeze or talk or during procedures such as suctioning cough induction by chest physiotherapy and cardiopulmonary resuscitation. Studies have shown that the nasal mucosa, conjunctivae and less frequently the mouth, are susceptible portals of entry for respiratory viruses. Transmission via large-particle droplets requires close contact between source and recipient of susceptible host, because droplets do not remain suspended in the air and generally travel only short distances through the air. These respiratory droplets can travel about one meter before gravity causes them to fall. This area of defined risk of one

meter around the patient is based on epidemiologic and simulated studies of selected infections. This makes it different from airborne transmission. Using this distance for donning masks has been effective in preventing transmission of infectious agents via the droplet route.

Droplet Precautions

The objective of Droplet Precautions is to prevent transmission of pathogens spread through close respiratory or mucous membrane contact with respiratory secretions. These pathogens do not remain infectious over long distances in a healthcare facility and does not require special air handling ventilation. Infectious agent that require droplet precautions include *B. pertussis*, influenza virus, adenovirus, rhinovirus, *N. meningitidis*, and group A *Streptococcus* (for the first 24 hours of antimicrobial therapy). A single room is preferred for Droplet Precautions. However if single room is not available, consult infection control personnel on other patient placement options (e.g., cohorting, keeping the patient with an existing roommate) Spatial separation of ≥1 meter and drawing the curtain between patient beds is especially important for patients in multi-bed rooms with infections transmitted by droplet route, Healthcare personnel wear a surgical mask for close contact with infectious patient; the mask is donned upon room entry. When transporting such patient outside the room, the patient should wear a mask if tolerated and follow Respiratory Hygiene.

Discontinuation of Precautions

Airborne infection isolation, Contact or Droplet Precautions remain in effect for limited periods of time. It is practised during the patient illness or when there is risk for transmission of the infectious agent.

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Multi-drug Resistant Organisms (MDRO)

Residents of ILTCs may be colonised or infected with multidrug-resistant organisms e.g. methicillin resistant *Staphylococcus aureus* (MRSA), vancomycin resistant *Enterococcus* (VRE), when they are admitted, or may develop these infections through antibiotic medication during their stay. The infection control program should therefore include a component specifically addressing prescription of antimicrobial agents. Using a multidisciplinary approach, recommendations should include clinical guidelines for empiric antimicrobial prescription, review of antibiotic usage and restricted formulary. ILTCs should liaise with other health care establishments to which they regularly refer patients for care about the ongoing surveillance and management of patients colonised or infected with antimicrobial-resistant bacteria.

Standard Precautions, ensuring the use of gloves and gowns for contact with uncontrolled secretions, pressure ulcers, draining wounds, stool and ostomy tubes/bags, are sufficient for relatively health and independent residents.

Contact Precautions are indicated for residents with MDROs who are ill and totally dependent upon healthcare workers for their daily living activities or who when the resident's secretions or drainage cannot be contained. Single rooms for these residents are recommended if available. Cohorting of MDRO residents is acceptable if single rooms are not available. If cohorting is not possible, then place the residents with MDRO with residents who are low risk for acquiring infection or with anticipated shorter lengths of stay.

MRSA and VRE

The route of transmission is via direct or indirect contact. Hence, Contact Precautions will be needed in the management of these patients i.e. use of gloves and gowns. Hand hygiene is the most effective means of breaking the cycle of transmission. Patients with

MRSA pneumonia are likely to be great dispersers of MRSA and hence, should ideally be isolated in a single room.

Antibiotic stewardship program (ASP)

Antibiotic resistance is strongly associated with antibiotic use. These are often used for lengthy periods of time. A common problem is failure to distinguish infections and colonisation and the treatment of colonisation with antibiotics.

The CDC (USA) has published a 12-step program for preventing antimicrobial resistance in a health care facility e.g. ILTC:

1. **Vaccinate**
   - Give influenza and pneumococcal vaccinations to residents
   - Promote vaccination among all staff
2. **Prevent conditions that lead to infection**
   - Prevent aspiration
   - Prevent pressure ulcers
   - Maintain hydration
3. **Get the unnecessary devices out**
   - Insert catheters and devices only when essential and minimize duration of exposure
   - Use proper insertion and catheter-care protocols
   - Reassess catheters regularly
   - Remove catheters and other devices when no longer essential
4. **Use established criteria for diagnosis of infection**
   - Target empiric therapy to likely pathogens
   - Target definitive therapy to known pathogens

- Obtain appropriate cultures and interpret results with care
- Consider *C. difficile* in patients with diarrhoea and antibiotic exposure

5. **Use local resources**
   - Consult infectious disease experts for complicated infections and potential outbreaks
   - Know your local and/or regional data
   - Get previous microbiology data for transfer residents
6. **Know when to say "no"**
   - Minimize use of broad-spectrum antibiotics
   - Avoid chronic or long-term antimicrobial prophylaxis
   - Develop a system to monitor antibiotic use and provide feedback to appropriate personnel
7. **Treat infection, not colonization or contamination**
   - Perform proper antisepsis with culture collection
   - Re-evaluate the need for continued therapy after 48-72 hours
   - Do not treat asymptomatic bacteriuria
8. **Stop antimicrobial treatment**
   - When cultures are negative and infection is unlikely
   - When infection has resolved
9. **Isolate the pathogen**
   - Use Standard Precautions
   - Contain infectious body fluids (use approved Droplet and Contact isolation precautions)
10. **Break the chain of contagion**
    - Follow CDC recommendations for work restrictions and stay home when sick
    - Cover your mouth when you cough or sneeze
    - Educate staff, residents, and families
    - Promote wellness in staff and residents

11. **Perform hand hygiene**

    - Use alcohol-based handrubs or wash your hands

    - Encourage staff and visitors

12. **Identify residents with multi-drug resistant organisms (MDROs)**

    - Identify both new admissions and existing residents with MDROs

    - Follow standard recommendations for MDRO case management

Infectious Diseases

(A) Common Cold

Acute viral rhinopharyngitis, or acute coryza, usually known as the common cold, is a contagious, viral infectious disease of the upper respiratory system, primarily caused by rhinoviruses (picornaviruses) or coronaviruses. It is the most common infectious disease in humans; there is no known cure, but it is rarely fatal.

Signs and symptoms

Common symptoms are sore throat, runny nose, nasal congestion, coughing and sneezing; sometimes accompanied by 'pink eye', muscle aches, fatigue, malaise, headaches, muscle weakness, uncontrollable shivering, loss of appetite, and rarely extreme exhaustion. Fever is more commonly a symptom of influenza, another viral upper respiratory tract infection (URTI) whose symptoms broadly overlaps with the cold but are more severe.

Incubation period

The typical common cold incubation period is from two to five days, but symptoms can appear in as little as ten hours after the virus first enters the nose.

Route of transmission

The common cold virus is transmitted mainly from droplet spread (via coughing or sneezing) or contact with the saliva or nasal secretions of an infected person.

Infection Control measures

Droplet Precautions are to be adopted by the healthcare worker i.e. use of surgical masks when taking care of the patient. It is also recommended that patients with influenza wear surgical masks when they are in common activity areas to prevent spread to others. In addition, the following are recommended:

- Good personal health and hygiene habits
- hand washing
- avoiding spitting
- covering the nose and mouth when sneezing or coughing

The best way to avoid a cold is to wash hands thoroughly and regularly; and to avoid touching the eyes, nose, mouth, and face. To prevent infection, washing or disinfecting hands has been found to be effective, as this minimizes person-to-person transmission of the virus.

Treatment

There are no antiviral drugs approved to treat or cure the infection; all medications used are palliative and treat symptoms only.

Treatment that may help alleviate symptoms include: analgesics, decongestants, and cough suppressants, getting plenty of rest, drinking fluids to maintain hydration, gargling with warm salt water, using cough drops, throat sprays.

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(B) Influenza

Influenza, commonly referred to as the flu, is an infectious disease that affects birds and mammals. The name *influenza* comes from the Italian *influenza*, meaning "influence" (Latin: *influentia*).

Signs and symptoms

Symptoms of influenza can start quite suddenly one to two days after infection. Symptoms may include:

- Body aches, especially joints and throat
- Extreme coldness and fever
- Fatigue
- Headache
- Irritated watering eyes
- Reddened eyes, skin (especially face), mouth, throat and nose

Incubation period

The incubation period of influenza is usually two days but can range from one to five days.

Route of transmission

Typically, influenza is transmitted through the air by coughs or sneezes, creating aerosols containing the virus. Influenza can also be transmitted by bird droppings, saliva, nasal secretions, faeces and blood. Infection can also occur through contact with these body fluids or through contact with contaminated surfaces.

Infection control measures

Droplet Precautions are to be adopted by the healthcare worker i.e. use of surgical masks when taking care of the patient. It is also recommended that patients with influenza

wear surgical masks when they are in common activity areas to prevent spread to others. In addition, the following are recommended:

- Good personal health and hygiene habits
- Hand washing
- Avoiding spitting
- Covering the nose and mouth when sneezing or coughing

In particular, hand-washing with soap and water, or with alcohol-based hand rubs, is very effective at inactivating influenza viruses. These simple personal hygiene precautions are recommended as the main way of reducing infections during pandemics. Although face masks might help prevent transmission when caring for the sick, evidence of beneficial effects is mixed in the community.

