Let’s Get Back To the Basics

Chain of Transmission - Routine Practices and Additional Precautions

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Outline:

• Chain of Transmission
• Hand Hygiene
• Routine Precautions & Additional Precautions
• Personal Protective Equipment (PPE)
• Donning and Doffing PPE
The Chain of Transmission
Or “How bugs move”

- Model used to understand the infectious process
- Each link represents a step in the transmission of infection
- Each link has to be present in order for an infection to occur
Infectious agents are any microorganisms that are capable of causing an infection.

Can be classified as:
- **Bacteria** – Staphylococcus, Enterococcus
- **Fungi** - Candida
- **Viruses** – Influenza, Norovirus
- **Parasites** – Scabies and head lice

Sources include:
- Humans
- Environment
- Animals
Reservoir: “Hiding Places”

• A reservoir is defined as any place an infectious agent lives and reproduces. These places can include:
  • **Humans** – Health care workers, residents, visitors
  • **Non-human reservoirs** – Contaminated water and food, dirt and soil, shared equipment, animals

Images source: Microsoft Clip Art
Portal of Exit: “way out”

- Portal of exit can be defined as the way the agent leaves the reservoir.

- This can be through:
  - Mouth and nose—coughing, sneezing
  - Wound drainage through non-intact skin
  - GI tract excretions—vomiting, diarrhea

Images source: Microsoft Clip Art

Image source: PHO
Mode of Transmission

How microorganisms “get around”

The mode of transmission is the method by which a microorganism travels. There are 6 modes of transmission:

1. **Contact Transmission** – Direct through touching or **Indirect** by contaminated objects coming into contact with others

2. **Droplet Transmission** – Occurs when large droplets leave a person’s respiratory tract. Droplets are projected a short distance (about 2 meters) and enter the host’s eyes, nose, mouth or fall onto surfaces
3. Airborne Transmission – Occurs when very tiny droplets (<5 microns) exit the respiratory tract. N95 fit-tested respirator should be worn when in the presence of the patient.

4. Parenteral Transmission – Spread through intact skin by sharp penetration. Examples include needle stick and a surgical incision.
5. **Common Vehicle** – Spread of an agent through a contaminated source. Examples include multi-dose vials, contaminated food or water.

6. **Vector** – Occurs when a host is bitten by an animal or insect carrying the infectious agent.
Portal of Entry

"way in"

• Portal of entry can be defined as the way the agent enters the host

• This can be through:
  • Non intact skin
  • Respiratory tract
  • GI tract
  • Mucous membranes
Susceptible Host

• A susceptible host can be any person who is at risk of an infection.

• Protection from acquiring an infection can be:
  • Intact skin and mucous membranes
  • Secretions such as tears, mucosal, and stomach acid
  • Immunization
• The person may not always develop symptoms or illness

• The following may occur:
  • **Infection/Disease** – if infected there will be microorganisms present with signs of infection. There are 2 types:
    • Localized – redness, heat, pain, swelling near site
    • Systemic – fever, chills, malaise. May be detected by blood cultures
  • **Colonization** – microorganisms might be present but the host shows no sign of infection. The host is capable of transmitting microorganisms when colonized
Breaking a Link in the Chain

Goal of infection prevention and control practices is to break a LINK in the chain of transmission to prevent the transfer of microorganisms.

You can break a link by using Routine Practices.
Routine Practices

- Minimum set of Infection Prevention And Control (IPAC) practices to prevent transmission of germs from patients/staff to patients/staff
- To be used with all patients for all care activities
- When used properly and consistently, routine practices can help prevent the spread of germs from patient-to-patient and patient-to-staff
Routine Practices

• Risk Assessment
• Hand Hygiene
• Barrier Equipment
• Environmental Controls
  • Placement, cleaning
• Engineering Controls
  • HVAC systems, preventative maintenance
• Administrative Controls
  • P&P, Education, Healthy Workplace Policies, Respiratory Etiquette, Monitoring of Compliance and Feedback
Routine Practices

Risk Assessment - Why is this necessary?

• First step in the effective use of Routine Practices
• Must be done before each interaction with a patient
• Assists the health care worker in determining which interventions are required to prevent transmission during interaction
• Must be incorporated into the culture and daily practice of each worker
Steps in Risk Assessment

• Each health care worker must identify the potential risks of each interaction with the patient

• 3 Things to be Considered:
  1. Will I be exposed to blood or body fluids, non-intact skin or soiled items/contaminated environment?
     
     If the answer is yes....
  2. What part of me will be exposed?
     • Hands, Arms, Face, Clothing?
  3. How do I protect myself?
     • Type of PPE and appropriate controls
• Hand hygiene is the most important and effective infection prevention and control measure in preventing the transmission of health care associated infections.

