
Preventing Future Outbreaks in Your Susceptible Host

AIPI

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Your Presenter

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Disclosure

Jim was employed by Diversey from 2015 - 2023. He received salary and expenses from them.

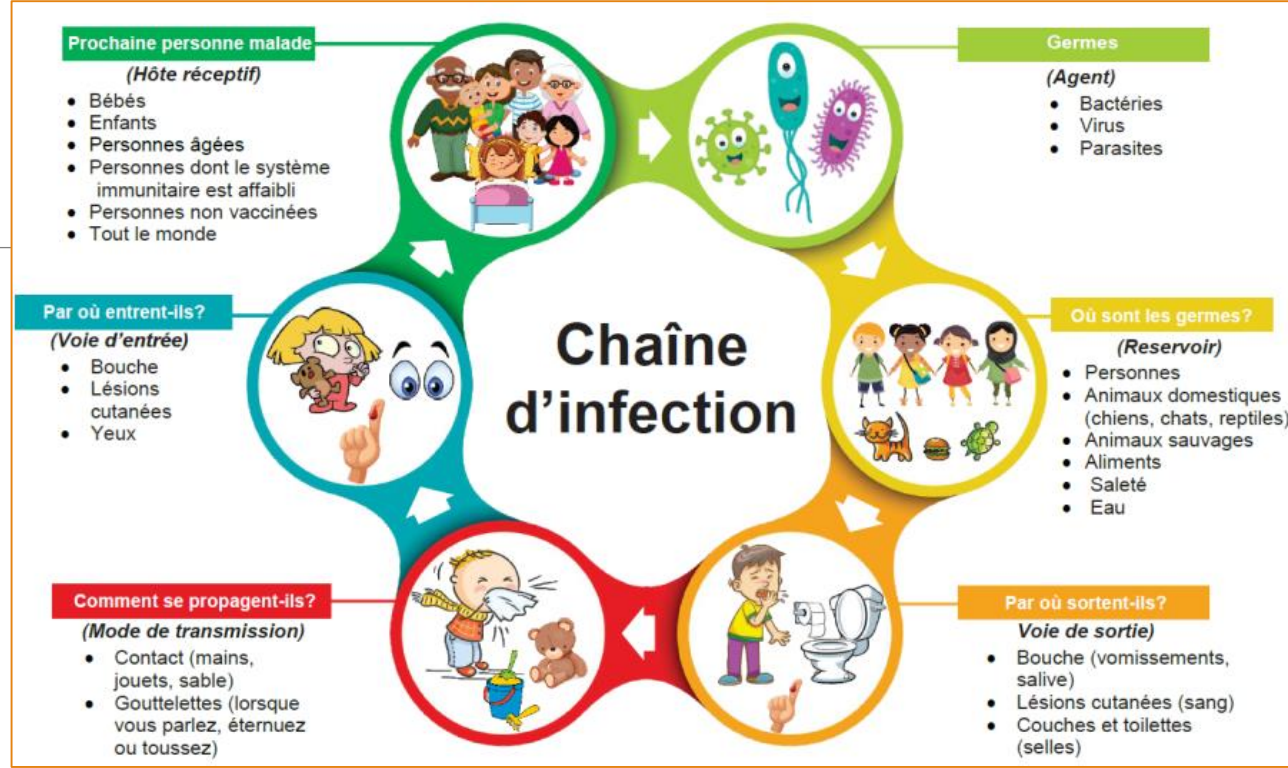
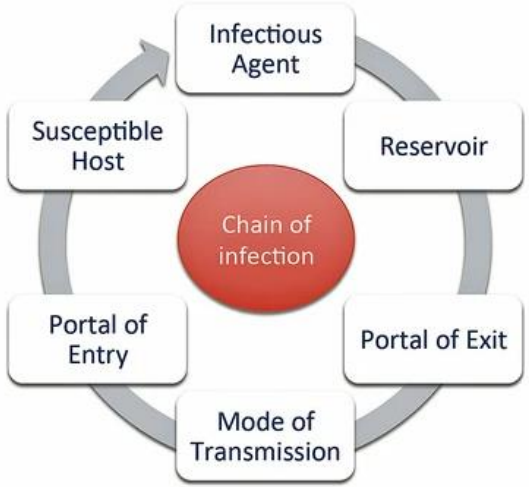
Jim has also consulted with Baxter Healthcare, Crede Technologies and Arjo

None of these companies have had any input into this presentation from a product or endorsement perspective

Objectives

- STATE AT LEAST 2 REASONS WHY WE ARE MORE SUSCEPTIBLE TO INFECTIONS AS WE AGE
- STATE THREE METHODS TO PREVENT/DETECT OUTBREAKS
- OUTLINE HORIZONTAL INFECTION CONTROL PRACTICES TO LIMIT THE SPREAD OF ANY MICROORGANISM

Chain of Transmission



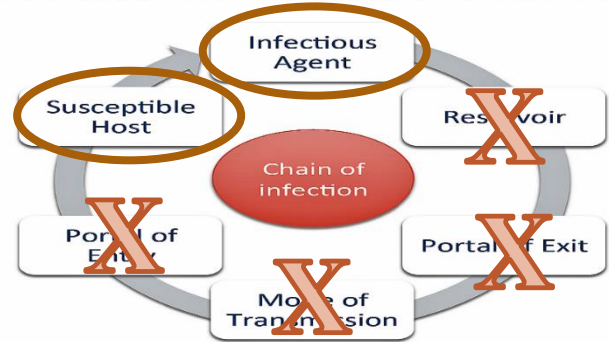
http://diseasedetectives.wikia.com/wiki/Chain_of_Transmission

<https://www.santepubliqueottawa.ca/fr/professionals-and-partners/chain-of-infection.asp>

Chain of Transmission

- All 6 links need to be present
 - Susceptible host is a given
 - Infectious agent always a concern
 - Break chain at:
 - Reservoir (hand hygiene, disinfection)
 - Portal of exit (limit movement when symptomatic)
 - Mode of Transmission (hand hygiene, disinfection)
 - Portal of Entry (personal protective equipment)

Chain of Transmission



What is Old?