Since influenza spreads through both aerosols and contact with contaminated surfaces, surface sanitizing may help prevent some infections. Influenza viruses can be inactivated by sunlight, disinfectants and detergents. As the virus can be inactivated by soap, frequent hand washing reduces the risk of infection.

Vaccinations against influenza are usually given to people in developed countries and to farmed poultry. The most common human vaccine is the trivalent influenza vaccine (TIV) that contains purified and inactivated material from three viral strains. The TIV carries no risk of transmitting the disease, and it has very low reactivity. A vaccine formulated for one year may be ineffective in the following year, since the influenza virus evolves rapidly, and new strains quickly replace the older ones. The influenza vaccine is recommended as an annual vaccine to protect against seasonal influenza and prevent healthcare-associated outbreaks.

Treatment

Antiviral drugs can be used to treat influenza, with neuraminidase inhibitors being particularly effective.

Pandemic Flu

Please refer to MOH website for updates on national control measures and management of Pandemic Flu (http://www.moh.gov.sg/mohcorp/diseases.aspx?id=422).

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(C) Tuberculosis (TB)

This is caused by *Mycobacterium tuberculosis* complex. Route of transmission is airborne. However, a patient who has completed 2 weeks of effective treatment with anti-tuberculosis drugs is rendered non-infectious.

Infection Control measures

Airborne precautions are to be adopted in care of the TB patient. This involves the following:

1. Isolation of patient (suspected and confirmed) in a negative pressure room. Where possible, this room is to comply with the CDC recommendations i.e. minimum of 12 air changes per hour, etc. Alternatively, the room may be created by opening the windows, keeping the door closed and turning off the air conditioning unit.
2. The isolation room should be equipped with its own toilet facility.
3. Healthcare workers and visitors are to wear N95 masks when entering the isolation room.

A diagnosis of tuberculosis infection is notifiable to the Ministry of Health. Reporting of suspected cases is also mandated by law. Contact tracing is done by the TB Control Unit. Persons exposed to a potentially contagious case of tuberculosis will have a Mantoux test done to determine if isoniazid prophylaxis is required.

Reference:

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(D) Scabies

Scabies is an itchy and contagious skin infestation caused by a mite, *Scarcoptes scabies*. It is a common infestation in long term care settings and transmissible if not given prompt appropriate medical attention. Infection control measures should be employed to prevent and manage the infestations should it occur.

Signs & Symptoms

Early symptoms are severe itching (pruritis) at night followed by itching and skin rash. The rash is pimple-like (papular), itchy (pruritic) known as 'scabies rash'. Much of the body may be affected or parts like webs of fingers, wrist, elbow, armpit, penis, nipple, waist, buttocks and shoulder blades.

Incubation period

The incubation period is 2-6 weeks. However, the infested person can spread scabies during this time even if there are no symptoms. Intense itching can lead to scratching and skin sores.

Route of transmission

Transmission occurs primarily by the transfer of the impregnated female mites during person-to-person, skin-to-skin contact with occasional transmission via fomites (e.g. bedding or clothing). Human scabies mites often are found between the fingers and on the wrists.

Prevention

Early detection, treatment, and implementation of appropriate isolation and infection control practices are essential in preventing scabies outbreaks. ILTCs should maintain a high index of suspicion that undiagnosed skin rashes and conditions may be scabies, even if

characteristic signs or symptoms of scabies are absent (e.g. no itching). The onset of scabies in a staff person who has had scabies before can be an early warning sign of undetected scabies in a patient. Skin scrapings can be used to confirm diagnosis.

All patients are screened for history of scabies infestation on admission to ILTC (intermediate long term care). If present, prophylactically treat with a scabicide e.g. Malathion 5% lotion for 3 consecutive days. The healthcare staff must be vigilant and alert to identify patients with scabies eruptions. A routine inspection of skin on bathing and examination of skin when patient complains of itches and rashes, should be carried out for early and prevention of scabies outbreak. Every skin condition and symptoms of itching are notified to the doctor for assessment to rule out scabies. Staffs are to report scabies infestations of self or close family members to Department Heads on a regular basis.

Infection Control Measures

Standard Precautions and Contact Precautions are to be applied in the management of the scabies patient. Gloves and gowns should be worn and changed in between each patient care.

Multiple cases or crusted scabies of the Norwegian type

Early detection of new cases, practice of Standard Precautions and transmission based precautions and identifying and treating single and isolated cases early prevents transmission. However, small outbreaks can occur. When more than one scabies case is detected in a room or cubicle, outbreak measures should be adopted at once to prevent further infestation of other patients and staff. Isolation procedures and cohort nursing with designated staff to the infested patients can reduce the potential for further transmission. Direct skin-to-skin contact between a patient with crusted scabies and his/her caretakers and visitors should be eliminated by following strictly Contact Precautions, including the use of protective garments such as gowns and gloves. The patient's room should be cleaned

thoroughly. Bedding and clothing used by a person with scabies should be changed daily or when soiled and machine-laundered using the hot water and hot dryer cycles, where possible. Rooms should be thoroughly cleaned and vacuumed after use. Environmental disinfection using pesticide sprays or fogs generally is unnecessary and is discouraged.

All staff, volunteers, and visitors who may have been exposed to a patient with crusted scabies, or to clothing, bedding, or furniture used by such a patient, should be identified and treated at the same time. This is to prevent re exposure as the 'infested' person can spread scabies during the asymptomatic period. Symptoms of scabies can take weeks to appear the first time in an infested person.

Surveillance

Scabies infestation in long term care settings is inevitable. A good surveillance system to capture clinical information about confirmed and suspected scabies patients should be in place and used for systematic review to facilitate early identification and response to potential outbreaks. All new patients and staff should be screened and treated for skin conditions suggestive of possible scabies. Communication to institutions where the patients are admitted from, visitors and family members of staff is vital.

Education

All staff should be informed and reinforced on scabies infestation periodically to keep their knowledge and skills intact for the identification and management of scabies.

(E) Gastroenteritis (GE)

Elderly residents with gastroenteritis must be tested as soon as possible to minimise the effects of outbreaks in aged care facilities. Gastroenteritis (also known as gastro, gastric flu, and stomach flu, although unrelated to influenza) is inflammation of the gastrointestinal tract, involving both the stomach and the small intestine and resulting in acute diarrhoea. The inflammation is caused most often by an infection from certain viruses or less often by bacteria, their toxins, parasites, or an adverse reaction to something in the diet or medication.

Different species of bacteria can cause gastroenteritis, including *Salmonella*, *Shigella*, *Staphylococcus*, *Campylobacter jejuni*, *Clostridium*, *Escherichia coli*, *Yersinia*, and others. Some sources of the infection are improperly prepared food, reheated meat dishes, seafood, dairy, and bakery products. Each organism causes slightly different symptoms but all result in diarrhoea. Viruses causing gastroenteritis include rotavirus, norovirus, adenovirus and astrovirus. Viruses do not respond to antibiotics.

Risk factors include consumption of improperly prepared foods or contaminated water and travel or residence in areas of poor sanitation. The loss of fluids through diarrhoea can cause severe dehydration which is one cause of death in diarrhoea sufferers. Along with water, sufferers also lose dangerous amounts of important salts, electrolytes, and other nutrients. Depending on the degree of dehydration, this can be done by giving the person oral rehydration therapy (ORT) or through intravenous delivery.

Signs and symptoms

It's usually of acute onset, normally lasting 1–6 days, and is self-limiting.

- Nausea and vomiting
- Diarrhoea

- Loss of appetite
- Headaches
- Abdominal pain
- Abdominal cramps
- Bloody stools (dysentery - suggesting infection by amoeba, *Campylobacter*, *Salmonella*, *Shigella* or some pathogenic strains of *Escherichia coli*)
- Fainting and Weakness

Incubation period

The incubation period ranges from 18-72 hours. During this incubation period, while the virus is multiplying inside those infected cells, the patient is asymptomatic.

Route of transmission

Gastroenteritis may be spread through food or person-to-person contact, or a combination of both. Infectious gastroenteritis is caused by a wide variety of bacteria and viruses.

Infection Control Measures

Contact Precautions are to be applied when managing the GE patient:

- Gloves
- Gown
- Handwashing **-** Refer to Appendix A for steps in hand hygiene.
- Patient isolation

Gloves should be worn when coming into contact with items that may be contaminated, such as clothing, bedding or environmental surfaces. Remove the gloves after caring for the patient, and wash hands with soap. Gloves alone do not guarantee prevention of transmission.

Gowns should be worn if direct care (e.g. bathing or lifting) is provided or when there is contact with secretions / excretions (changing linens). In addition, gowns should be worn when coming into contact with environmental surfaces that are likely to be contaminated. Gowns should be removed and discarded prior to leaving the patient room.

Persons can reduce their chance of getting infected by frequent handwashing, prompt disinfection of contaminated surfaces with household chlorine bleach-based cleaners, and prompt washing of soiled articles of clothing. If food or water is thought to be contaminated, it should be avoided.

Environmental Cleaning

Clean toilet with 5000 parts per million (ppm) sodium hypochlorite after use.

(F) Norovirus

Noroviruses are highly contagious and can spread easily from person to person. They are found in the stool or vomit of infected people.

Signs and symptoms

The disease is usually self-limiting,

- characterised by nausea,
- vomiting,
- diarrhoea,
- abdominal pain,
- and in some cases, loss of taste,
- general lethargy,
- weakness
- muscle aches
- headache
- low-grade fever

Incubation period

When a person becomes infected with norovirus, the virus begins to multiply within the small intestine. After approximately 1 to 2 days, norovirus symptoms can appear. This period between the norovirus transmission and the start of norovirus symptoms is known as the "norovirus incubation period." In some cases, the norovirus incubation period can be as short as 12 hours after exposure.

