# CHAPTER 11 – COMMUNICABLE DISEASES

*First Nations and Inuit Health Branch (FNHB) Clinical Practice Guidelines for Nurses in Primary Care. The content of this chapter was revised February 2010.*

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COMMUNICABLE DISEASES COMMON IN CHILDREN AND ADULTS

For information about communicable diseases more commonly seen in children, but also seen in adults, refer to the “Communicable Diseases” chapter of the Pediatric and Adolescent care Clinical Guidelines. The section covers the following topics:

- Botulism
- Chickenpox (Varicella)
- Diphtheria
- Erythema Infectiosum (Fifth Disease)
- Meningitis
- Parotitis (Mumps)
- Pertussis (Whooping Cough)
- Pinworms
- Roseola Infantum
- Rubella (German Measles)
- Rubeola (Measles)
- Scarlet Fever

IMMUNIZATION

For information about and guidelines for vaccination and immunization, refer to the latest Canadian Immunization Guide (available at: http://www.atlantique.phac.gc.ca/naci-ccni/index-eng.php) and local, provincial/territorial vaccination schedules and regional protocol documents.

ASSESSMENT OF COMMUNICABLE DISEASES

HISTORY OF PRESENT ILLNESS AND REVIEW OF SYSTEMS

When a communicable disease is suspected, a thorough history is essential. Because microorganisms can affect every system, a thorough review of every body system is indicated. Some of the more common symptoms are detailed below.

The following points should be emphasized:

- Onset (date and time) and duration of illness
- Fever, chills or rigors
- Pain
- Rash: site, colour, consistency
- Involvement of mucous membranes or conjunctiva
- Coryza (head cold)
- Cough
- Sore throat
- Drooling
- Vomiting
- Diarrhea
- Level of consciousness

- Irritability
- Seizures
- Contact with a person with similar symptoms or known communicable disease
- Travel history (specifically, recent travel to an area where a communicable disease is endemic)
- Dietary history: raw fish, raw or poorly cooked meat

PHYSICAL EXAMINATION

Many communicable diseases affect more than one body system, so a thorough head to toe examination is indicated. The most common signs are detailed below.

VITAL SIGNS

- Temperature
- Heart rate
- Respiratory rate
- Oxygen saturation
- Blood pressure
**INSPECTION**

- Colour
- Coryza
- Pharynx: redness, lesions
- Mucous membranes: moistness, lesions (for example, Koplik’s spots)
- Skin: description of rash or petechiae (see the section “Physical Examination” in the chapter “Skin”)
- Joints: swelling and mobility

**PALPATION**

- Neck for rigidity
- Tactile characteristics of rash
- Lymphadenopathy
- Hepatosplenomegaly
- Joint movement
- Skin turgor and hydration

**AUSCULTATION (HEART AND LUNGS)**

- Breath sounds
- Crackles
- Wheezing
- Heart sounds
- Pleuritic or cardiac rubs
- Murmurs

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**COMMON COMMUNICABLE DISEASES**

**ACQUIRED IMMUNODEFICIENCY SYNDROME**

Acquired immunodeficiency syndrome (AIDS) is the advanced stage of the human immunodeficiency virus (HIV) disease. After a period of time where HIV infects and destroys blood cells, the immune system is weakened and can no longer defend the body from infections, diseases or cancers. When a person with HIV is diagnosed with one of the serious illnesses or cancers which are “AIDS-defining” (for example, pulmonary tuberculosis, recurrent bacterial pneumonia, invasive cervical cancer), the person is then said to have AIDS.\(^1,2\)

**CLINICAL CHARACTERISTICS**

- Insidious onset of illness
- Fever
- Diarrhea
- Fatigue
- Weight loss
- Lymphadenopathy

The person may present with opportunistic infections, sometimes severe and life-threatening:

- *Pneumocystis jirovecii* (formerly *Pneumocystis carinii*) pneumonia
- Cryptosporidiosis
- Toxoplasmosis
- Cryptococcus infection
- Tuberculosis
- Cytomegalovirus\(^3\)

Alternatively, the person may have unusual cancers, such as:

- Kaposi’s sarcoma
- Primary brain lymphoma

Other conditions associated with AIDS:

- Wasting syndrome
- Encephalopathy


**BACTERIAL GASTROENTERITIS**

Bacterial infection of gastrointestinal (GI) tract.

**CAUSES**

- The two most common causative organisms of community-acquired gastroenteritis are Salmonella and Shigella
- Other important causes to consider are *E. coli*, campylobacter, *C. difficile* (recent antibiotic use)
Salmonella
Transmission by fecal-oral route.
- Primary reservoir in domestic and wild animals, including poultry, livestock, rodents and pets such as iguanas, tortoises, turtles, chicks, dogs and cats
- Humans, such as convalescent carriers and especially mild and unrecognized cases

Shigella
Transmission by direct or indirect fecal-oral route of a symptomatic patient or a short-term asymptomatic patient.
- Feces of infected humans are the source; no animal reservoir known
- Ingestion of contaminated food or water is most common route of transmission in adults
- Infection most common in children 1–4 years of age (important problem in daycare centres)

E. Coli 0157:H7
- The most important reservoir is cattle
- Humans may serve as a reservoir for person-to-person transmission
- Ingestion of contaminated food or water or cattle feces is the most common source of infection
- This may occur by improperly cooked hamburger meat, contamination of produce and unpasteurized dairy products
- Infection can lead to life-threatening hemolytic uremic syndrome (HUS) in a small percentage of cases (10%), and can be precipitated by antibiotic treatment in unsuspected cases

HISTORY AND PHYSICAL FINDINGS
The history and physical findings differ for the two causative agents (see Table 1, “History and Physical Findings for Salmonella and Shigella Infection”).

Table 1 – History and Physical Findings for Salmonella and Shigella Infection

<table>
<thead>
<tr>
<th>Salmonella</th>
<th>Shigella</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>History</strong></td>
<td><strong>History</strong></td>
</tr>
<tr>
<td>Symptoms begin 8–48 hours after ingestion of contaminated food or water</td>
<td>Spread by fecal-oral route or through contaminated food</td>
</tr>
<tr>
<td>Generally an acute, self-limited illness, lasting 3–6 days</td>
<td>Incubation ranges from 1–7 days (typically 2–4 days)</td>
</tr>
<tr>
<td>Usually several members of household or community are affected</td>
<td>Condition usually resolves within 4–8 days</td>
</tr>
<tr>
<td>Sudden onset of colicky abdominal pain</td>
<td>Usually more than one member of household or community is affected</td>
</tr>
<tr>
<td>Watery brown diarrhea, may contain blood and mucus</td>
<td>Sudden onset of fever, anorexia, vomiting, gripping abdominal pain</td>
</tr>
<tr>
<td>Fever</td>
<td>Initially, stool is formed</td>
</tr>
<tr>
<td>Nausea and vomiting may be present</td>
<td>Passage of stool temporarily relieves abdominal pain</td>
</tr>
<tr>
<td>Headache</td>
<td>Stools become more frequent and less solid (diarrhea)</td>
</tr>
<tr>
<td>Myalgia</td>
<td>Diarrhea is watery brown and contains mucus, blood and pus</td>
</tr>
<tr>
<td><strong>Physical Findings</strong></td>
<td><strong>Physical Findings</strong></td>
</tr>
<tr>
<td>Temperature may be elevated</td>
<td>Temperature elevated</td>
</tr>
<tr>
<td>Heart rate may be elevated</td>
<td>Heart rate elevated</td>
</tr>
<tr>
<td>Client appears moderately ill</td>
<td>Client appears ill, may double over with waves of abdominal pain</td>
</tr>
<tr>
<td>Abdomen may be distended</td>
<td>Abdomen may be distended</td>
</tr>
<tr>
<td>Stool watery brown, possibly streaked with blood</td>
<td>Stool watery brown and contains blood, mucus and pus</td>
</tr>
<tr>
<td>Bowel sounds hyperactive</td>
<td>Bowel sounds hyperactive</td>
</tr>
<tr>
<td>Abdomen diffusely tender</td>
<td>Abdomen diffusely tender</td>
</tr>
</tbody>
</table>
Signs of Dehydration
- Blood pressure normal or low if dehydration is significant
- Postural blood pressure drop may be present in early moderate dehydration
- Eyes sunken, mucous membranes dry
- Skin warm, dry, with poor tissue turgor

DIFFERENTIAL DIAGNOSIS
- Viral gastroenteritis
- Parasitic gastroenteritis (for example, giardiasis)
- Ulcerative colitis

COMPLICATIONS
- Dehydration
- Death in elderly or debilitated clients

DIAGNOSTIC TESTS
- Obtain three consecutive stool samples for culture and sensitivity
- If considering possible viral cause (Norovirus), ensure appropriate sample is taken for this

MANAGEMENT

Goals of Treatment
- Prevent complications
- Prevent spread of infection to others
- Identify asymptomatic household carriers of Salmonella

Infection with Salmonella, Shigella and E. coli 0157:H7 are notifiable communicable diseases.