OLD
IS WHEN YOU'RE NAPPING...



BUT EVERYONE'S WORRIED
THAT YOU'RE DEAD!

Immune System Decline

Not only do you forget where you left your keys...

You forget to mount a strong immune response to challenges!

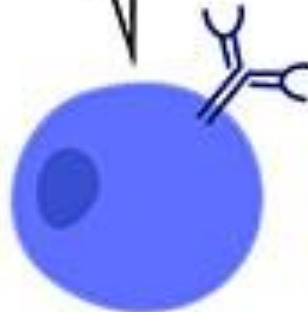
Immune System Decline

Referred to as immune senescence or dysregulation affecting:

- Cell mediated immunity
 - phagocytes, T and B cells
- Humoral immunity
 - immunoglobulin, complement

Antibody
Producers

I attack
invaders outside
the cells.



B-Cells

I attack
infected
cells.



T-Cells

Killer T Cells
Helper T cells
(help B-cells!)

Immune System

As cell mediated immunity decreases, there is an increase in vulnerability to viral, fungal and mycobacterial diseases

- Can't have staff coming to work sick
- Need to screen for tuberculosis
 - Or watch for symptoms
- Need to be careful with construction dust

Immune System

As humoral immunity decreases, there is a decreased response to immunizations with pneumococcal polysaccharide, tetanus toxoid, hepatitis B and influenza vaccines

- Influenza vaccination of staff protects elderly (Amodio 2014)
- SARS-CoV-2 vaccine boosters – 50 and older
 - More to learn!

Skin – Portal of Entry



Skin Damage

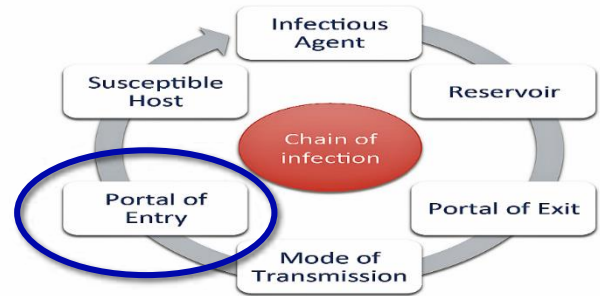
Friction

- Pulling across sheets
- Use of draw sheets or lifts for repositioning

Pressure

- Immobility
- Regular repositioning of patient
- Cushions to protect bony prominences

Chain of Transmission



Skin Damage

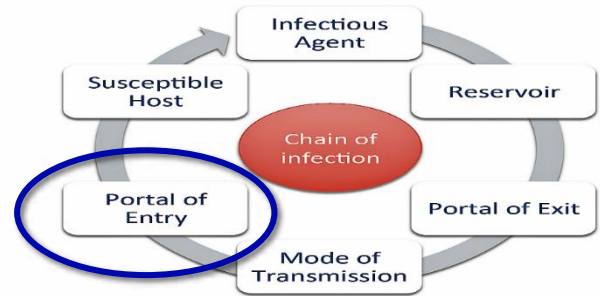
Shear

- Sliding down in chair
- Reposition hourly

Other Causes

- Moisture, incontinence, steroids, malnutrition, infection

Chain of Transmission



Infected Pressure Injuries

Occurs in up to 20% of patients of LTC Facilities, and up to 38% in Acute Care

Susceptible patients

- Diabetes, vascular insufficiency, vasculitis, malignancy

Malnutrition

Studies have shown 30-85% of patients may have signs of malnutrition.

Causes a decrease in cell mediated immunity

Leads to delayed wound healing, decrease level of consciousness, decline in functional status

Causes

Depression

Dementia

Malabsorption

Change in smell or taste sense

Dysphagia

Dysphagia

40-60% of patients in LTC can experience dysphagia

- Keep patient upright, arms and legs supported, head midline, chin tucked slightly helps with aspiration prevention
- Good assessment of clients is needed
 - Modified diets and/or consistencies

Malnutrition

Need to increase calorie count

- Ideally through consumption of food
- Protein drinks (liquid caloric supplements)

