



Breaking the Chain of Infection

DOM Education Day

October 27, 2014

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Topics Covered in Presentation

- ◆ The Chain of infection and how to break the chain
- ◆ Role of the Designated Officer
- ◆ Today's Diseases of interest



Media has made some infections famous



Hepatitis

Norovirus

E. Coli

Clostridium
Difficile

SAR
S

Listeria

MRSA

Influenza

West Nile
Virus

Tuberculosis



**simcoe
muskoka**
DISTRICT HEALTH UNIT

How Do I Protect Myself Against All of these Invisible Germs When They are Everywhere?

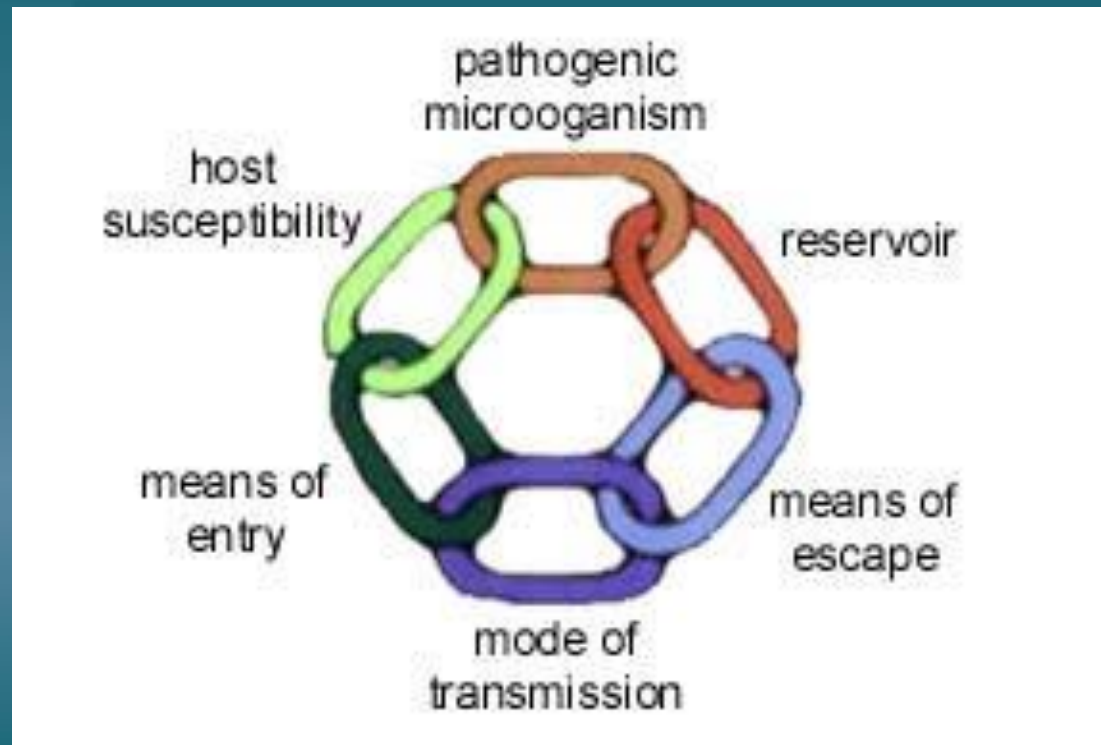


- Break The Chain of Infection

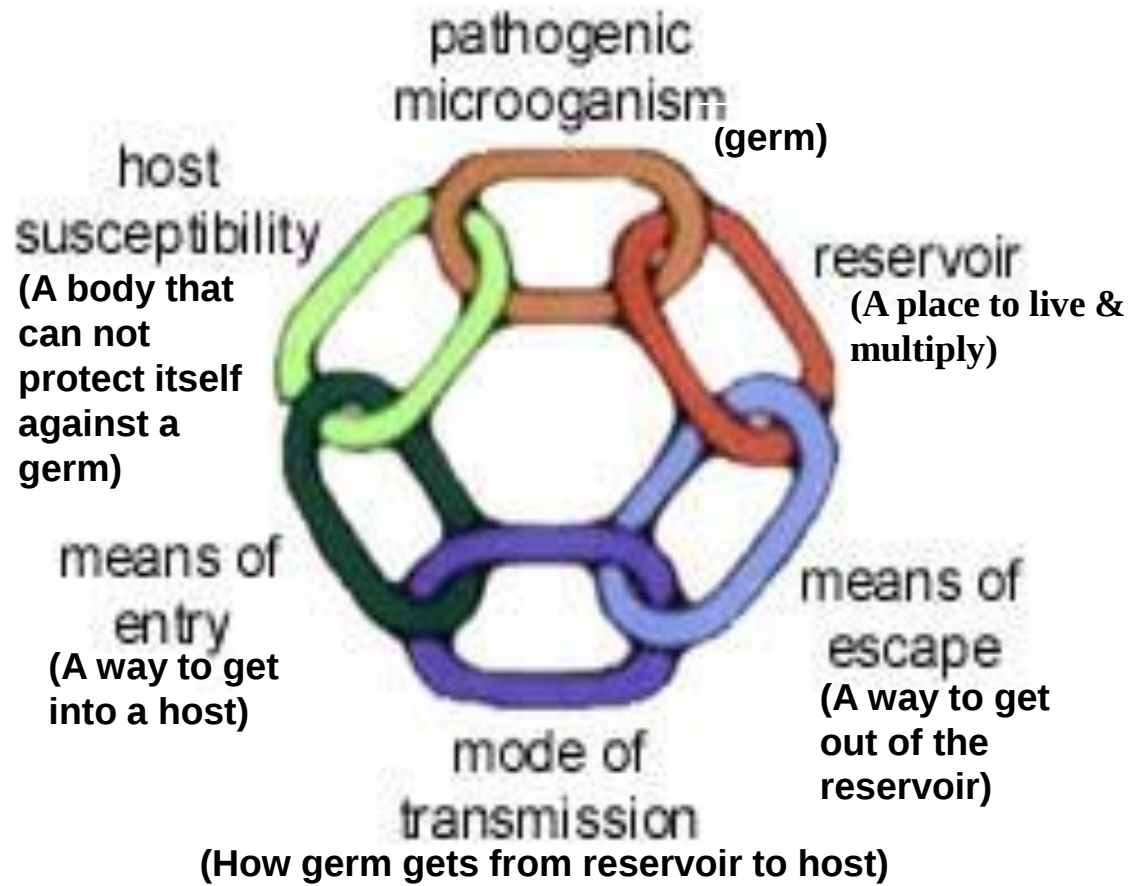


What is the chain of infection?

- ◆ It is a model or picture that explains how infections are spread.