Route of transmission

The viruses are transmitted by faecally contaminated food or water and by person-to-person contact. Norovirus transmission can happen in one of several ways, including:

- Eating foods or drinking liquids that are contaminated with norovirus
- Touching surfaces or objects contaminated with norovirus and then putting your hands in your mouth
- Having direct contact with another person who is infected and showing symptoms (for example, when caring with the illness, or sharing foods or eating utensils with someone who is ill).

Contagiousness

People infected with norovirus are usually contagious from the moment they begin feeling ill to at least 3 days after recovery. Some people may be contagious for as long as 2 weeks after recovery. Therefore, it is particularly important for people to use good hand washing and other hygienic practices after they have recently recovered from norovirus illness.

Outbreaks of norovirus infection often occur in closed or semi-closed communities, such as long-term care facilities, hospitals, prisons, dormitories, and cruise ships where once the virus has been introduced, the infection spreads very rapidly by either person-to-person transmission or through contaminated food. Many norovirus outbreaks have been traced to food that was handled by one infected person.

Infection Control measures

Contact Precautions are to be applied when managing patients with Norovirus infections:

- Gloves - should be worn when coming into contact with items that may be contaminated, such as clothing, bedding or environmental surfaces. Remove the

gloves after caring for the patient, and perform hand hygiene with alcohol hand rub or soap and water. Gloves alone do not guarantee prevention of transmission.

- Gown - worn if direct care (bathing or lifting) is provided or when in contact with secretions / excretions (changing linens). In addition, gowns should be worn when coming into contact with environmental surfaces likely to be contaminated. Gowns should be removed and discarded prior to leaving the patient room.
    - Handwashing **-** Refer to Appendix A for steps in hand hygiene.
    - Patient isolation

Environmental Cleaning

Norovirus is rapidly inactivated by chlorine-based disinfectants, but because the virus particle does not have a lipid envelope, it is less susceptible to alcohols and detergents. Frequent cleaning of common toilets is recommended. Clean toilet with 5000 ppm sodium hypochlorite after use.

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(G) Pneumonia

Introduction

Pneumonia or lower respiratory tract infection is the second most common health care related infection in long term care settings. It has substantial morbidity and mortality, being the third cause of deaths in Singapore in the last few years (Health Facts, Singapore 2008). Most patients who have this pneumonia are the infants, young children, and persons greater than 65 years of age; persons who have severe underlying disease, immuno-suppression, depressed sensorium, and/or cardiopulmonary disease; and persons who have had thoraco-abdominal surgery.

Epidemiology

The reported distribution of etiologic agents that cause healthcare associated pneumonia differs between hospitals. In general hospital acquired bacterial pneumonias are frequently polymicrobial and gram-negative bacilli. However, *Staphylococcus aureus,* especially MRSA and other gram-positive cocci, including *Streptococcus pneumoniae* are common pathogens, too.

The incidence of pneumonia in hospitalized patients might result from colonization of the pharynx by gram-negative bacilli and the subsequent entry of these organisms into the lower respiratory tract .There are also evidence of aerobic gram-negative and they are likely to result from colonization in comatose patients, in patients treated with antimicrobial agents, and in patients who have hypotension, acidosis, diabetes mellitus, leucocytosis, leucopenia, pulmonary disease, or nasogastric or tracheal tubes in place. Other conditions e.g., malnutrition, severe illness, or postoperative state can increase adherence of gram-negative bacteria.

Signs & Symptoms

Health care associated pneumonia is difficult to diagnose. Traditionally symptoms of fever and cough with radiologic evidence of new or progressive pulmonary infiltrate, leucocytosis and suggestive sputum cultures. In ILTC settings, it is even more difficult because of unavailability of diagnostic tests, the general inability of patients to provide good sputum specimens and difficulty in interpreting sputum cultures and chest radiographs.

Prevention and Control Measures

Droplet precautions are to be applied with Standard Precautions.

Infection Control measures

1 Placement of Patient

A single room is ideal for the management of a patient with pneumonia. Alternatively, a bed placed near the window for better ventilation and air flow may be used.

2 Standard Precautions

2.1 Hand Hygiene

- Clean hands before and after touching patients.
- Clean hands after touching respiratory secretions or respiratory equipment and after removal of gloves.
- Use alcohol based antiseptic hand-rub if hands are not visibly soiled after coming into contact with mucous membrane, respiratory secretions or contaminated objects.

2.2 Gloving

- Wear gloves when handling respiratory secretions or objects contaminated with respiratory secretions

- Change gloves and clean hands upon removal before moving on to care for another patient

2.3 Gowning

- Wear gown when soiling from respiratory secretions is anticipated.
- Change gown in between care of patients.

3 Care of patient with tracheostomy

- Perform tracheostomy care under aseptic conditions
- Wear gown to change tracheostomy tube under sterile condition with aseptic technique.
- Change inner tubes of tracheostomy daily. Replace metal inner tubes with one that has undergone sterilisation or high level disinfection
- Clean the skin around the wound daily with saline and dressed it with sterile dressing.
- Autoclave or disinfect reusable equipment using a non-toxic chlorine product, rinse off with sterile water or normal saline, dry aseptically before re-insertion.

4 Suctioning of respiratory tract secretions

- Suction only if necessary
- Wash hands, wear gloves, surgical masks and goggles when doing suctioning.
- Use sterile single use catheter for each series of suctioning
- Use a separate sterile bowl set for each suctioning procedure.
- Use sterile water to remove secretions from the suction catheter if catheter is to be used for re-entry into the patient's lower respiratory tract normal saline to loosen secretions
- Carry out intermittent suction gently.

- Change suction collection tubing and suction collection canister at least once every 24 hours.

6 Sterilisation or disinfection and maintenance of respiratory equipment

- Thoroughly clean all equipment and devices to be sterilised or disinfected. Methods are steam sterilisation by autoclaving or high level disinfection with a chlorine-based product for 30 minutes, followed by appropriate rinsing with sterile water, drying and packaging.

  Use sterile water for humidifiers and nebulisers and for rinsing and dispense it aseptically. No topping up of sterile water when respiratory equipment is in use. Periodically, drain and discard any condensate that collects in the tubing of respiratory equipment.
- Change nasal prongs and masks when visibly soiled or malfunctioning.
- For small volume medication nebulizers, in between treatment for the individual patient, clean, disinfect, rinse with sterile water if needed and dry. Wherever possible, use aerosolised medications in single dose vials. If multi-dose medication vials are used, follow manufacturer's instructions for handling, storing an dispensing the medications
- Resuscitator (air-viva) and intubation equipment- disconnect parts, rinse and pack for steam sterilisation. High level disinfection with chlorine based product can also be used, if possible.

7 Modifying host's risk for infection

7.1 Prevention of aspiration

- Discontinue the use of feeding tubes and respiratory tubes when not indicated.
- In the absence of medical contra-indications, place at risk patient in semi recumbent position i.e. propped up at 30-45 degrees

- Routine check of position of feeding tubes
- Withhold enteral feeding if the residual volume in the stomach is >100mls or if bowel sounds are not heard upon auscultation of the abdomen.
- Administer enteral nutrition intermittently in small boluses rather than continuously by using flexible, small-bore enteral tubes.
- Usually a Percutaneous Endoscopic Gastronomy (PEG) tube to maintain nutrition for patients with repeated episodes of pneumonia due to aspiration.

7.2 Reduction of oral–pharyngeal colonisation

- Develop and implement a comprehensive oral hygiene program
- Components include oral cavity assessments and attention to decay teeth and less than optimal oral health, daily or twice a day oral toilets and brushing of teeth with a fluoride toothpaste and brush
- Limit the use of gargle unless used for treatment of oral conditions.

7.3 Pneumococcal Vaccination

- If possible, establish a program for the administration of pneumococcal vaccination for persons at high risks for severe pneumococcal pneumonia.

8 Staff Education

All staff concerned must be educated regarding the risk factors, pathogenesis and infection control procedures of preventing and managing health care associated bacterial pneumonia. Other interventions are compliance and performance related using surveillance or performance improvement tools and techniques.

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(H) Urinary tract infections

Urinary tract infections are the most frequent infections; while most patients are asymptomatic, the prevalence rates of bacteriuria are 25% to 50%. Most of these infections may be related instrumentation of the urinary tract and prolonged catheter use. It is the top 10 causes of morbidity and mortality, being the 9th cause of deaths in Singapore in the last few years (Health Facts, Singapore 2008).

Signs & Symptoms

The risk of acquiring a urinary tract infection depends on the method and duration of catheterization, the quality of catheter care, and host susceptibility. Reported infection rates vary. Adoption of the closed method of urinary drainage has markedly reduced the risk of acquiring a catheter-associated infection. Recent studies have shown, over 20% of patients catheterized and maintained on closed drainage may be expected to become infected due to errors in maintaining sterile closed drainage, host factors like advanced age, debilitation, and the postpartum state

Catheter-associated urinary tract infections are generally assumed to be benign. In otherwise healthy patients, these are often asymptomatic and likely to resolve spontaneously with the removal of the catheter and voiding. Occasionally, infection persists and leads to complications like prostatitis, epididymitis, cystitis, pyelonephritis, and gram-negative bacteremia, a serious condition associated with significant mortality.