• Responsibility of all health care workers

• Gloves do **NOT** eliminate the need for hand hygiene
Background

Why perform Hand Hygiene?

*Because it's the right thing to do!*

- protect patients and providers
- reduce the spread of infections
- reduce costs associated with treating infections
- reduce hospital readmissions
- reduce wait times
- prevent deaths
Methods of Hand Hygiene

Two ways to clean hands:

Hand sanitizing with a 70-90% alcohol-based hand rub (ABHR) if hands NOT visibly soiled

Washing hands with soap and running water if visibly soiled
Alcohol-Based Hand Rub (ABHR)
“Preferred method when hands are not visibly soiled”

• More effective than washing hands that are not visibly soiled – even with antibacterial soap
• Less time consuming than washing hands with soap and water
• When visible soil is present and there is no available running water, use moistened towelettes followed by ABHR
• Should not be used with water as this will dilute the effectiveness of the alcohol
• Should not be used after washing hands with soap and water
• Should be readily accessible at point of care
Personal Protective Equipment

• **Mask/Respirator and Eye Protection** – protects eyes, nose, mouth during procedures and activities that may result in sprays or splashes of blood or body fluids

• **Gown** – wear a long sleeved gown if contamination of skin or clothing is anticipated

• **Gloves** – wear gloves when there is a risk of hand contact with blood or body fluids, non intact skin, mucous membranes or contaminated surfaces or objects
Considerations with Gloves

Gloves:

• Do not replace the need for hand hygiene
• Worn only when indicated
• Not to be used for care of multiple patients
• To be discarded after each procedure and hand hygiene performed
• Do not wash or reuse gloves
Donning PPE

1. Perform hand hygiene
2. Put on gown
3. Put on mask or N95 respirator
4. Put on eye protection
5. Put on gloves
Doffing PPE

1. Remove gloves
2. Remove gown
3. Perform hand hygiene
4. Remove eye protection
5. Remove mask or N95 respirator
6. Perform hand hygiene
Equipment and Environment

• All equipment being used by more than one patient must be cleaned in between uses

• All high-touch areas in the patient’s environment must be cleaned daily
Additional Precautions

- Additional Precautions are used in addition to Routine Practices
  - They are NEVER a substitute for Routine Practices

- Additional Precautions must be started immediately when an infectious disease is identified or suspected based on:
  - Diagnosis, symptoms, lab results and risk factors
• Identify patients who require precautions and place in single room where possible
• Gloves for all activities in room
• Gown for all activities where skin or clothes will contact patient or their environment
• Dedicated equipment if possible
• Clean and disinfect shared items
• Routine cleaning (except if VRE or *C. difficile* suspected)
• Communication of precautions
Droplet Precautions

• Patients should remain in their room/bed space, if possible with privacy curtain drawn
• Signage indicating droplet precautions is required
• Facial protection is required within 2 meters of patient (mask with eye protection)
• Dedicate equipment if possible
• Routine cleaning
• Examples of droplet infections include:
  • Pertussis, Meningitis
Combinations of additional precautions

• Infectious agents have a primary mode of transmission but may also have a secondary mode. Precautions used must then take into considerations both modes

• e.g. Droplet + Contact for Influenza
Airborne Precautions

• Require a single airborne (negative pressure) isolation room
• Signage indicating Airborne Precautions is required
• Fit tested, seal checked, N95 respirator must be worn for room entry

• Examples of airborne illnesses include:
  • Tuberculosis
  • Measles
  • Chicken Pox
On-line learning

Infectious Diseases

IPAC Core Competencies Online Learning Course

Infection Prevention and Control (IPAC) core competencies are basic knowledge and skills all health care workers in Ontario need to possess about infection prevention and control, regardless of their role or position, education, experience or culture.

Go to Course »

Environmental Cleaning Toolkit

This toolkit supports Environmental Services Managers and Infection Control Professionals to provide staff training in effective procedures for environmental cleaning. It is based on the Provincial Infectious Disease Advisory Committee’s (PIDAC) Best Practices document for Environmental Cleaning for Prevention and Control of Infections in all Health Care Settings.

Go to Toolkit »

Just Clean Your Hands (JCYH)

The JCYH program offers training videos to support the implementation of the JCYH program in hospitals and long-term care homes.

JCYH training videos for hospitals and long-term care homes are available by following the link below.

Go to Videos »

http://www.publichealthontario.ca/en/LearningAndDevelopment/OnlineLearning/InfectiousDiseases/Pages/default.aspx
In Closing.....

• If we all work together and follow recommended practices, the transmission of potentially harmful microorganisms will be minimized greatly!

Image source: Microsoft Clip Art
References

• PIDAC documents can be accessed at:
  http://www.publichealthontario.ca/en/BrowseByTopic/InfectiousDiseases/PIDAC/Pages/PIDAC_Documents.aspx

• Just Clean Your Hands Program: