

# Infection Control in Day Care

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## Infection Control in Day Care Centres

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## Your Faculty Today!



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## Our Goals

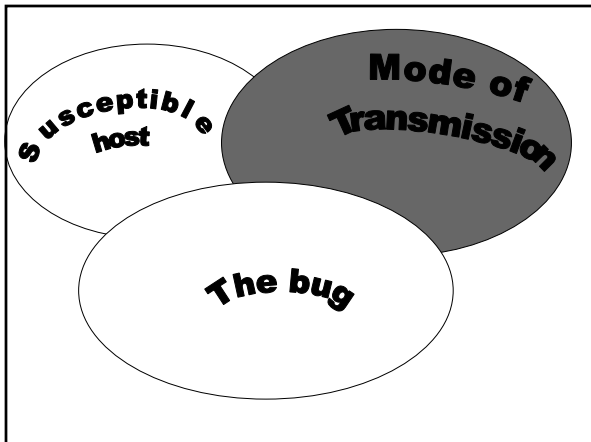
- Understand why our population is at risk
- Understand the transmission of nemesis to population
- Understand ways of stopping or preventing this transmission
- Have a bit of fun!

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## In a Nut Shell

- Keep it clean
- Understand our nemesis - the bugs
  - The environment
  - Our hands
    - which leads to:
- Don't eat it!
  - Clean eating areas and high touch surfaces
  - Clean hands before and after eating
  - Clean hands regularly

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## The Bug: Feces Facts

- 70% of passed feces is water
- 70% dried weight of feces is bacteria
- 1 gram of dried feces contains up to  $1 \times 10^{12}$  bacteria (1,000,000,000,000)
- 1 microgram contains  $1 \times 10^6$  bacteria
- Most of these bacteria are anaerobic, non-pathogenic organisms...however...

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## Saliva

- 1 mL of saliva can contain  $1 \times 10^8$  organisms
- Predominantly anaerobic
- Whole spectrum of organisms
  - aerobic
  - anaerobic
  - viruses

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## The Children - Our Host- The Risk

- Infants and toddlers require assistance with toileting
- Explore the environment with their mouths
- Drool
- Developing immunity
- Hands-on contact with care providers
- Contact with other children

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## Risk Factors for Transmission

- Organism Characteristics
  - mode of spread
  - infective dose
  - environmental survival
- Presence of carrier state, or asymptomatic infection
- Immunity

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## Transmission - Fecal-Oral

Bacteria	Viruses	Parasites
Campylobacter	Enterovirus	Cryptosporidium
E. coli O157:H7	Hepatitis A	G. lamblia
Salmonella	Rotavirus	Pinworm
Shigella	Calicivirus	

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## Transmission - Respiratory

Bacteria	Viruses	More Viruses
Hib	Adenovirus	Influenza A&B
N. mening.	Measles	Parainfluenza
Pertussis	RSV	Parvovirus B19
Tuberculosis	Rhinoviruses	Varicella-zoster
Group A Strept	Mumps	Rubella

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## Transmission - Person to Person

Bacteria	Viruses	Others
Group A streptococci	Herpes simplex	Pediculosis
Staph. aureus	Varicella-zoster	Scabies
		Ringworm

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## Transmission - Blood, Urine and/or Saliva

### Viruses

Cytomegalovirus

Herpes simplex

(Hepatitis B and C)

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## Standard or Routine Precautions

- **Treat all body fluids, excretions, secretions as potentially infectious**
- **Wash hands well after any inadvertent contact with such fluids**
- **Have immunizations up to date**
- **Wear gloves if contact is anticipated**
  - this could be controversial for diapering

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## Standard or Routine Precautions

- **Gloves**
  - can cause more problems especially if not used properly
  - must be changed or removed immediately after use
    - don't use same gloves to change a child, then sanitize change area

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## Are These Bad Places to Be?

- **Extensive contact with other children in a day care setting is associated with a reduced risk of acute lymphoblastic leukemia.**

• Ma, X et al. Daycare attendance and risk of childhood acute lymphoblastic leukemia. *Br J Cancer* 2002;86(9):1419-24

- **Attending a daycare centre is the most important risk factor for respiratory tract infections in children aged 2-5 years.**

• Forssell, G et al. Risk factors for respiratory tract infections in children aged 2-5 years. *Scand J Prim Health Care* 2001;19(2):122-5

## Are These Bad Places to Be?

- **Young children in child care have averaged 96 days of illness per year.**
  - **60 %** are respiratory illnesses

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## Do We Really Need to Know This?

- **100 soils and sand samples from 10 daycare sandboxes yielded *Toxocara*, *Ascaris*, and hookworm ova**
- **Only 3 sandboxes were actually positive**

• Gyorkos, TW et al. Parasite contamination of sand and soil from daycare sandboxes and play areas. *Can J Infect Dis* 1994;5(1):17-20

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## Exclusion of Children

- **American Academy of Pediatrics - Red Book**
  - Cannot participate comfortably
  - Care greater than what can be provided by the centre
  - Any of: fever, lethargy, irritability, persistent crying, difficult breathing, etc.
  - Diarrhea or stools with blood or mucus
  - Shigella infection or E. coli O157:H7

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## Exclusion of Children

- Vomiting 2 or more times in previous 24 hours, unless non communicable
- Mouth sores associated with excessive drooling
- Rash with fever or behavioral changes
- Purulent conjunctivitis
  - pink or red conjunctiva with white or yellow discharge
- Impetigo, Streptococcal pharyngitis