Infection Control measures

Standard Precautions apply. Other measures include:

1. Limit use of urinary catheter

   One of the most important infection control measures is to limit the use of urinary catheters to carefully selected patients, thereby reducing the size of the population at risk. Generally, urinary catheter should be inserted only when necessary and removed as soon as possible.

2 Review indications for catheterization. Catheterization should not be used as a means of obtaining urine for culture or certain diagnostic tests when the patient can voluntarily void or as a substitute for nursing care in the incontinent patient. Other methods of urinary drainage like the condom catheter drainage may be useful for incontinent male patients with an intact voiding reflex. Its use, however, requires meticulous nursing care to prevent local complications such as skin maceration or frequent manipulation by restless patients as this has been associated with an increased risk of urinary tract infection. For certain types of patients with bladder-emptying dysfunction, such as those with spinal cord injuries, intermittent catheterization is commonly employed. The "no-touch" method of intermittent catheterization conducted under aseptic conditions is performed in hospitalised patients. For patients with long term catheterization, a longer duration silicon catheter should be used. Such patients should be reviewed frequently by the home nurses.

3 Use aseptic technique and sterile sets to insert the urinary catheter with pre-disinfection and sterile draping of the urethra with 0.05% Chlorhexidine solution.

4 Set up and maintain a closed drainage system and maintaining an un obstructive and smooth flow of urine.

5 Clean hands with alcohol hand rub or soap and water after manipulating with the closed urinary catheterization

6 Keep drainage system closed and sterile.

For patients who require indwelling urethral catheterization, adherence to keeping a sterile continuous closed system of urinary drainage is the cornerstone of infection control. Technologies like urine sampling port and pre-connected catheter/collecting tube system, one way valves to prevent reflux have been introduced to lessen the risk of infections

Procedure to maintain closed drainage system

- Clean hands immediately before and after any manipulation of the catheter site and closed drainage apparatus.
- Position the drainage bag above the floor and below the level of the bladder.
- Ensure that the bag or outlet port does not get contaminated from the floor, clothing or measuring jug.
- Keep catheter site and collecting tube free from kinks.
- Perform daily meatal care with soap and water to prevent encrustation. Frequency of meatal should be determined by nursing assessment and examination on personal hygiene rounds.
- Empty the drainage bag when it is two-thirds full.
- Before emptying the drainage bag, swab the drainage port with a 70% alcohol swab before opening it, prior to closing it and after closing the drainage port. Drain urine into a sterile urinal.

7. Change catheter if there is poor function or obstruction, damage or leakage of parts in the closed system, accumulation of sediments or the bag becomes odorous. Re-insert under strict aseptic conditions.
8. Avoid irrigation. When obstruction occurs, remove catheter and re-insert if patient fails to void after catheter removal

9. Collect of urine specimen under septic condition.

10. Staff Education

- Educate all staff on the risk factors, pathogenesis and infection control procedures of preventing and managing catheter-associated UTI.

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(I) *Varicella zoster* virus

Varicella zoster virus (VZV) is one of eight herpes viruses known to infect humans (and other vertebrates). It commonly causes chicken-pox and both shingles and post-herpetic neuralgia in adults. Chickenpox is a common illness that causes an itchy rash and red spots or blisters (pox) all over the body. It is most common in children, but most people will get chickenpox at some point in their lives if they have not had the chickenpox vaccine.

Signs and symptoms

The first symptoms of chickenpox often are a fever, a headache, and a sore throat. The chickenpox rash usually appears about 1 or 2 days after the first symptoms start. A rash may appear without fever or other early symptoms.

Incubation period

The incubation period is usually 10 to 21 days after one is exposed to another person infected with chickenpox. After a chickenpox red spot appears, it usually takes about 1 or 2 days for the spot to go through all its stages. This includes blistering, bursting, drying, and crusting over. New red spots will appear every day for up to 5 to 7 days.

Route of transmission

Chickenpox is transmitted via airborne route or contact with fluid from a chickenpox blister. A person who has chickenpox can spread the virus even before he or she has any symptoms. Chickenpox is most easily spread from 2 to 3 days before the rash appears until all the blisters have crusted over.

Infection Control measures

Air borne Infection Precautions are to be adopted:

- Isolate patient.
- Wear protective personal equipment i.e. N95 mask
- Designate an immune staff in care of patient.

- Hand hygiene and general hygiene measure.

Administer immune globulin (VZIG) if a contact becomes ill within the incubation period of the disease (e.g. up to 21 days after the last exposure) with even a trivial cold or fever, then they should not.

Non-immune staff should not nurse these patients, but if in contact with these diseases must not transfer to other wards or nurse immunosuppressed patients during the incubation period.

Adequate general hygiene measures are important. Bathing, astringent soaks, and closely cropped fingernails to avoid scratching of the pruritic lesions. Vaccination of healthy, elderly, susceptible patients may reduce the incidence of zoster and subsequent complications in these patients

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(J) Herpes zoster

Shingles (herpes zoster) is a viral infection of the nerve roots. It causes pain and often causes a rash on one side of the body, the left or right. The rash appears in a band, a strip, or a small area. Shingles is most common in older adults and people who have weak immune systems because of stress, injury, certain medicines, or other reasons.

Shingles occurs following a latent infection of *varicella zoster*. In some people, it stays dormant forever.

Signs and symptoms

Shingles symptoms happen in stages. Headache or photophobia may be an early symptom. Itching, tingling, or pain in a certain area may next occur to progress on to a band, strip, or small area of rash a few days later. The rash turns into clusters of blisters. The blisters fill with fluid and then crust over. It takes 2 to 4 weeks for the blisters to heal, and they may leave scars. Some people only get a mild rash, and some do not get a rash at all.

Treatment

Antiviral medicines, sometimes given with steroid medicines, may be given to alleviate pain. Medicines to help alleviate long-term pain include antidepressants, pain medicines, and skin creams.

Incubation period

Incubation period is usually 14-16 days; some cases occur as early as 10 or as late as 21 days after exposure. An individual is most contagious 1-2 days before the onset of the rash.

Route of transmission

The zoster virus is transmitted by the airborne route and from person-to-person by direct contact with skin lesions.

Infection Control measures

It is best to isolate the patient using Airborne Precautions. Contact Precautions also apply until all lesions have dried and are crusted over.

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Infectious disease outbreak

An infectious disease outbreak can be defined as “two or more linked cases of the same illness or when the number of cases of the same illness unaccountably exceeds the expected number.”

Outbreaks of infectious disease may occur in ILTCs. Their importance depends on several factors: -

a. severity of the disease
b. number of residents affected
c. mode of mode of spread
d. amount of anxiety they generate in parents and staff
e. if any specific action is necessary to stop further cases (e.g. immunisation, improving food-handling practices).

Prevention

Prevention may be considered in three areas, aiming at:

a. the outbreak source
b. contaminated vehicles of infection mode of spread
c. susceptible human

Choice of control measure within these three areas is dictated by factors such as whether the outbreak source is known, whether a suspected vehicle has been identified, and whether a vaccine or prophylactic treatment is available for susceptible humans.

Infectious disease prevention includes:

1. Requiring certain immunizations

ILTCs should keep an updated staff and resident’s immunisation record**.** Some infections, however, cannot be prevented by immunisation and limiting their spread in the

community is dependent on a combination of isolating the infectious source as well as improving personal hygiene practices, where appropriate.

2. Identifying residents who have communicable diseases

If an outbreak is suspected, the Ministry of Health should be notified. It is helpful for the initial assessment of the situation if the following can be established:

a. What are the symptoms?
b. When did each resident fall ill i.e. when did symptoms first start?
c. How residents are ill?
d. Which group of residents i.e. are the residents from the same ward?
e. What type of food did the residents eat i.e. they have taken same type of food? (for situations when the residents develop food poisoning symptoms such as diarrhoea and/or vomiting)

Prevention of spread

a. It is the responsibility of the supervisor of the ILTCs to ensure that if any staff or person engaged in food preparation or rendering services to the ILTC is suffering from an infectious disease, he/she should be excluded from the centre until well and displaying no symptoms.

b. Disseminate messages about preventive hygiene - including effective hand washing and the importance of covering the mouth during coughs and sneezes - by using posters and educational talks to outline recommended procedures for staff, residents and visitors.

c. ILTCs should clean and sanitize frequently-touched surfaces (e.g. door knobs, switches, computer keyboards,) routinely and if they become visibly soiled.

d. Conduct training for staff and food service staff about infectious diseases, their symptoms and treatments, and how to prevent and control outbreaks

Surveillance

1. Establish processes and procedures (a “surveillance system”) e.g. monitoring absentee rates for staff.

2. Early recognition of disease outbreaks is necessary to implement effective control methods. Clusters of illness (such as two or more people ill with similar symptoms closely grouped in terms of time and place) should be reported.

Notification

If an outbreak of two or more cases of infectious diseases occurs, the Ministry of Health is to be immediately notified under the Infectious Diseases Act (Cap 137). Please refer to the MOH website for instructions on notification (http://www.moh.gov.sg/).

Cleaning and Disinfection

Routine cleaning and disinfectant of the healthcare environmental surfaces is one of the most critical interventions that can be routinely performed to decrease the risk for cross transmission and development of HAIs. To maximize the efficacy of the chosen disinfectant product, thorough cleaning must be carried out before using disinfectant.

It is important to select disinfectant that efficacy claims proven for its intended use. Thorough cleaning and disinfection program combined with careful selection of the most appropriate healthcare grade disinfectant.

Respiratory droplets and direct contact appear to be the most common forms of transmission of infectious diseases. Aerosol spread cannot be ruled out and transmission by fomites and environment contamination is possible. Maintaining a clean environment can interrupt transmission of infectious diseases. Cleaning guidelines should be made known to all relevant staff in ILTC facilities. Relevant sections should be made known to contractors e.g. kitchen, laundry, cleaning and maintenance contractors. All contractors should have a copy of the guidelines.

1. Cleaning Principles

1.1. Cleaning is important to reduce the level of contamination on all surfaces.

1.2. All surfaces must be dried after they have been cleaned and rinsed, as damp surfaces attract contaminants.

2. Cleaning Procedures

2.1. Use of personal protective equipment (PPE)

2.1.1. Gloves should always be worn when cleaning.

2.1.2. Disposable gloves should not be reused or washed.

2.2. Proper hand hygiene must be carried out after cleaning procedures. If hand washing with soap and water is not possible immediately, an alcohol based hand gel/solution (at least 70%) may be used as an alternative.

2.3. Infectious Disease Cases – Procedures

2.3.1. Appropriate PPE is to be worn. Cleaning staff should be fully instructed on how to wear and dispose of PPE and how to minimize the risk of transmission of infection while cleaning.

2.3.2. 1% sodium hypochlorite solution (diluted bleach) should be used on surfaces after general cleaning procedures for environmental disinfection.

2.4. Floors and floor coverings

2.4.1. Carpets are to be avoided, if possible. Carpets or rugs/mats, if present, should be vacuumed using a cleaner that does not throw dust into the air or steam cleaned if soiled by bodily fluids.

Waste management

Handling and Disposing of Infectious Waste

Appropriate handling and disposal of potentially infectious waste is important in preventing or minimising the spread of infection, illness and disease. When cleaning and disposing of potentially infectious waste such as blood or body fluids, or items contaminated with bloodstained items or soiled clothing, the following steps should be taken:

- Wear disposable gloves, and a plastic apron if necessary.
- For blood and body fluid spills, absorb the bulk of the spill with disposable materials such as paper towels. Special care should be taken if waste contains sharp material such as broken glass. Sharp material should be picked up with sturdy tongs, and put into a puncture-resistant rigid-walled container such as a sharps container.
- Clean the spill with water and detergent.
- After cleaning, disinfect the area with a freshly prepared solution of 10,000 ppm sodium hypochlorite and leave to dry. For small spills (e.g. spots of blood) an alcohol wipe may be sufficient
- Clean cleaning equipment such as mops and buckets with warm water and detergent and store dry.
- Remove and dispose of gloves and other waste such as paper towels into a sealable plastic bag (see Appendix C). Clean hands with alcohol hand rub or wash hands thoroughly with soap, water and dry with paper towels (see Appendix A).
- If the spill is on carpet, clean with a neutral detergent and arrange for the carpet to be cleaned with an industrial cleaner as soon as possible.
- Granular formulations that produce high available chlorine concentrations can be used to contain the spill and prevent airborne contaminants. Cleaning supervisors may assist in recommending products that are available from chemical suppliers.

- Sharps should be disposed off immediately after use into sharps disposal boxes. No attempt should be made to recap, break or bend the needle as this is a common cause of injury.
- If a needle-stick or other injury involving exposure to blood or body fluids occurs during handling and disposal of potentially infectious waste, the person should be medically assessed as soon as possible.

Kitchen

1. National Environment Agency (NEA) Regulatory Requirements for Food Handlers

1.1. All food handlers are to undergo typhoid inoculation once every 3 years

1.2. A pulmonary tuberculosis screening by taking chest X-ray once every 3 years is recommended for those over 45 years old

1.3. Attended and passed Work Development Agency's Food Hygiene Course

2. NEA definition of Food Handler

2.1. A food handler refers to any person who handles and prepares food and beverage. Chefs, sous chefs, cooks and kitchen assistants are considered as food handlers as they are primarily involved in food preparation.

2.2. Waiters, dishwashers, cleaners and other service staff are generally not considered as food handlers as they are primarily involved in the serving of food and beverage. However, they will be considered as food handlers if they are also involved in the handling and preparation of food and beverage. This may include the washing and cutting of raw fruit, vegetable and meat, processing of ready to eat food (in raw or cooked form), preparation of sauces, spices and condiments, mixing of beverage drinks and any other forms of food and beverage handling and preparation.

3. Personal hygiene

3.1. Wash hands thoroughly with soap and water:

3.1.1. before handling any food items or utensils

3.1.2. before and after preparing food, especially raw meat, poultry and seafood

3.1.3. before handling cooked or ready to eat food

3.1.4. after using the toilet

3.1.5. after touching rubbish bins

4. Avoid Cross-Contamination

4.1. During Storage

4.1.1. Store raw food separately from ready-to-eat food

4.1.2. Place packages of raw meat, poultry or fish in plates before refrigerating and place at the bottom shelf of the fridge so that the juices would not drip onto other food. Do not use plates that are used to hold raw meat, fish or poultry to place cooked food.

4.1.3. Store fresh fruit and vegetable in clean plastic bags when not in use and away from raw meat or seafood products in the fridge.

4.1.4. Keep food covered and elevated from the floor during storage and handling.

4.1.5. Place food that are likely to spill in suitably covered trays or containers and place them in the lower part of the fridge

4.2. During Food Preparation

4.2.1. Pay attention to personal hygiene during food preparation

a) Keep hands clean by washing hands thoroughly with soap including finger tips before, during intervals and after food preparation, changing tasks and returning from breaks

b) It is essential that jewellery worn in hands such as rings be removed before preparation of food as they may harbour food poisoning organisms

c) Avoid touching face, skin and hair or wiping hands on cleaning cloth

d) Cuts should be covered with waterproof bandages

e) Food handlers who are sick or have a skin infection should not be allowed to prepare food for others

4.2.2. Use separate utensils for preparing raw food and cooked/read-to-eat food

a) Use different plates for raw food and cooked/ready-to-eat food. Never use the same plate without washing it thoroughly before use. Do not put raw

vegetables on a plate that has previously held raw meat, poultry or seafood until it has been thoroughly washed.

b) Use separate cutting boards and knives for cutting raw meat/seafood and for slicing cooked or ready-to-eat food. Replace cutting boards that have become excessively worn out or developed hard-to-clean grooves

4.2.3. Wash and sanitise all equipment and utensils that come into contact with food with water and soap between tasks and handling raw and read-to-eat food.

a) After preparing raw food in a food processor, clean the parts of the equipment thoroughly.

b) Keep all work surfaces clean between each task to remove all food scraps, crumbs spillage or spots that serve as potential reservoir of bacteria

c) Discard food that has dropped on the tabletop or on the floor

d) Regularly change, wash and sanitise cloths used for wiping tables or equipment. Never use cloths for cleaning dirty areas to clean anything that may come into contact with food.

e) Do not recycle used food packaging and paper bags for storage of food

4.2.4. Cleaning Food

a) Wash fresh fruit and vegetables thoroughly to remove soil and residue.

b) Clean raw meat and seafood before cooking or storing to remove dirt and other contaminants.

4.3. When Serving Food

4.3.1. Always use different serving containers and serving spoons for raw and cooked food.

4.3.2. Use shouldow containers and leave sufficient air space around the food to provide rapid and even cooling. Cooked food stored in large, deep containers remains warm for a longer time. Dangerous bacteria may grow in the warm spots which can lead to food poisoning if consumed.

4.3.3. Never place cooked food in a container that has been used to hold raw food

4.3.4. Cooked food intended for consumption later should be separated from food to be served as soon as it is cooked.

4.4. When Storing Leftovers

4.4.1. Refrigerate or freeze leftovers within 2 hours in clean, shouldow, covered containers to prevent harmful bacteria from multiplying. When in doubt, discard leftovers

4.4.2. Do not keep cooked food for more than 4 days. Label and date food before storing them. If there is any doubt about the safety of the food, throw it out.

5. Cooking Food

5.1. Cook food thoroughly, especially meat, poultry, eggs and seafood. Cook at high temperatures (above 75°C).

5.2. Ensure that the centres of meat and poultry are well cooked as partially cooked food increases the risk of bacterial growth

5.3. Bring food like stews, soups and curries to boiling temperatures when cooking

6. Keep Food Safe

6.1. When it comes to food, there are two temperatures to keep in mind always – keep hot food above 60°C and cold food below 5°C. As a general guide, keep hot food hot and cold food cold, as bacteria multiply quickly in the temperature danger zone of between 5°C and 60°C.

6.2. Do not serve cooked food standing at room temperature for more than 2 hours

6.3. Reheat stored cooked food at temperatures above 75°C or bring them to boil to kill bacteria.

6.4. Portion out excess cooked food immediately after cooking and refrigerate quickly

6.5. Keep cold food in refrigerator or on a bed of ice until it is time to serve

6.6. Do not thaw food at room temperature. Defrost food overnight in the fridge or use the microwave oven. When defrosting meat in the fridge, place the meat in containers or trays to prevent the meat juices from contaminating other food.

6.7. Do not leave chilled or thawed meat at room temperature for more than 2 hours as bacteria will rapidly multiply. Chilled and thawed mat should be placed in the fridge if not cooked immediately.