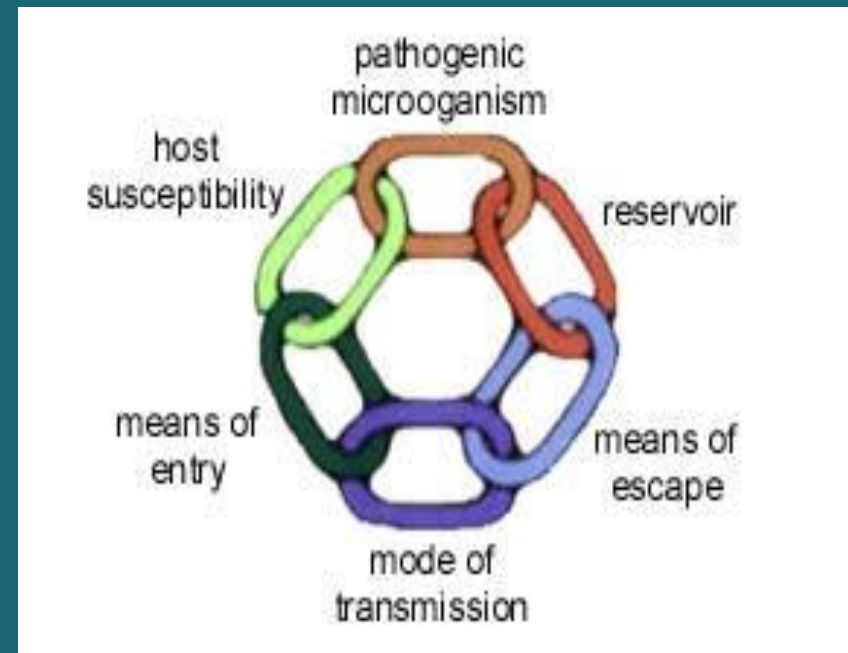


Components of the chain of infection?



The chain of infection-How does it work?

- ◆ For any infection to occur, all 6 of these links must exist in sequence



The 6 links of the Chain

1. Germs include:

Bacteria, Viruses, Fungi, Algae, Yeast, and Protozoa. All having different characteristics (act and spread differently).

2. Reservoir (where germs like to live) includes:

People, Plants, Food, Soil, Water, Animals, Insects, Rodents and Environmental Surfaces.



The 6 Links of the Chain

3. Means of Escape:

Respiratory Tract: coughing, sneezing, spitting, runny nose

Intestine: vomit, feces

Skin: wounds, skin breaks

Blood: bleeding wound, needle stick, blood transfusion

Mother to baby: placenta, birth canal

Urinary Tract:



The 6 Links of the Chain

4. Mode of Transmission:

- **Direct Contact:** person to person contact (e.g. Herpes, MRSA)



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The 6 Links of the Chain

4. Mode of Transmission:

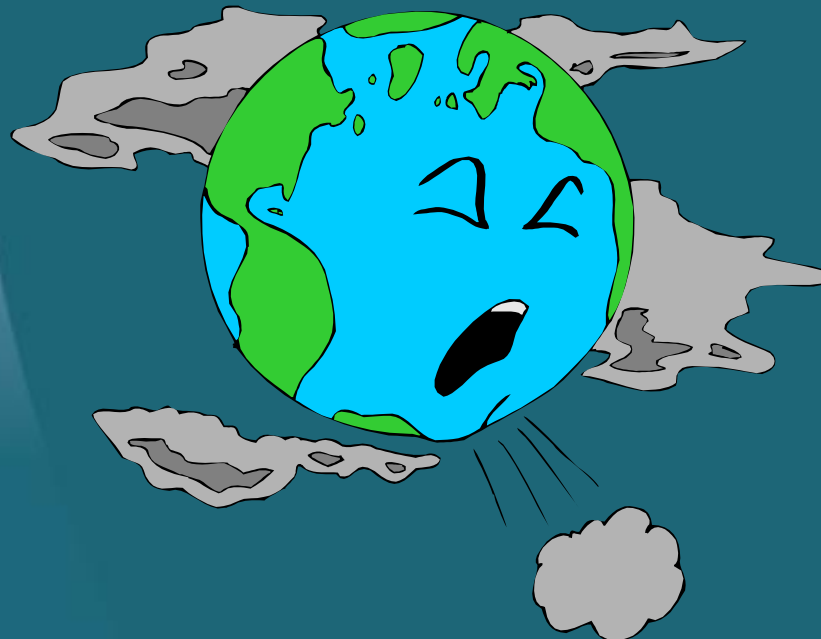
- **Indirect Contact:** contact with a contaminated object such as doorknob touched by a contaminated hand (e.g. Norovirus on a surface then someone touches the surface)



The 6 Links of the Chain

4. Mode of Transmission:

- **Airborne:** evaporated droplets or dust particles containing germs remain suspended in air and are for a period of time and get into the host.
e.g. Tuberculosis, Chicken Pox, Measles



The 6 Links of the Chain

4. Mode of Transmission:

- **Vector Borne:** Vectors are animals/insects that are capable of transmitting diseases (e.g. West Nile virus - mosquito bite)