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## Exclusion of Children

- Head lice, scabies
- Varicella
- Pertussis, mumps, measles
- Hepatitis A infection

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## Inclusion of Children

- **Non purulent conjunctivitis**
  - pink conjunctiva with clear, watery eye discharge without fever, eye pain, or eyelid redness
- **Rash without fever and without behavioral change**
- **Parvovirus B 19 infection in immuno-competent host**
- **CMV infection**

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## Sick Children

- **Never assume a child does not have an illness because they appear healthy!**
- **Cohorting of ill children with same symptoms**
  - requires cohorting of care worker
- **Separate area for ill and well children**

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## Staff

- **All staff will be screened as outlined by Provincial or State regulations**
  - both criminally and medically
- **Need clear guidelines for staff for recognizing illness in themselves**
- **Food preparation staff separate from “toileting” staff**
- **Eat same meals as children!**

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## Disinfection

- **CLEAN before DISINFECTING!**
  - Soap and water for general cleaning
  - Dilute bleach solutions
  - Accelerated Hydrogen Peroxide
  - Household disinfectants

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## Disinfectants

- **Bleach**
  - 800 ppm- effective against rotavirus
  - 1/64 dilution
    - 1/4 cup in 1 gallon (approx. 50 mL in 4 L)
    - bathrooms, diapering areas (CDC)
  - 1/1000 dilution
    - (1mL in 1L water)- water table
  - 1/10 dilution- body fluid spills
  - 1 Tbsp in 1 gallon (approx. 15 mL in 4 L)
    - toys, clean eating utensils, etc.

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## Disinfectants

- **Accelerated Hydrogen peroxide**
  - Virox, Accel
  - Very effective against non-enveloped and enveloped viruses, and vegetative bacteria with a 5 minute contact time
  - Also works as a cleaner.
  - Can buy concentrate or ready-to-use

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## Disinfectants

- **Accel**
  - high level disinfectant with prolonged contact
  - No rinsing in food preparation areas- no active residue
  - non toxic
- [www.virox.com](http://www.virox.com)

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## Disinfectants

- **Lysol spray**
  - o phenylphenol 0.1% (quat) and ethanol 79%
  - Disinfectant effective against poliovirus (small, hydrophobic virus) with 30 second exposure- >3 log reduction
  - >99.9% of rotavirus was inactivated in 10 minutes (1 and 3 minutes were almost as effective
  - 4 log or better reduction of common bacteria

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## Disinfectants

- **Lysol references**
  - Rutala WA, et al. Antimicrobial activity of home disinfectants and natural products against potential human pathogens. ICHE 2000;21:33-38
  - Sattar SA, et al. Interruption of rotavirus spread through chemical disinfection. ICHE 1994;15:751-756

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## Hand Hygiene

- **Recognized as the best way of stopping the spread of organisms in this setting**
- **Soap and water**
  - No indication for antimicrobial soap
  - 10 ½ seconds of lathering
- **Alcohol**
  - more research into concentration required to kill all viruses

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## Hand Hygiene

- **Towelettes**
  - Must be alcohol based if used for hand hygiene
- **Children**
  - after toileting
  - before and after eating
  - after pets, sand, dirt, art, .....
  - Education on sneezing and coughing
    - never too early to start!

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## Toilet Areas

- **Handwashing must be observed**
- **Outbreak of E coli O157:H7 possibly linked to contaminated surfaces and fomites from poor handwashing by symptomatic children OR shedders.**
- **Need records of attendance, and changes in children, even if mild symptoms.**
- **CCDR 29-03 1 Feb 2003**

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## Water Tables

- **Add bleach to water (1 mL per litre)**
- **Have children wash hands before and after use**
- **Disinfect all toys to be used in the table with dilute bleach solution**
- **Avoid sponge toys**
- **Watch straws and bubble pipes**

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## Toys

- **No soft or plush toys if “mouthers” are present**
- **Dishwasher offers good level of sanitation on hard toys if hot water cycle is used-**
  - must be aware of water temperature
- **Establish a bin for used, mouthed toys for cleaning in soap and water, then disinfectant rinse**

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## Pregnant Workers

- **CMV**
  - Highest concentration in urine and saliva
  - High seroconversion rate seen in child care workers working with children under 3 years of age, compared to general population
  - Best protection is Standard or Routine Precautions!
  - Avoid kissing, or eating saliva!

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## Parent Education

- **Hygiene**
- **Management of minor illness**
  - inclusion, exclusion
- **Beyond my scope:**
  - Child development
  - Appropriate nutrition

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## Outbreak Management

- **Involve the local health unit!**
- **Have decision flow chart readily available**
- **Thresholds - what is acceptable**
- **Day Care staff need to recognize potential outbreaks developing, and also infectious disease exposure that could lead to outbreak.**

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## In Summary:

- **Keep it clean**
  - The environment
  - Our hands
    - which leads to:
- **Don't eat it!**
  - Clean eating and high touch surfaces, especially where fecal contamination may be
  - Clean hands before and after eating
  - Clean hands regularly

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## Useful References

- **American Academy of Pediatrics- Red Book**
  - 2003
- **Canadian Pediatric Society**
  - <http://www.cps.ca>
  - <http://www.caringforkids.cps.ca>
- **APIC Text of Infection Control and Epidemiology. 2000**

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