Assistance with meals

- Pureed, thickened
- **Need adequate time, variety**

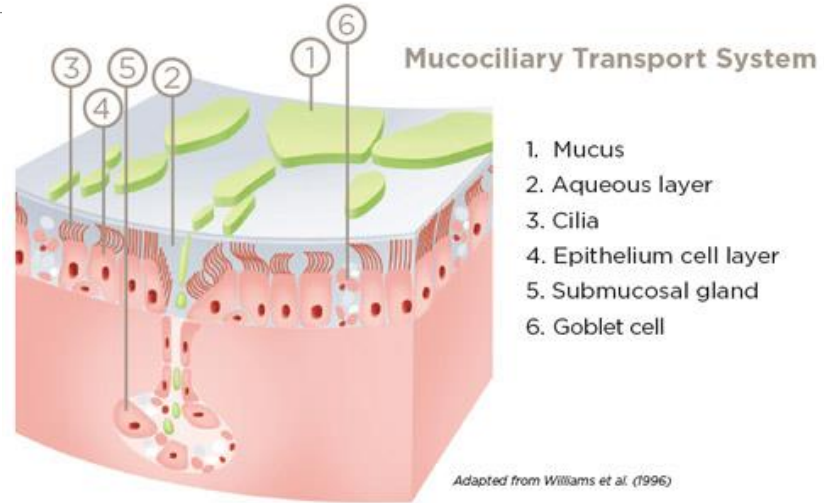
Respiratory

Decreased mucociliary transport →

- decreased clearance of secretions

Decline in cough reflex →
aspiration

- poorer clearing in the elderly



Respiratory

Abnormal gag and swallowing

- Neurological deficits, esophageal motility disorders, reflux, oral cancer

Loss of elastic tissue → decrease lung expansion

Increase Gram negative colonization of oropharynx →
reservoir of lower respiratory pathogens

Respiratory

Altered consciousness

- Sedatives, alcoholism, seizure disorder, CVA, general anesthesia

Diminished IgA secretion → increased susceptibility to pathogens

- IgA protects external surfaces and predominates in GI and respiratory mucous secretions

Respiratory Prevention

Do not lie flat if receiving tube feedings

Care with dysphagia

Oral Care (Yoneyama 2002)

Pneumococcal/influenza vaccine

- COVID

Urinary Tract



Urinary

Females

- Hormonal changes in urinary system leads to perineal colonization, vaginitis

Males

- Prostate enlargement → urinary stasis, bacterial colonization
- Decreased prostatic secretions → decrease in antibacterial activity and uro-mucoid protection

Urinary Signs and Symptoms: **NOT!**

- Cloudy, milky or turbid urine
- Malodorous urine
- Change in urine colour
- Falls
- **Behavioural changes** without additional clinical symptoms of a UTI: worsening functional status or worsening mental status (e.g., new behavioural changes, increased confusion, acute delirium or agitation).

Urinalysis Sticks

A negative dip stick indicates the patient does not have a UTI

A POSITIVE DIP STICK TELLS YOU NOTHING!

Collection important: MSU or in/out catheter!

Urine

Adequate hydration is difficult

- Dehydration can cause confusion
- Offer water constantly!

Wiping front to back

Emptying bladder after sexual intercourse

Gastrointestinal

Decrease in gastric acidity leads to an increased susceptibility to Salmonella and other enteric pathogens.

Surgery or Antacids decrease gastric acidity

- Acid suppression now linked to *Clostridioides difficile* acquisition
- H2 Antagonists, Proton Pump inhibitors

Gastrointestinal

Mucosal layer deteriorates with age

Dehydration is serious concern for patient

Gastrointestinal

The human gastrointestinal tract contains as much lymphoid tissue as the spleen

Approximately 80% of all immunoglobulin-producing cells in the body are in the intestinal mucosa

Gastroenteritis

Safe food handling

Cleaning/disinfection food preparation areas (sponges!)

Hoarding of perishable foods

Hand Hygiene!

- Patients
- Staff

Medications

Sedatives, narcotic analgesics

- decrease level of consciousness

Anti-hypertensives

- cause urinary retention

H₂ blockers

- decrease gastric acidity

Medications

Corticosteroids

- reduce immune function

Antibiotics

- encourage colonization
 - Yeast infections

Invasive Devices

Urinary catheters

Tracheostomies

Feeding tubes

Central venous access (Hickman, PICC)

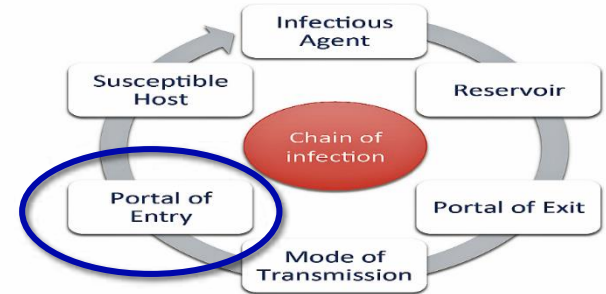
Intravenous access

Invasive Devices

Need clear understanding of risk of infection

- Chain of infection: portal of entry

Chain of Transmission



Atypical Clinical Manifestations

Subtle - **listen to staff, family and visitors**

Altered inflammatory response

- temperature elevations may be blunted or absent in 1 of 3 patients
- 1.3°C (~2.4°F) increase over normal baseline should be considered a fever

Atypical Clinical Manifestations

- Hypothermia can be a symptom (35°C/95°F)
- Leukocyte increase in bacteremia may be absent

Dementia

Pump Soap or ABHR are not familiar to them

- Used bar soap at home

Must remind or assist with hand hygiene before meals

- Ongoing assessment of hand hygiene capabilities

Preventing Outbreaks

The 'New' Normal

Everyone has a role!



Screening for Illness

- Passive screening at entrances (staff, visitors)
 - Sign asking if new cough and/or fever post SARS 2003
 - Might need travel questions (e.g., Ebola)
 - Might need vaccination question/proof
- Active Screening
 - Local Epidemiology – Public Health



Read Carefully

**Do you have a NEW or WORSE cough or shortness of breath?
Are you feeling feverish?**

If the answer to these questions is **YES** and you are a **patient**:

Clean your hands

AND

**If you have a cough, put on a mask or use a tissue to cover your mouth
while coughing**

AND

Tell the receptionist or nurse right away

Screening for Illness

- Resident screening
 - Daily
 - Before any group activity



<https://www.milton.ca/en/living-in-milton/milton-access.aspx>

<https://www.notjustbingo.com/articles-and-resources/how-to-articles/fun-evening-activities.html>

4 MOMENTS POUR L'HYGIÈNE DES MAINS

1

AVANT
de toucher
à l'utilisateur ou à
son environnement

Exemples :

Aide à l'alimentation,
soins d'hygiène, transfert
de l'utilisateur, etc. et avant
d'entrer dans la chambre.

2

AVANT
une intervention
aseptique

Exemples :

Pansement, gouttes
ophtalmiques, glycémie,
etc.



3

APRÈS
un risque de contact
avec du liquide
organique

Exemples :

Mouchoir, changement
de culotte d'incontinence,
changement de literie
et après avoir enlevé
les gants.

4

APRÈS
un contact avec
l'utilisateur ou son
environnement

Exemples :

Marchette, fauteuil roulant,
téléphone ou tablette
de l'utilisateur, etc. et en
sortant de la chambre.

CENTRE INTÉGRÉ DE SANTÉ ET
DE SERVICES SOCIAUX DE LA
MONTÉRÉGIE-OUEST (S. D.)

Hand Hygiene

- Breaks links (reservoir, mode of transmission)
- Alcohol-based hand rub (ABHR) if hands not visibly soiled and/or access to soap and water is limited
 - Actively assist residents who require this!
- Soap and water if soiling present, or preparing food
 - Ensure residents recognize dispensers

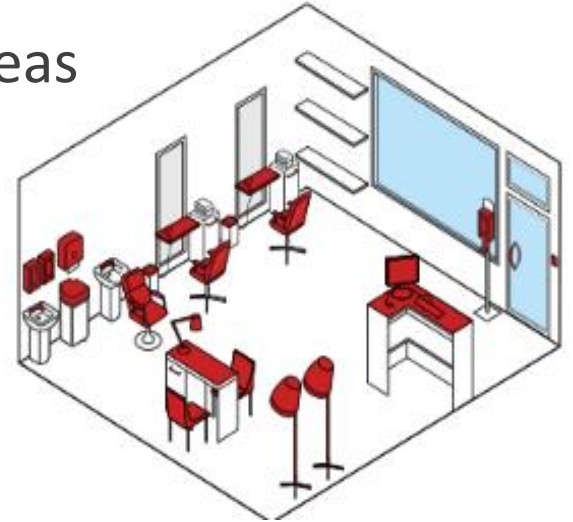
Hand Hygiene

- Before meals
- Before and after common area activities
 - Games, cards, pubs, movies, exercise
- Before and after transportation



High Touch Surfaces

- Frequent disinfection will keep microbial load low
 - 3x per day (Centre Alzheimer Faubourg 2018)
- Elevator buttons, handrails, common areas
 - Public Restrooms
 - Need SOP



Staff

- Ideal would be full time with benefits!
 - Paid sick time
 - Stay at home if unwell
 - Only work in one residence, or within chain
- Vaccinations
 - MMR, Tdap, Hepatitis B (&A?), Influenza, SARS-CoV-2
 - Positive Polio case NYC!
 - Measles on the rise
 - 'Mandatory' can and will be an issue!

Routine Practices

- If they are leaking, limit their movement and protect yourself
- If it is dirty, or you used it, disinfect it

Ill Residents

- Leaking
 - Cough, runny nose, incontinence, vomiting
- How to accommodate for:
 - Meals?
 - Appointments?
 - Medical care?
- Medical directives for care / transfer

Masks

- Protecting us?
 - Surgical Masks
 - N95 respirators
 - Aerosol-generating Medical Procedures (AGMP)
- Protecting them?
 - Surgical Masks



Ill Residents

- Many outbreaks start with a single resident
 - Respiratory signs and symptoms or non-vaccinated staff with limited symptoms
 - Influenza – 24 hour of asymptomatic spread
 - COVID has asymptomatic presentation (upwards of 40%?)
 - Vomiting and/or Diarrhea
 - Bad in common areas
 - Clean/disinfect consistently

Feces Clean up: Standardize for ALL Feces

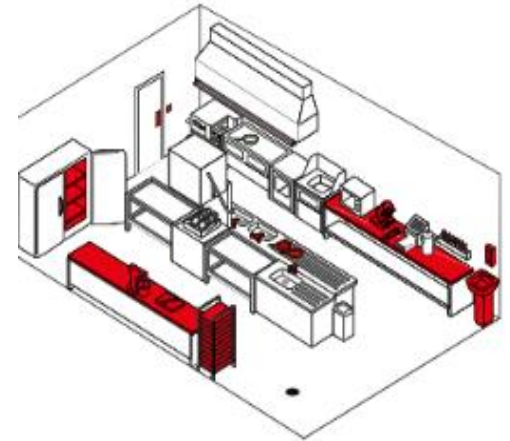
- Clean area of visible feces with paper products or a launderable cloth
- Wipe area with a disinfectant wipe
 - Use 2 if first wipe appears soiled (clean then disinfect)
 - Allow contact time
- Wipe AREA of spill with a sporicidal product
 - Allow contact time

Why?

- We do not know who might have spores in their feces, so treat all visible feces the same way: loose or formed
 - Paper Product: Clean before we disinfect
 - Disinfectant Wipe: clean and disinfect microorganisms that are present
 - Sporicidal Wipe: clean and disinfect spores that might still be present

Food Preparation

- Food borne outbreaks
 - Salmonella, Listeria, Shigella, Staph, Bacillus
 - Proper handling of raw food
 - Proper cooling and reheating of hot food
 - Staff with no symptoms, cuts, etc.
 - Public Health will inspect
- Food hoarding



Family / Visitors

- Source of many outbreaks
 - ‘We always see Mom on Sundays’
 - Screening
 - Immunizations
 - Limited visiting during high-risk seasons
 - Masks



https://www.vcuhealth.org/-/media/media/featurednewsimages/visitor_withmask_receptiondesk_resized.ashx

Outside Contractors

- Contractors
 - Repairs, maintenance, construction/renovations
- Deliveries
- Home Care staff
- Screen!
- SOP for presence on site
 - Immunizations
 - Criminal Record check

Prevention

- Just because you use a disinfectant does NOT mean you are disinfecting!

Prevention

- “One good housekeeper can prevent more infections than a dozen doctors can cure” – E. Rose - Infection Control Today

Day to Day Care Practices

If, during care, you touched it or used it: Disinfect it!

Auditing

- Verify surfaces have been addressed
 - Visual inspection is not sensitive
 - Adenosine Triphosphate (ATP)
 - Clean or dirty
 - Fluorescent Marker
 - Surface has been wiped
 - Better co-relation to microorganism removal (Rutala Poster)
 - Culture
 - Expensive, slow



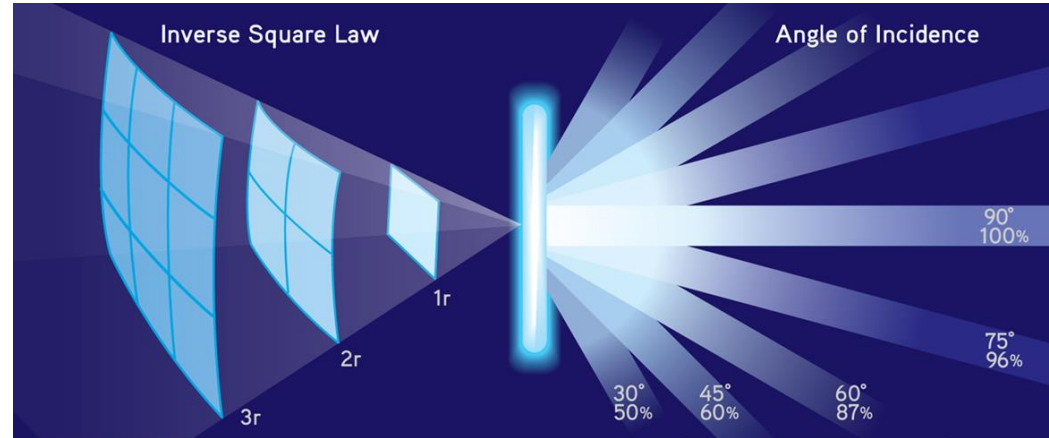
Theatre of Clean

- Sprayers / foggers
 - Still need to clean before disinfect
 - Concept of 'hard to reach' areas
 - Are they that contaminated if they are hard to reach?
- It's imperative to question, "Will this process provide a safer environment for residents or staff?"



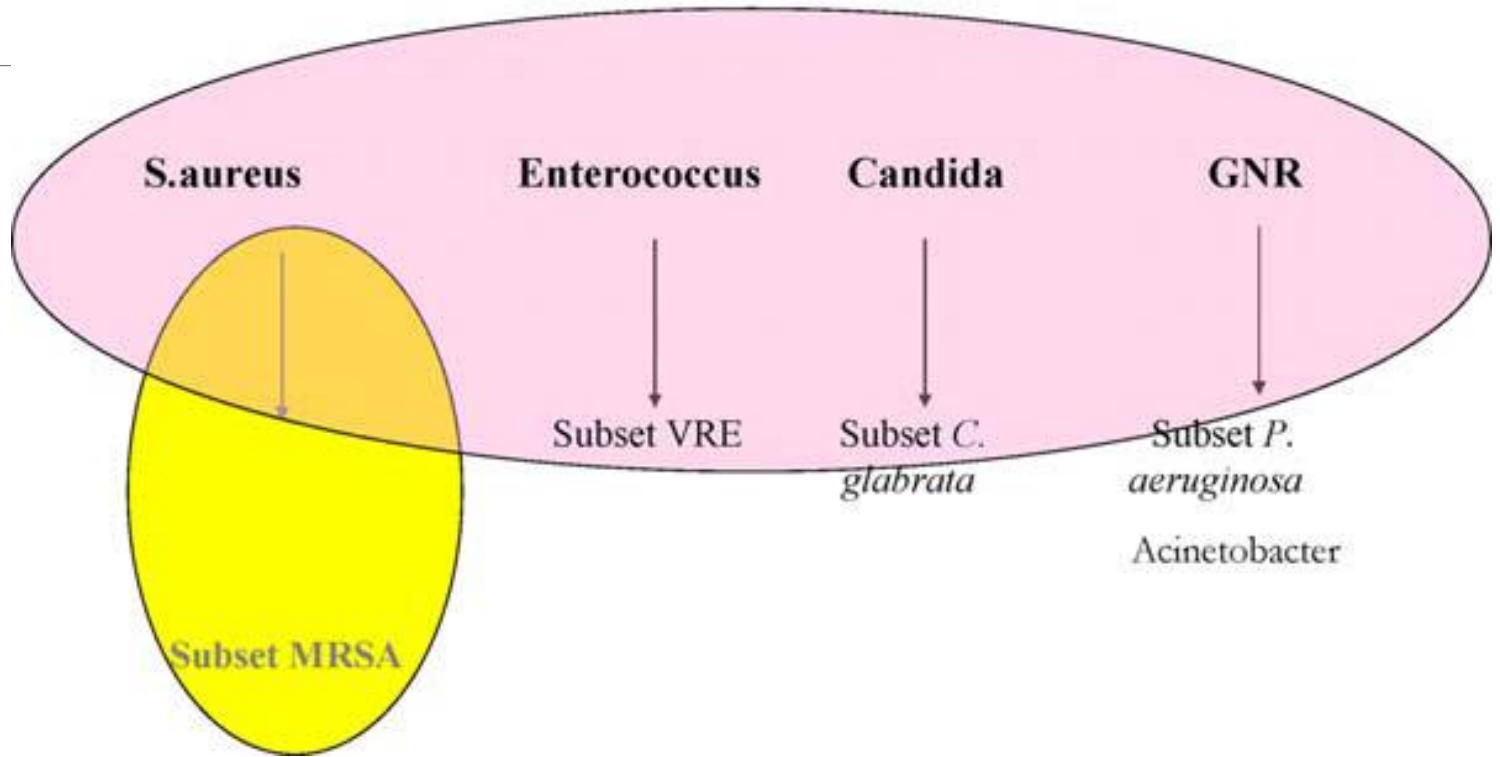
Adjunct Disinfectant Applications

- UV-C Lights
 - Does not replace cleaning!
 - Angle of Incidence and Inverse Square Law important!
 - Good surface coverage but shadowing can be issue
 - Chemical Free!
 - Health Canada Registration

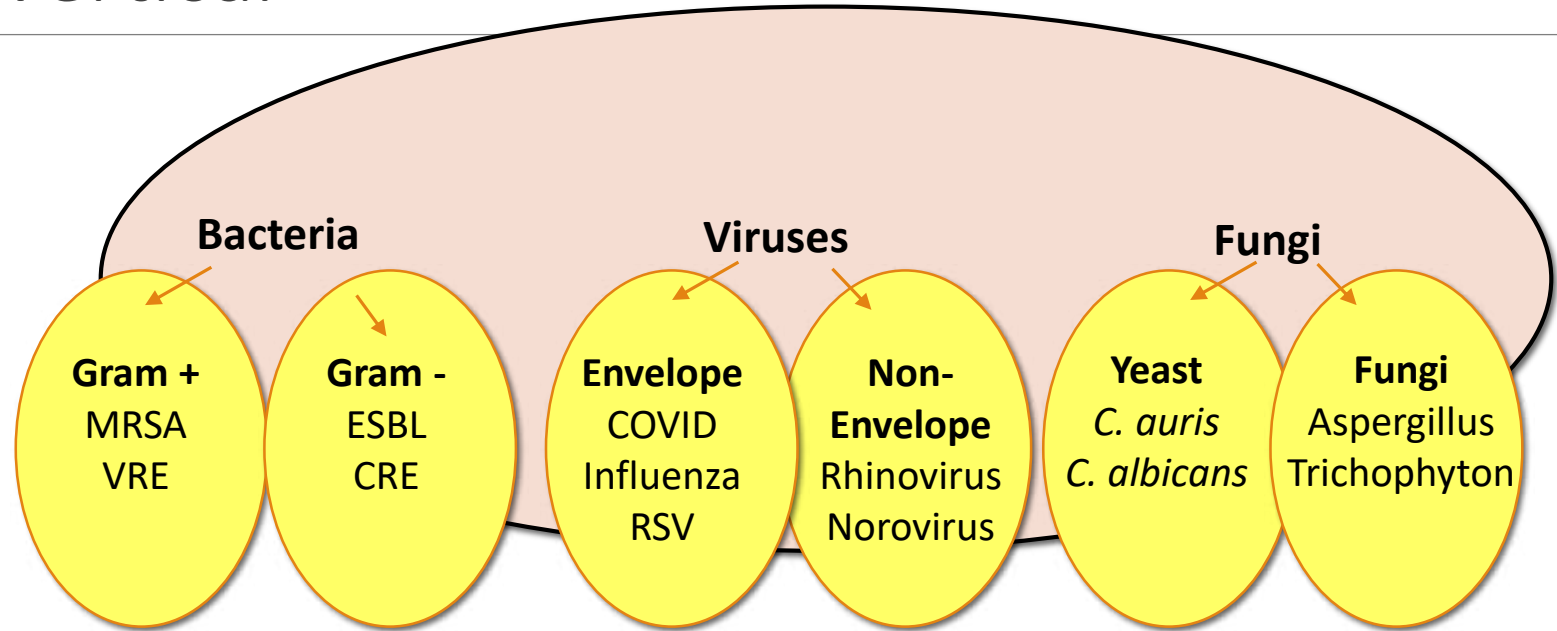


<https://www.youtube.com/watch?v=KARCOGT95W0>

Horizontal vs Vertical Infection Control



Vertical



Management of Multidrug-Resistant Organisms In



2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings

Centers for Disease Control and Prevention

MMWR

Morbidity and Mortality W

Early Release / Vol. 62

Vital Signs: Carbapenem-Resistant Enterobacteriaceae

DRUG-RESISTANT
CANDIDA AURIS

World Health Organization

Home Health Topics Countries Newsroom Emer

Home / Disease Outbreak News / Item / Extensively drug-resistant Shigella sonnei infections - Europe

Extensively drug-resistant Shigella sonnei infections - Europe

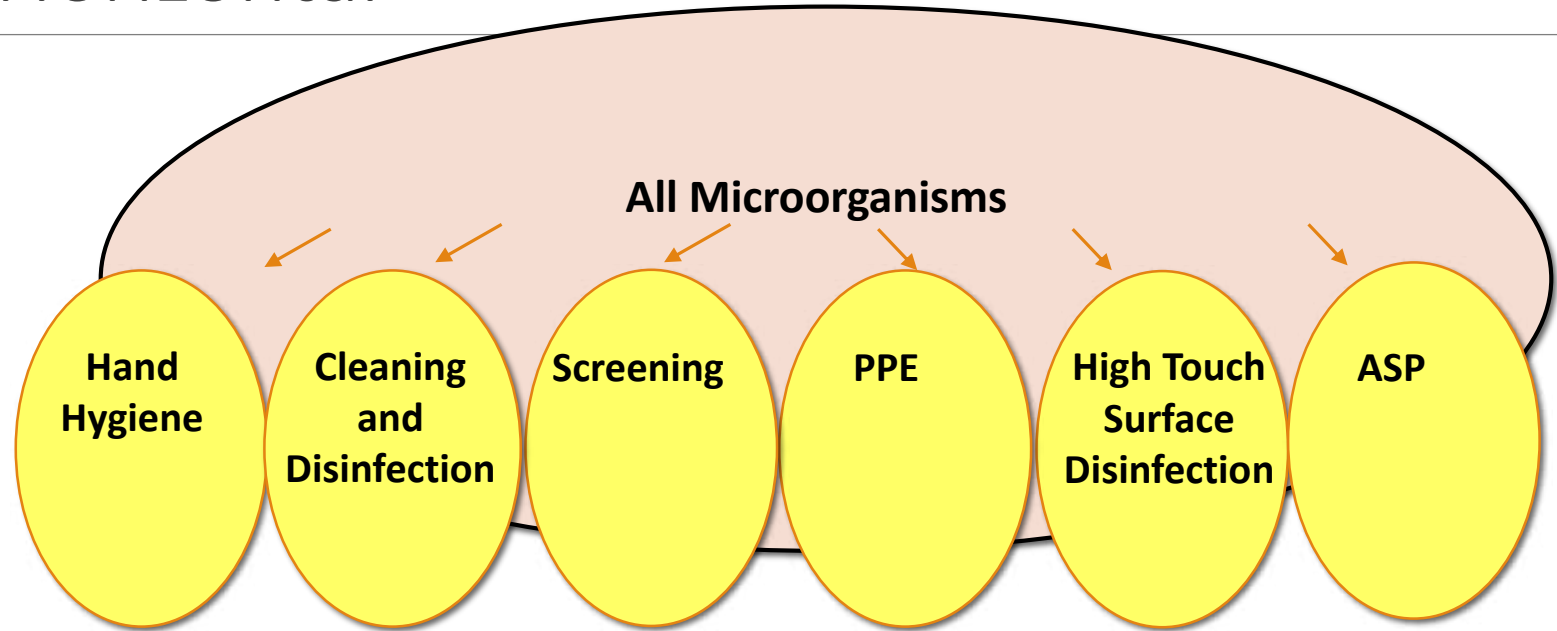
Annex A: Screening, Testing and Surveillance for Antibiotic-Resistant Organisms (AROs)

Healthcare-associated Infections
(HAI)

HAI Data +

ESBL-producing Enterobacterales in Healthcare Settings

Horizontal



PART C: TRANSMISSION CHARACTERISTICS AND PRECAUTIONS


Table 9: Transmission characteristics and precautions by condition/clinical presentation. Once specific etiology is known, refer to Table 10

Condition/ clinical presentation	Potential pathogens	Precautions	Infective material	Route of transmission	Duration of precautions	Comments
Abscess See draining wound						
Bronchiolitis	RSV, human metapneumovirus, parainfluenza virus, influenza, adenovirus	Droplet and contact	Respiratory secretions	Large droplet and direct and indirect contact	Duration of symptoms	Patient should not share room with high-risk roommates
Burns, infected See draining wound						
Cellulitis Draining: See draining wound Periorbital in child <5 years old without portal of entry	<i>H. influenzae</i> type B in non-immune child <2 years of age; <i>Streptococcus pneumoniae</i> , Group A <i>Streptococcus</i> , <i>S. aureus</i> , other bacteria	Droplet if <i>H. influenzae</i> type B is possible cause, otherwise routine practices	Respiratory secretions	Large droplet, direct contact	Until 24 hours of appropriate antimicrobial therapy received or if <i>H. influenzae</i> type B ruled out	
Cold	Rhinovirus, RSV, human metapneumovirus, parainfluenza, adenovirus, coronavirus	Droplet and contact	Respiratory secretions	Large droplet and direct and indirect contact	Duration of symptoms	Patient should not share room with high-risk roommates
Conjunctivitis	Adenovirus, enterovirus, chlamydia, <i>Neisseria gonorrhoea</i> , other microbial agents	Contact^a	Eye discharge	Direct and indirect contact	Until viral etiology ruled out; duration of symptoms, up to 14 days if viral	^a Routine if non-viral
Cough, fever, acute upper respiratory tract infection	Rhinovirus, RSV, human metapneumovirus, parainfluenza, influenza, adenovirus, coronavirus, pertussis	Droplet and contact	Respiratory secretions	Large droplet, direct and indirect contact	Duration of symptoms or until infectious etiology ruled out	Consider fever and asthma in child <2 years old as viral infection Patient should not share room with high-risk roommates