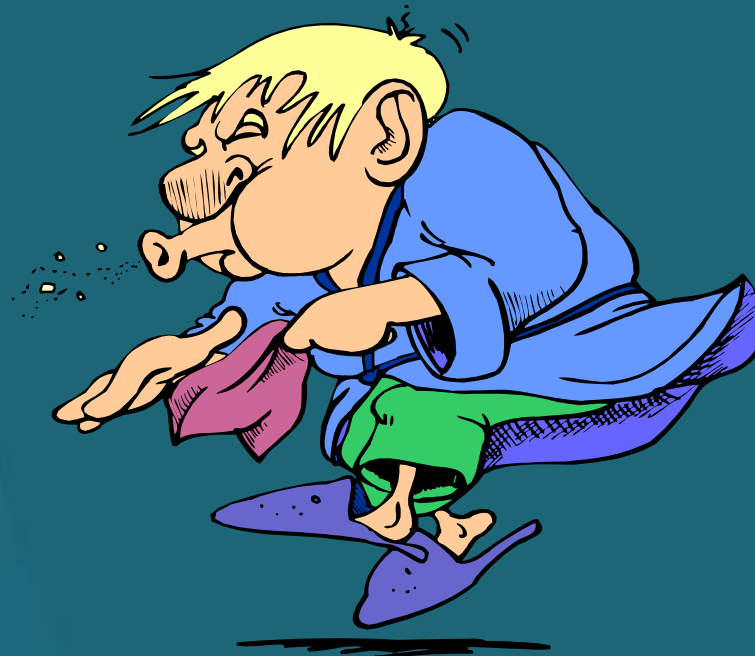
- **Vehicle:** Water, Food, Soil
e.g. Listeria, E. coli, Salmonella



The 6 Links of the Chain

4. Mode of Transmission:

- **Droplet:** transferred by infected droplets contacting surfaces of the eye, nose, or mouth of the host spread by coughing, sneezing (e.g. measles, whooping cough, influenza)



The 6 Links of the Chain

- 5. Portal of Entry – Ways the germ can get into the host: e.g. Respiratory tract: (nose, mouth, eyes)
- 6. Susceptible Host -A body that cannot protect itself against germs for some reason. Normal barriers to infection are weakened.

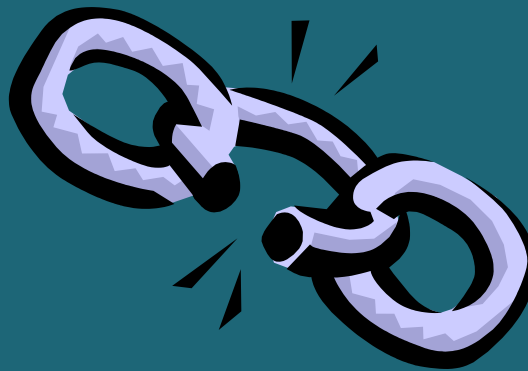


Stop Infection - Break the Chain



Routine and Additional Precautions

- ◆ When one link of the chain is broken, it interrupts the process, and no infection will occur.



Risk Assessment

- ◆ Must be done BEFORE interaction with the patient
- ◆ Risk assessment will determine which precautions you take
- ◆ Should include questions like:
 - ◆ Is the patient symptomatic? If so, what symptoms?
 - ◆ What will my work involve? Will I have direct contact with the patient?
 - ◆ Am I going to be providing any service that requires me to come in contact with a patient's mucosal membranes, bodily fluids or blood?
 - ◆ How experienced am I in performing this task?
 - ◆ Is there the potential for an accidental exposure with the patient's blood or bodily fluids? Will the patient be cooperative?
 - ◆ What is my own health status? Do I have any open wounds?
Am I symptomatic with any illnesses? Am I fully immunized?

Why is Cleaning Your Hands Important

- ◆ Hand Hygiene is considered the single most important means of preventing the spread of infection.
- ◆ respiratory infections like colds, coughs, or flu.
- ◆ enteric infections, including those that cause diarrhea and vomiting.

Hand washing vs. ABHR

Personal Protective Equipment

Gloves – Use when touching blood, body fluids, secretions, excretions and contaminated items

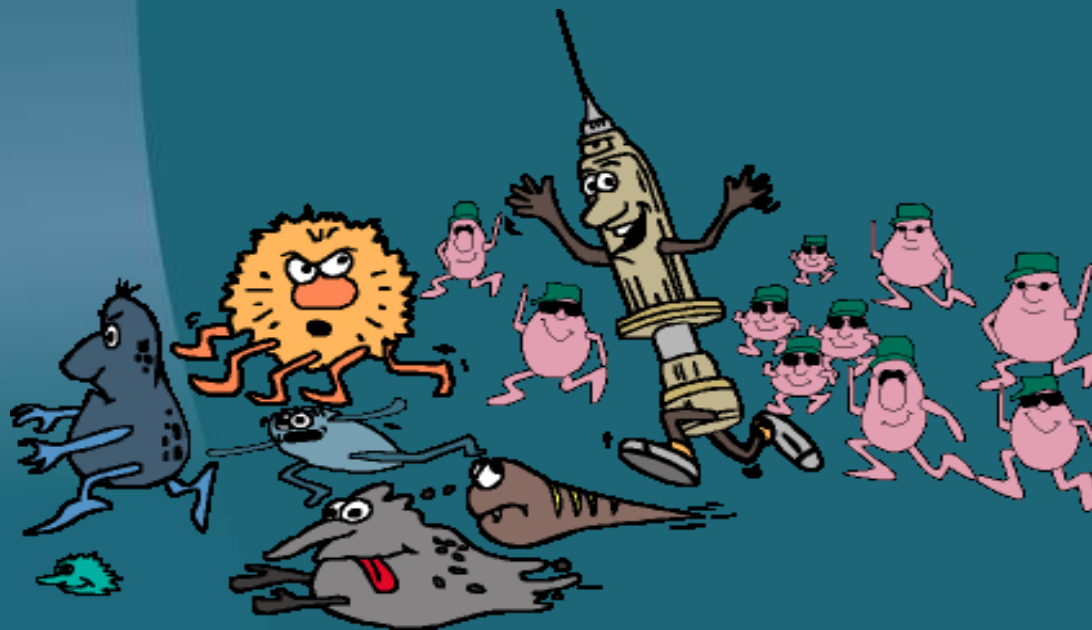
- ◆ Gowns
- ◆ Goggles
- ◆ Mask



If it is wet and not yours, don't touch it!!!

Breaking the Chain

2. The chain is broken at “host susceptibility”. If the host is less susceptible, the germ cannot crack the safe so cannot cause infection. e.g. immunize the host so germ cannot make host ill.
- ◆ Have you had your flu shot?
 - ◆ Are you up-to-date with all immunizations?



Breaking the Chain

3. Clean and Disinfect Shared Surfaces:

- ◆ Some germs can live on surfaces for several weeks
- ◆ Surfaces that are frequently touched by hands (i.e. door knobs) require frequent cleaning
- ◆ CLEAN before DISINFECTING!
 - ◆ Soap and water for general cleaning
 - ◆ dilute bleach solutions
 - ◆ accelerated or stabilized hydrogen peroxide
 - ◆ Household disinfectants like sprays or wipes



Understanding the chain of infection leads to protection

- ◆ Once you understand how it works you can apply it to your world –use to prevent the spread of infections, protecting yourself and others
- ◆ Use this knowledge to break the chain





Role of the Designated Officer



Purpose of Designated Officers Program

- ◆ Increasingly the threat of contracting a communicable disease is a serious risk for emergency workers.
- ◆ This program is designed for emergency services personnel who wish to become the “designated officer” within their organization, as required by the Ministry of Health.
- ◆ This program will provide participants with information about the legislation and guidelines that apply, and how to recognize, assess and control common communicable diseases in the emergency services.

Emergency Services Workers may come in contact with:

- ◆ Blood borne disease e.g. Hepatitis B, and AIDS
- ◆ Respiratory spread diseases e.g. TB and meningococcal disease
- ◆ Emerging drug resistant organisms

The Designated Officer

- ◆ Appointed by their organization
- ◆ Works within a set standard of practices
- ◆ Assesses reports to determine exposure situation/risk
- ◆ Consults with the local Medical Officer of Health (MOH) for recommendations of action
 - ◆ Consultation with MOH does not replace requirement for urgent medical assessment and/or the role of the family physician
- ◆ Completion of forms





Role of the Designated Officer

- ◆ Receive detailed reports from workers who believe they may have had an exposure to a communicable disease
- ◆ Assess whether a significant exposure has occurred
- ◆ If an exposure has occurred contact Health Unit with details as needed for support and recommendations.
- ◆ Inform Emergency Response Worker of recommendations and advise to seek medical care.

Role of the Simcoe Muskoka District Health Unit

To support DO's and Emergency Response Workers, the public health unit is required to:

- ◆ Have an on-call system for receiving and responding to reports of infectious diseases of public health importance 24/7.
- ◆ Have available to DO's and ESW's a MOH or designate to receive and respond to calls .
- ◆ Advise DO's in the health unit jurisdiction of possible exposure of ESWs including circumstances such as:
 - ◆ Actively seek out contacts of cases with infectious disease of public health importance.
 - ◆ Inform the respective DO that an ESW may have been exposed to an infectious disease of public health importance.
 - ◆ Informing DO's regarding any specific actions to be taken based on information provided.

Supporting Designated Officers in their Roles

Local

Support DO's in training ESWs

Training manual under development

List Serve for DO's (updates, notices, information via email)

Local services (individual detachments and organizations)

DO Training day and individual department training as requested

SMDHU Health Connection Line (services to various programs)

Provincially

Local iPAC chapter (iPAC SM)

Provincial Designated Officers Group (OADO)

Public Health Ontario or local Regional Infection Control Network

National

iPAC Canada and Pre-hospital Care Interest group

Diseases of the Day!!

- ◆ Ebola
- ◆ iGAS
- ◆ Invasive Meningococcal Disease
- ◆ Measles
- ◆ Influenza

Ebola Viral Hemorrhagic Fever

Never have there been cases in Canada

- ◆ Spread through contact with blood and body fluids
- ◆ Not Communicable prior to illness – flu symptoms and fever with history of Travel to affected areas – Western Africa
 - ◆ communicability increases as illness progresses
- ◆ S/S – Flu like symptoms,
- ◆ Incubation Period – 2-21 days (8-10 days)
- ◆ Precautions – Droplet, Contact, Airborne
- ◆ Routine Environmental Cleaning

iGAS Invasive Group A Strep

- ◆ GAS Isolated from a sterile body fluid
- ◆ Can be non-invasive or invasive and non-severe or severe
- ◆ Incubation Period -1-3 days
- ◆ Communicable till 24 hrs. post-appropriate antibiotics
- ◆ S/S:
- ◆ Only severe case close contacts will be recommended prophylaxis
- ◆ Close contacts are to monitor for 30 days post exposure
- ◆ Droplet Contact precautions

Invasive Meningococcal Disease

Severe Bacterial Meningitis

Prophylaxis and/or immunization will be determined by MOH pending typing – Not all types are covered by prophylaxis

- ◆ **Incubation Period** - 2-10 days, commonly 3-4 days.
- ◆ **Period of Communicability** - Usually 7 days prior to onset of symptoms to 24 hours after the initiation of appropriate antibiotic therapy.

S/S: similar to the flu symptoms but much more rapid in onset and severity: high fever, headache, stiff neck (up and down), nausea and vomiting, photophobia, confusion, drowsiness. Sometimes a purplish skin rash -flat and smooth. In young children, you may notice irritability, excessive crying, grunting, moaning or convulsions.