6.8. Do not refreeze meat that has been completely thawed.

6.9. Do not marinate food at room temperature on the kitchen counter. Marinate food safely in a covered bowl in the fridge.

6.10. Inspect dried and preserved food regularly for insect infestations, mouldiness and other signs of spoilage. Discard where necessary.

7. Food Utensils

7.1. Clean all utensils (including cutting boards and knives) and kitchen surfaces and countertops with detergent and hot water and dry them thoroughly.

7.2. Cutting boards in particular are prone to harbouring bacteria. Use a brush to scrub off the stubborn food and dirt particles. Sanitise plastic cutting boards with chlorine or bleach solution.

7.3. Wash dishcloths and tea towels frequently and dry them thoroughly. Damp dishcloths and tea towels harbour bacteria. Frequently change tea towels or dishcloths that come into contact with plates and utensils. After using them, dry them quickly to prevent germs from breeding.

7.4. Disinfect kitchen sponges in chlorine solution. Kitchen sponges can harbour millions of bacteria.

7.5. Clean all kitchen surfaces and countertops with detergent and hot water. Do not let food residue dry on kitchen surfaces and utensils.

7.6. Keep cutting boards, utensils, cleaning cloths, sinks and countertops clean and dry to prevent accumulation of dirt and harbouring of bacteria.

8. Kitchen Waste

8.1. Place all kitchen waste in bags or covered bins and dispose of them frequently. Kitchen waste attracts insects and rodents which can carry microbial flora.

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Laundry

1. **Furnishings** in a room that may need laundering include items such as curtains, drapes, screens; lampshades and furniture items (e.g. cushion covers). Curtains and drapes and screens should be washed or steamed cleaned if contaminated.

2. **When linen laundering is needed for a room where a patient with an infectious disease has been:**
   2.1. Appropriate PPE should be worn before removing linen
   2.2. Heavily contaminated linen should be placed in separate leak-proof container with lid for transport into the laundry
   2.3. Linen should not be sorted, shaken or excessively handled. To avoid the generation of contaminated aerosols, linen should not be tossed or thrown, but placed gently into coded laundry bags and washing machines.

3. **Laundry**
   3.1. ILTCs who have outsourced their laundry services should liaise with their contractors on precautionary measures with regard to handling of laundry. Institutions doing their own laundry should observe the guidelines below.
   3.2. Laundries should be cleaned with detergent and warm water at least daily and should involve the cleaning of all surfaces and all laundry machinery including washers, dryers and ironing presses.
   3.3. Linen (sheets, cotton blankets) should be washed in hot water (70 - 80°C) and detergent, rinsed and dried preferably in a dryer or in the sun.
   3.4. Linen should be ironed at high temperature (60°C).
   3.5. Blankets should be washed in warm water and dried in the sun, in dryers at cool temperature or dry cleaned.

3.6. Quilts can be dry cleaned or where appropriate washed in hot water (70°C) and detergent, rinsed and dried preferably in a dryer or in the sun.

4. Bedding

4.1. Mattresses and pillows with plastic covers can be wiped over as for surface cleaning

4.2. Mattresses without plastic covers may be steam cleaned if contaminated with bodily fluids.

4.3. Pillows can be either washed using the standard laundering procedure described above or dry cleaned if contaminated with bodily fluids.

Table 1 Cleaning regime

Item	Frequency	Method
Clothes	Daily	1. Wash clothes with detergent in warm water
Bed sheets and pillow cases	Weekly or when stained	1. Wash with detergent in hot water (70 - 80°C) and dry preferably in a dryer or in the sun 2. Iron at high temperature (60°C)
Cotton Blankets	Monthly or when stained	1. Wash with detergent in hot water (70 - 80°C) and dry preferably in a dryer or in the sun 2. Iron at high temperature (60°C)
Woollen Blankets	Monthly or when stained	Dry clean or wash with detergent in warm water and dry in the sun or in a dryer at cool temperature.
Quilts	Monthly or when stained	Dry clean or wash with detergent in hot water (70°C) and dry in drier or in the sun

Item	Frequency	Method
Mattresses and pillows	Quarterly or when stained or after each infection or when resident has been identified with Scabies	1. With plastic covers – wipe over as for surface cleaning 2. Without plastic covers – steam clean
Window curtains, bedside screens	Quarterly or when stained	1. Wash with detergent in hot water (70 - 80°C) and dry preferably in a dryer or in the sun 2. Iron at high temperature (60°C)
Linen used by patients with infectious disease	After each episode of infection or weekly	1. Use appropriate PPE 2. Place heavily contaminated linen in separate leak-proof container with lid for transport to the laundry 3. Do not sort, shake or excessively handle linen. Do not toss or throw linen but place them gently into coded laundry bags and washing machines

Staff Welfare: Immunization and exposure management

The differences between hospitals and most long term care facilities include living conditions which are congregated in most long term care facilities. A such, there would be an increased risk of exposure to residents with certain infectious diseases such as herpes zoster, scabies, conjunctivitis, influenza, TB, and viral gastroenteritis.

A baseline health assessment for all new employees should include immunization status and history of relevant past or present infectious diseases. The past history of infectious disease should address diseases such as protection from chicken pox, hepatitis, skin boils, and bacteria diarrhoea.

An essential part of successful staff health programs is ensuring that hospital staffs are immune to vaccine-preventable diseases. A comprehensive staff immunization program is far more cost-effective than case management and outbreak control. To ensure susceptible staffs are vaccinated, the immunization programs should be mandatory for newly employed staff and existing staff rather than voluntarily.

Chickenpox:

Anyone who is not fully vaccinated, and never had chickenpox, should receive one or two doses of chickenpox vaccine. The timing of these doses depends on the person's age. Chickenpox vaccine may be given at the same time as other vaccines.

Hepatitis

Hepatitis B vaccine should be offered to healthcare workers who have a reasonable expectation of being exposed to blood on the job. This excludes staff who would not be expected to have occupational risk, such as receptionists, billing staff, and general office

workers. Substantial evidence suggests that adults who respond to hepatitis B vaccination (anti-HBs of at least 10 mIU/mL) are protected from chronic HBV infection for as long as 23 years, even if there is no detectable anti-HBs currently. Only immunocompromised persons (e.g., hemodialysis patients, some HIV-positive persons) need to have anti-HBs testing and booster doses of vaccine to maintain their protective anti-HBs concentrations of at least 10 mIU/mL. For persons whose immune status is normal, periodic serologic testing to assess anti-HBs concentrations is not necessary. Persons who perform invasive procedures should be treated no differently from other HCWs with respect to anti-HBs testing. Immunoprophylaxis should be considered if a HCW has an exposure (e.g. needlestick).

Table 1 Post-Exposure Prophylaxis (PEP) against Hepatitis B for HCW Exposed to Blood and / Body Fluids

Immune Status of HCW	Source Patient HBsAg (+)	Source Patient HBsAg (-)	Source not tested or unknown
Unvaccinated	One dose HBIG and start one series of HB vaccination	Start HB vaccine series	Start HB vaccine series
Previously Vaccinated - Known responder (anti-HBs ≥ 10 mIU/ml	No treatment	No treatment	
Known non-responder	One does HBIG and start one series of HB vaccine	No treatment	If known high risk source, treat as if source were HBsAg (+)
Antibody response unknown	Check anti-HBs; if ≥ 10 mIU/ml, one dose HBIG and vaccine booster	No treatment	Check anti-HBs: if ≥ 10mIU/ml, one dose HBIG and vaccine booster

Abbreviation: HBIG – Hepatitis B immunoglobulin HB – Hepatitis B
HCW – Health Care Worker HBsAg – Hepatitis B surface antigen

Influenza

Annual vaccination with seasonal flu vaccine is recommended.

Tuberculosis

Tuberculosis (TB) has caused extensive outbreaks in ILTCs, generally traced to a single ambulatory resident. Large numbers of staff and residents may be involved. Screening for Tuberculosis during employment may include annual TB symptom questionnaire, Mantoux Test and / or Chest X-Rays. Exclusion from duty is indicated in personnel with active pulmonary or laryngeal TB until they are non-infectious. There should be documentation to indicate the personnel are not infectious before they are allowed to return to duty. The following evidence should be included in the documentation:

1. Adequate therapy has been received;
2. The cough has resolved;
3. Results of AFB smears collected on different days are negative.

In an ILTC that does not have a negative-pressure room; residents with suspected active TB should be transferred to an appropriate acute-care facility for evaluation. There should be a referral agreement with that facility. The following measures will give some protection for staff from TB infection:

- Provide all staff and volunteers with up-to-date information about the risks of contracting TB and how to protect themselves from infection. They must be aware of all TB symptoms and seek advice from health facilities if symptoms develop;
- Ensure that proper hygiene techniques are in place such as washing hands with appropriate disinfectant or alcohol rub after touching a patient. Wear gloves when handling objects contaminated by sputum.
- Ensure that all rooms where people with TB sleep have plenty of sunlight and good ventilation. Ultraviolet radiation kills TB bacteria while ventilation removes the

infected particles from the air. Patients should be encouraged to cover their mouths when coughing

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Components of an Infection Control program in ILTC

Structure and Components

Infection control program for ILTCs have evolved over the years, since then the structure and components of an effective program are usually drawn from regulatory requirements, existing practices in the nursing homes, and base on extrapolation from hospital programs. Infection Control programs (Table 1) should include basic surveillance for infections, an epidemic control program, policies and procedures formation and review, education of employees in infection control methods, an employee health program, a nursing residents health program (e.g. immunization), and monitoring of resident care practices. In addition, other aspects of the program should also include quality improvement, patient safety, environmental review, antibiotic monitoring, product assay and evaluation, preparedness planning, and reporting of diseases to the Ministry of Health.