CDC
Appendix A

Infection/Condition	Type of Precaution	Duration of Precaution	Precautions/Comments
Rat-bite fever (<i>Streptobacillus moniliformis</i> disease, <i>Spirillum minus</i> disease)	Standard		Not transmitted from person to person.
Relapsing fever	Standard		Not transmitted from person to person.
Resistant bacterial infection or colonization (see Multidrug-Resistant Organisms)			
Respiratory infectious disease, acute (if not covered elsewhere) Adults	Standard		
Respiratory infectious disease, acute (if not covered elsewhere) Infants and young children	Contact + Standard	Duration of illness	Also see syndromes or conditions listed in Table 2.
Respiratory syncytial virus infection, in infants, young children and immunocompromised adults	Contact + Standard	Duration of illness	Wear mask according to Standard Precautions [24] CB [116, 117]. In immunocompromised patients, extend the duration of Contact Precautions due to prolonged shedding [928]. Reliability of antigen testing to determine when to remove patients with prolonged hospitalizations from Contact Precautions uncertain.
Reye's syndrome	Standard		Not an infectious condition.
Rheumatic fever	Standard		Not an infectious condition.
Rhinovirus	Droplet + Standard	Duration of illness	Droplet most important route of transmission [104 1090]. Outbreaks have occurred in NICUs and LTCFs [413, 1091, 1092]. Add Contact Precautions if copious moist secretions and close contact likely to occur (e.g., young infants) [111, 833].

Table 2. Clinical Syndromes or Conditions Warranting Empiric Transmission-Based Precautions in Addition to Standard Precautions.

Disease	Clinical Syndrome or Condition†	Potential Pathogens‡	Empiric Precautions (Always Includes Standard Precautions)
Diarrhea	Acute diarrhea with a likely infectious cause in an incontinent or diapered patient	Enteric pathogens§	Contact Precautions (pediatrics and adult)
Meningitis	Meningitis	Neisseria meningitidis	Droplet Precautions for first 24 hours of antimicrobial therapy; mask and face protection for intubation
Meningitis	Meningitis	Enteroviruses	Contact Precautions for infants and children
Meningitis	Meningitis	M. tuberculosis	Airborne Precautions if pulmonary infiltrate Airborne Precautions plus Contact Precautions if potentially infectious draining body fluid present
Rash or Exanthems, Generalized, Etiology Unknown	Petechial/ecchymotic with fever (general)	Neisseria meningitidis	Droplet Precautions for first 24 hours of antimicrobial therapy
Rash or Exanthems, Generalized, Etiology Unknown	Petechial/ecchymotic with fever (general) If positive history of travel to an area with an ongoing outbreak of VHF in the 10 days before onset of fever	Ebola, Lassa, Marburg viruses	Droplet Precautions plus Contact Precautions, with face/eye protection, emphasizing safety sharps and barrier precautions when blood exposure likely. Use N95 or higher respiratory protection when aerosol-generating procedure performed.  Ebola Virus Disease Update [2014]: Updated recommendations for healthcare workers can be found at Ebola: for Clinicians (https://www.cdc.gov/vhf/ebola/clinicians/index.html accessed September 2018).

CDC

Table 2

<https://www.cdc.gov/infectioncontrol/pdf/guidelines/isolation-guidelines-H.pdf>

Summary

Growing old is not for sissies – Jerry Gauthier

Understanding why the elderly get sick will help us address some common problems

Education of our non-regulated HCW can also help address some common problems

We must always be 'on-guard' for ALL pathogens



References

- Amodio E., et al. Can influenza vaccination coverage among healthcare workers influence the risk of nosocomial influenza-like illness in hospitalized patients? *J Hosp Inf* 2014;86:182-7
- Centre Intégré Universitaire de Santé et de Services Sociaux de la Capitale-nationale (s.d.), Recommandations en prévention des infections pour les activités autoportantes au Centre Alzheimer Faubourg, [Québec], [Le Centre]. [Document interne]. 2018
- Cuddigan J, et al. Pressure Ulcers in America. *Skin and Wound Care* 2001;14(4):208-15.
- Gerontological Nursing – Competencies for Care. 2014. Mauk, KL, Ed. Jones and Bartlett Learning Burlington MA.
- Ministère de la Santé et des Services sociaux. Approches en gestion intégrée des risques et en prévention et contrôle des infections. 2023 www.msss.gouv.qc.ca, section Publications

References

- Oxford Handbook of Geriatric Medicine. 2012. Bowker LK, Price JD, Smith SC eds. Oxford University Press
- Public Health Ontario UTI Program. Available at: <https://www.publichealthontario.ca/en/health-topics/antimicrobial-stewardship/uti-program> Accessed August 18, 2022
- Wenzel RP et al. Infection control: the case for horizontal rather than vertical interventional programs. *Int J Infect Dis* 2010;14S4:S3-S5
- Xavier S, et al. Proton pump inhibitors: are they a real threat to the patient? *GE Port J Gastroenterol* 2018;25(5):243-252. doi: 10.1159/000487154.
- Yoneyama T, et al. Oral care reduces pneumonia in older patients in nursing homes. *J Am Geriatr Soc* 2002;50(3):430-3.

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