Precautions: Droplet/Contact

Measles

- ◆ The most communicable disease - IMMUNIZATION
- ◆ Airborne – 2 hrs. post shared air space
- ◆ All HCW need 2 documented MMR or proof of immunity – titer
- ◆ Communicable – 1 day prior to symptom onset till 4 days post rash (up to 12 days)
- ◆ S/S - begin 7 to 18 days after exposure and include fever, runny nose, cough, drowsiness, irritability and red eyes (conjunctivitis). Small white spots ("Koplik's spots") on the inside of the mouth and throat but not always present.
Then, 3 to 7 days after the start of the symptoms a red, blotchy (maculopapular) rash appears on the face and then progresses down the body.
Complications : middle ear infections, pneumonia, diarrhea or encephalitis (swelling of the brain) and occasionally death in the very young.

Influenza

- ◆ Virus – no antibiotics – IMMUNIZE
 - ◆ Incubation 1-3 days
 - ◆ Communicable 1 day prior to symptom on-set till 5 (7) days
 - ◆ S/S – ARI – headache, myalgia, malaise, sore throat (kids – GI)
 - ◆ Precautions – Droplet / Contact
-
- ◆ GET YOUR YEARLY FLU SHOT, IT'S FREE

Communicable Disease Reporting

Timely reporting of communicable diseases is mandated and essential for their control. If you *suspect* or have confirmation of the following specified Reportable Diseases or their etiologic agents, (as per Ontario Regulation 559/91 and amendments under the *Health Protection and Promotion Act, R.S.O. c.H.7*) please report them to the local Medical Officer of Health.

REPORTABLE COMMUNICABLE DISEASES

Note: Diseases highlighted (and influenza in institutions) should be reported immediately to the Medical Officer of Health by telephone. Other diseases can be reported by the next working day by fax, phone, or mail.

Acquired Immunodeficiency Syndrome (AIDS)

Acute flaccid paralysis (AFP)

Amebiasis

Anthrax

Botulism

Brucellosis

Campylobacter enteritis

Chancroid

Chickenpox (Varicella)

Chlamydia trachomatis infections

Cholera

Clostridium difficile associated disease (CDAD) outbreaks in Public Hospitals

Creutzfeldt-Jakob Disease, all types

Cryptosporidiosis

Cyclosporiasis

Diphtheria

Encephalitis, including:

1. Primary, viral

2. Post-infectious

3. Vaccine-related

4. Subacute sclerosing panencephalitis

5. Unspecified

Food poisoning, all causes

Gastroenteritis, institutional outbreaks

Giardiasis, except asymptomatic cases

Gonorrhoea

Group A Streptococcal disease, invasive

Group B Streptococcal disease, neonatal

Haemophilus influenzae b disease, invasive

Hantavirus pulmonary syndrome

Hemorrhagic fevers, including:

1. Ebola virus disease

2. Marburg virus disease

3. Other viral causes

Hepatitis, viral

1. Hepatitis A

2. Hepatitis B

3. Hepatitis C

Influenza

Lassa Fever

Legionellosis

Leprosy

Listeriosis

Lyme disease

Malaria

Measles

Meningitis, acute

1. bacterial

2. viral

3. other

Meningococcal disease, invasive

Mumps

Ophthalmia neonatorum

Paralytic shellfish poisoning (PSP)

Paratyphoid Fever

Pertussis (Whooping Cough)

Plague

Pneumococcal disease, invasive

Poliomyelitis, acute

Psittacosis/Ornithosis

Q Fever

Rabies

Respiratory Infection outbreaks in Institutions

Rubella

Rubella, congenital syndrome

Salmonellosis

Severe Acute Respiratory Syndrome (SARS)

Shigellosis

Smallpox

Syphilis

Tetanus

Trichinosis

Tuberculosis

Tularemia

Typhoid Fever

Verotoxin-producing E. coli infection
Indicator conditions including,
Haemolytic Uraemic Syndrome (HUS)

West Nile Virus Illness

Yellow fever

Yersiniosis

Communicable Diseases

Contact Information

Communicable Disease Program

705-721-7520 ext 8809

Or

1-877-721-7520 ext 8809

Regular Public Health Office Hours

(8:30 am – 4:30 pm Monday to Friday)

After Hours and Weekends/Holidays

1-888-225-7851



Questions

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