The Infection Control Personnel/Nurse (ICN)

An ICN is an essential component of an effective infection control program and is the person designated by the facility to be responsible for infection control (refer Table 1 for structure of IC program). The ICN is usually a staff with nursing background which will be necessary for assessment and chart review of the residents. He/she is a registered nurse and in most ILTC, owing to the size and staffing limitations, ICN has other duties, such as assistant director of nursing, charge nurse, in-service coordinator, employee health, or performance improvement. The number of ILTC beds justifying a full-time ICN depends on the acuity level of residents and the level of care provided, where possible a ILTC with more than 250 to 300 beds may need a fulltime ICN. The ILTC ICN, like the acute care hospital,

requires specific training in infection control; well-defined support from administration; and the ability to interact tactfully with personnel, physicians, and residents. In addition to the professional nursing qualifications, other criteria required for the ICN include:

- knowledge and experience in areas of resident care practices, microbiology, asepsis, disinfection/sterilization, infectious diseases, communication, program administration, and epidemiology;
- ICN is a registered nurse
- Undergone a basic infection control training course
- Maintains current knowledge and skills in the area of infection prevention, control, and epidemiology for his/her professional development.

Elements and Structure of Infection Control in ILTCs

Refer to Tables 1 and 2.

Table 1. ILTC Infection Control Program

Elements	**Examples**
Infection control activities- Establish and implement routine infection control policies and procedures	Hand hygiene Standard precautions Organism-specific isolation Employee education
Infection identification	Develop case definitions Establish endemic rates Establish outbreak thresholds
Outbreak Management	Identification, investigation, and control of outbreaks
Organism-specific infection control policies and procedures	Influenza, TB, Scabies, MDROs (eg, MRSA)
Disease reporting	Public health authorities (MOH) ILTCs' senior management and staff
Antibiotic stewardship	Review of antimicrobial use
Monitoring of patient care practices	Aspiration precautions

Elements	Examples
	Pressure ulcer prevention Invasive device care and use
Facility management issues	General maintenance Plumbing/ventilation Food preparation/storage Laundry collection/cleaning Infectious waste collection/disposal Environment Housekeeping/cleaning Disinfection/sanitation Equipment cleaning
Product evaluation	Single use devices
Resident (patient) health program	TB screening Immunization program (e.g influenza)
Employee health program TB screening	TB screening Immunizations (Hep B, influenza) Occupational exposures
Other program elements: Quality improvement (QI)	Serve on QI committee
Preparedness planning	Develop pandemic influenza preparedness plan

Table 2. ILTCInfection Control Program: Structure

Infection Control Committee (ICC)		
Leadership	**Expertise/training**	**Role(s)**
Core members	Administration, Nursing Representative, Medical Director, ICN	Identifies areas of risk
Ad hoc members	Food Service, Maintenance, Housekeeping, Laundry Services, Clinical Services, Resident Activities (Physio, Occupational Health Representative) Employee Health (Human Resource)	Establishes priorities Plans, strategies to achieve goals Implements plans Develops policies/procedures Allocates of resources Assesses program efficiency at least annually
Infection Control Doctor Infection Control Nurse (ICN)	Qualification via education, experience, and local credentials	Surveillance Data collection and analysis Implementation of policies, procedures Education Reporting to ICC Communication to public health

		Communication to other agencies Communication to other facilities

The Infection Control Committee (ICC)

The committee oversees infection prevention and control issues in the ILTCs, because of the limitation in the physician availability a small working group consisting of the ICN, the administrator, the medical director, and the nursing supervisor or their designee may efficiently make most of the infection control decisions (Table 2). The ICC functions may be combined with the quality improvement or patient safety programs, with infection control identified as a distinct program. The group should meet at least six monthly to review infection control data, review policies, and monitor program goals and activities. Documentation and written records of these meetings should be kept and readily available for inspection by the accreditation authorities.

Surveillance

Infection surveillance in the ILTCs involves the systematic collection, consolidation, and analysis of data on healthcare associated infections (HAIs). Standardization of surveillance is ideal and to facilitate standardization, resources that include practice guidance for surveillance the following recommended steps are as follows:

1) assess the residential/nursing home population

2) select the outcome or process for surveillance

3) use surveillance definitions (CDC, NHSN)

4) collect surveillance data

5) calculate and analyzing infection rates

6) apply risk stratification methodology

7) report and apply surveillance information

1) Assessing the population

Infection surveillance may either include all residents/patients in a facility (total house surveillance) or be targeted at specific subpopulations. Although facility wide surveillance is useful for calculating baseline rates and detecting outbreaks, however a more focused analysis could include examination of infection rates in residents who are at risk for specific infections (such as aspiration pneumonia in residents receiving tube feedings or urinary tract infections).

2) Selecting the outcome measures

Generally, surveillance in the ILTC refers to collection of data on outcome measures such as HAIs that occur within the institution (e.g., incidence of UTI or aspiration pneumonia). These surveillance data could be used primarily to guide activities, plan educational programs, and detect epidemics. Additionally process measures (e.g. surveillance of infection control practices) could also be part of the infection control and quality improvement programs in identifying areas for improvement in practice and for monitoring compliance with regulatory aspects of the infection control program. Examples of process measures include observation of hand hygiene compliance, observation of correct catheter care technique, antibiotic utilization studies, and administration of hepatitis B immunization to all new employees.

3) Using surveillance definitions

Surveillance requires objective, valid definitions of infections. Definitions could be based on the National Healthcare Safety Network [NHSN]) definitions. In the ILTC, radiology and microbiology data are less available, and written physician notes and nursing assessments in the medical record usually are brief. Timely detection of HAI in the ILTC often depends on recognition of clues to infection by nurses and reporting of the findings.

4) Collecting surveillance data

ILTC surveillance could be incidence or prevalence studies. The surveillance process consists of collecting data on individual cases and determining whether or not a HAI is present by comparing collected data to standard written definitions (criteria) of infections. Surveillance should be done on a timely basis, probably at least weekly. The ICN, during her rounds may use house reports from nursing staff, chart reviews, laboratory or radiology reports, treatment reviews, antibiotic usage data, and clinical observations as sources of information.

5) Analysis and reporting of surveillance data

Analysis and calculation of infection rates provide the most accurate information. Rates are generally calculated by using 1000 resident- days as the denominator. The data could be done quarterly, and annually to detect trends and steer toward specific interventions such as education and control programs.

Outbreak Management

Outbreak management and control should be considered a high priority for ILTC. The ICN is required to monitor residents and staff for illnesses and clustering of cases of an infectious diseases and initiate control measures. Leading causes and examples are: influenza, or other respiratory viruses, viral gastroenteritis, scabies and conjunctivitis. The ICN may approach to investigate an outbreak by:

a) determining that an outbreak has occurred
b) developing a case definition
c) case finding
d) analysing the outbreak
e) formulating a hypothesis regarding mechanism of transmission
f) designating control measures
g) evaluating control measures

She may also refer to the available guide to investigation of outbreaks by CDC, SHEA publication.

Other Aspects of the Program

1) Policies and procedures

An important aspect of infection control programs is the development and updating of infection control policies and procedures, when necessary they should be reviewed on a scheduled basis.

2) Education

Basic training program on key infection control practices like surveillance using infection definitions, calculating infection rates play an important role in enhancing the educational needs of ILTC personnel. In addition education on basic hygiene, barrier precautions and hand hygiene to residents and families should be routinely directed and incorporated in the orientation program. A structured orientation program should be designed for all new employees and regular on going infection control education should include all staff especially those providing direct resident care.

3) Facility management

Environmental control in the facility is an important consideration. Routine environmental cultures are not cost-effective and do not usually generate information relevant to clinical infections. Proper selection of disinfectants and antiseptics with periodic environmental compliance rounds are recommended.

4) Waste management

Proper waste disposal is another important factor in the ILTC (See **Waste Management**).

5) Infectious Disease reporting

Another important function of the infection control program is infectious disease reporting to the public health authorities. The list of reportable diseases will be in accordance to the requirement indicated in Infectious Disease Act of Singapore.

6) Performance/Quality improvement/resident safety

The increased emphasis on quality indicators in health care is becoming evident in ILTC. A quality assessment and assurance committee may be required as many of the techniques used in infection prevention and control are applicable to Quality Improvement (QI), such as data collection, data analysis, and intervention.

7) Preparedness planning

The ICN will play a key role in ILTC preparedness planning. Currently the planning may be focused on pandemic influenza and the ILTC should be prepared for dealing with a variety of disaster scenarios. Issues to be considered include surge capacity, medication availability and rationing, stockpiling, staff shortages during an influenza pandemic, and communication with public health authorities.

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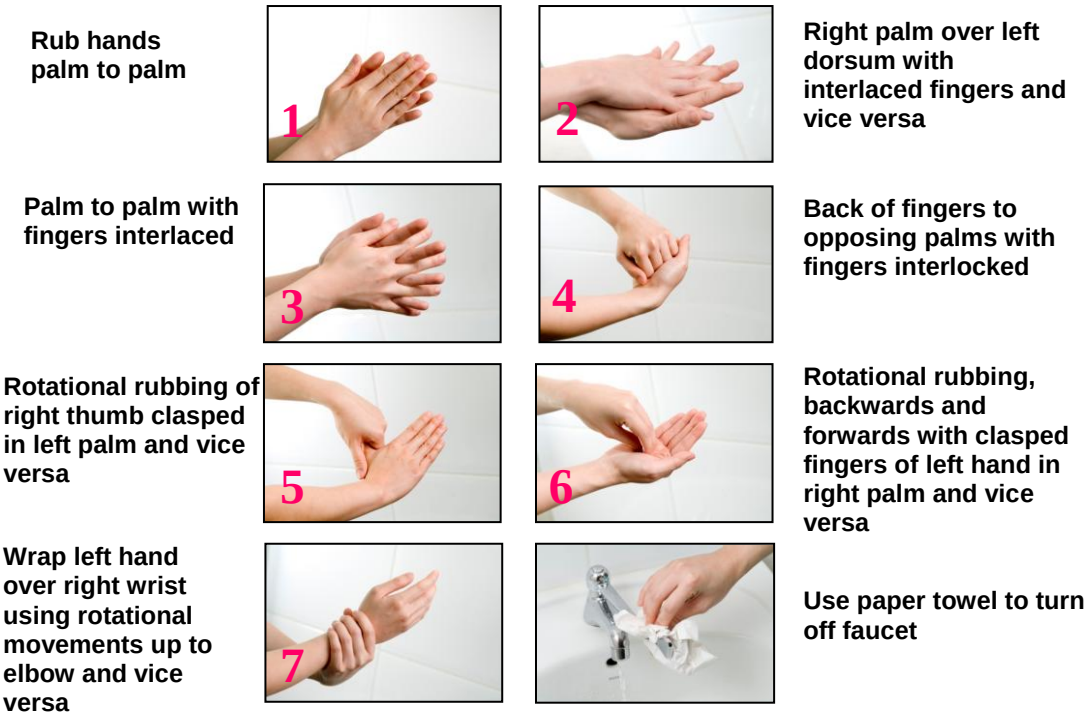
15 Beck-Sague C, Soto-Caceres V, Jarvis WR. Outbreak investigations (chapter 10). In: Lautenbach E, Woeltje KF, editors. *Practical handbook for healthcare epidemiologists.* 2nd ed. Thorofare, NJ: Slack; 2004 p. 373.

Appendix A

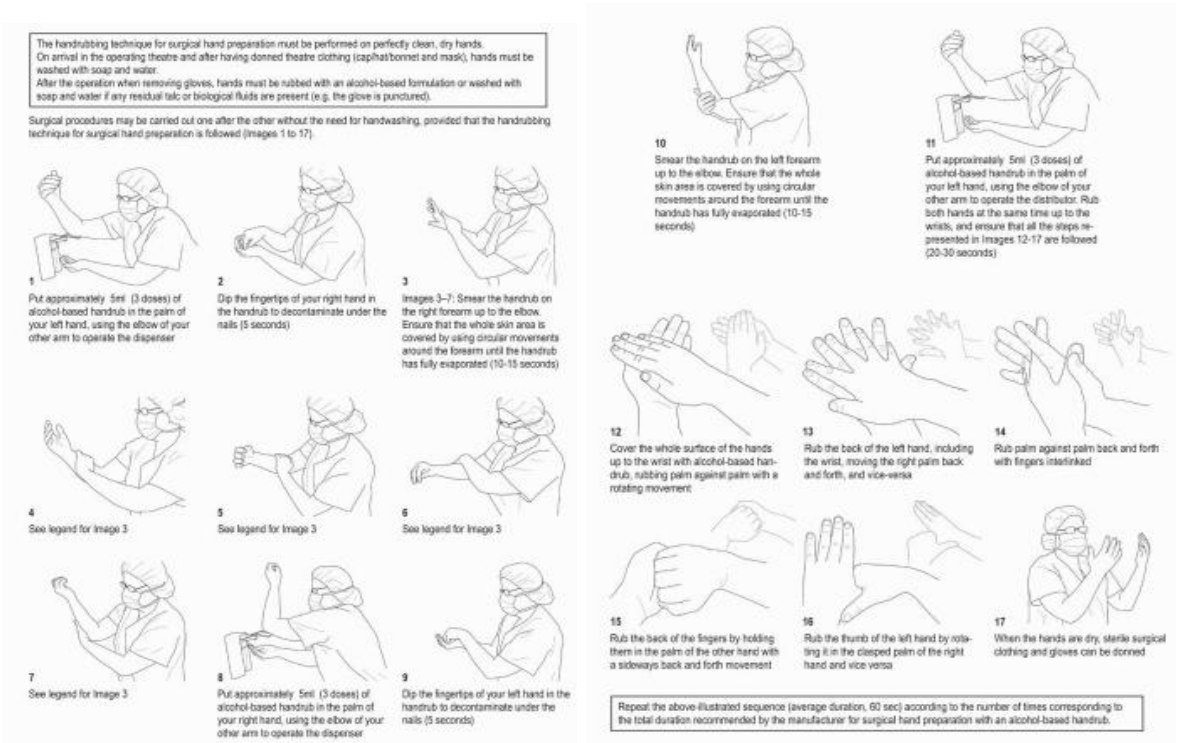
Hand hygiene



Source: Infection Control, SGH, used with permission

Appendix B

Surgical hand rub



Source: WHO Guidelines on Hand Hygiene in Healthcare

Appendix C

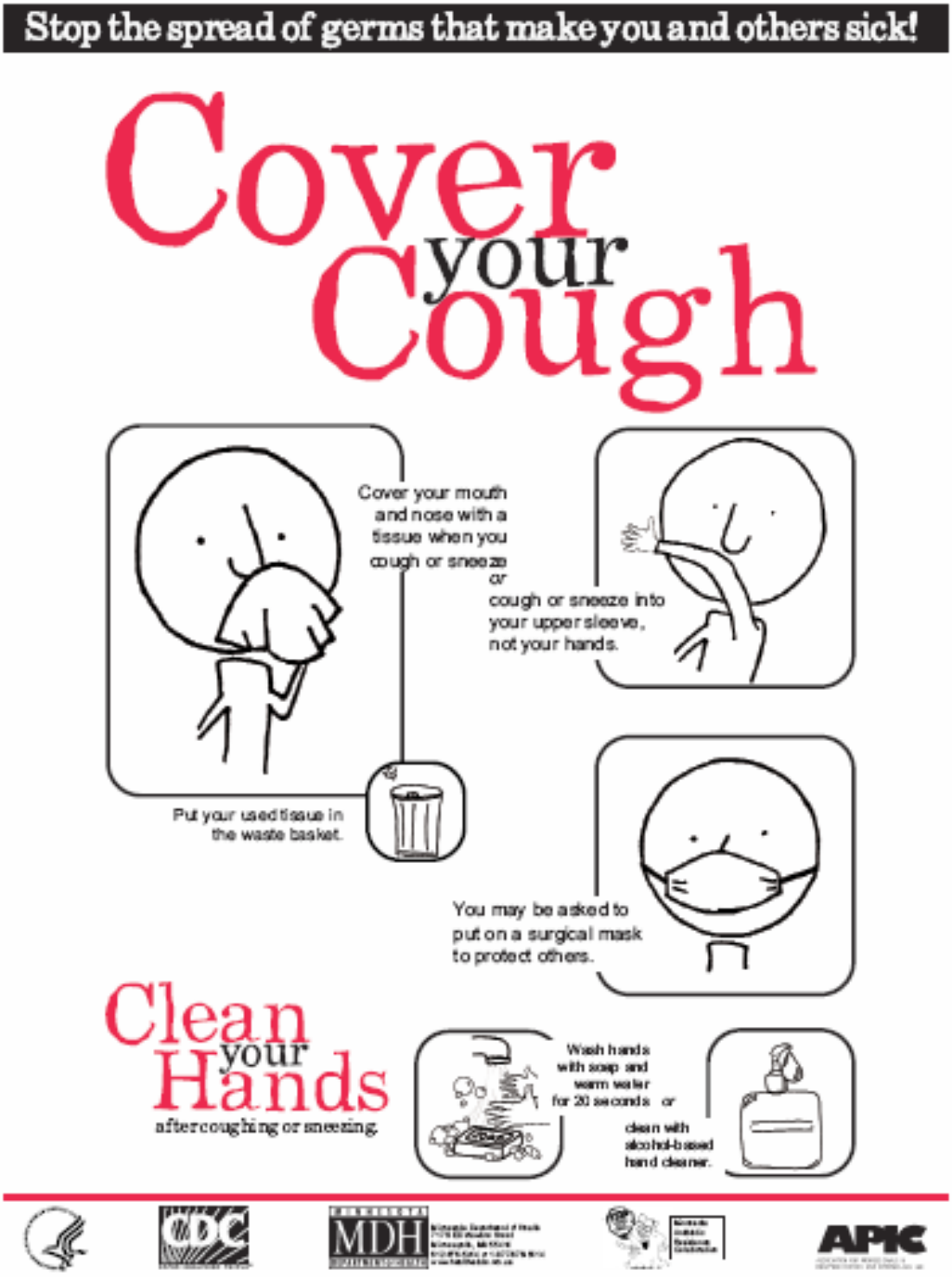
Putting on PPE

Removal of PPE

Source: Infection Control, SGH, used with permission

Appendix D

Respiratory Hygiene



Acknowledgment

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