Appropriate Consultation
Consult a physician for treatment of clients who are immunocompromised or debilitated and those who have severe symptoms or are dehydrated.

Nonpharmacologic Interventions
See “Diarrhea” for details of general management of diarrhea (see “Diarrhea” in the chapter “Gastrointestinal System”).

Rehydrate with small amounts of fluids, given frequently; use oral rehydration fluids if necessary or IV therapy if serious dehydration is present (see “Dehydration” in the chapter “Gastrointestinal System”).

Client Education
- Recommend increased rest during acute phase
- If there is concern of potential water contamination then:
  - the Environmental Health Officer or water technician should be notified for water sampling
  - recommend water purification (boiling all water used for drinking or cooking in the house for 1 minute at a rolling boil) if the potential cause is a waterborne illness
- Counsel client about appropriate personal hygiene (hand-washing after touching soiled material and after using the washroom; separate utensils)
- Teach client how to avoid spreading bacteria to other household and community members (impeccable hand-washing after toileting is the most useful intervention)
- Teach client the signs of dehydration and advise client to return to clinic if these occur
- Enteric precautions are required during acute illness because Shigella infection is highly contagious
- Clients should not handle food or provide child or patient care until follow-up stool cultures are negative

Pharmacologic Interventions
If nausea and vomiting are present:
- dimenhydrinate (Gravol), 25–50 mg IM or IV prn stat, then 50 mg PO or PR q4–6h prn

Do not use anti-diarrheal medications (for example, loperamide [Imodium] or diphenoxylate-atropine [Lomotil]), as these slow the clearance of bacteria from the bowel.

Consult with a physician before giving antibiotics, as they may prolong the carrier state, encourage development of resistant strains and, in the case of E.coli 0157, may worsen the clinical outcome of the patient.

Monitoring and Follow-Up
- Instruct client to return for follow-up in 24–48 hours if symptoms are not diminishing
- Isolation not necessary
- Household contacts or contacts involved in direct client care must be investigated (observe three stool samples for culture)

Referral
Usually not necessary unless there is significant dehydration or failure to improve with therapy.
GIARDIASIS GASTROENTERITIS

Parasitic intestinal infection.

CAUSES
- *Giardia lamblia*, one of the most commonly identified intestinal parasites
- Infection caused by ingestion of infective cysts
- Person-to-person transmission (fecal-oral) and poor hygiene are the primary means of infection
- Giardiasis may also be contracted through the ingestion of contaminated water, a mechanism responsible for a significant number of waterborne outbreaks
- Venereal transmission occurs among sexually active homosexuals through direct fecal-oral transmission

HISTORY
A broad spectrum of clinical syndromes may occur. Most symptoms are gastrointestinal.

A small number of people have the following symptoms:
- Abrupt onset of explosive, watery diarrhea
- Abdominal cramps, bloating
- Foul flatus
- Nausea/vomiting
- Fever and malaise

These symptoms can last for more than 1 week before transition into the more common subacute syndrome.

Most patients experience a more insidious onset of symptoms, which are recurrent or resistant:
- Stool malodorous, mushy and greasy
- Watery diarrhea may alternate with soft stools or even constipation
- Stools do not contain blood or pus, since dysenteric symptoms are not a feature of giardiasis

Upper GI symptoms, often exacerbated by eating, accompany stool changes or may be present in the absence of soft stools:
- Upper and mid-abdominal cramping
- Nausea
- Early satiety
- Bloating
- Sulphurous-smelling belching
- Substernal burning and acid indigestion
- Anorexia

- Fatigue, malaise
- Weight loss (occurs in > 50% of patients; average weight loss is 4.5 kg [10 lb])
- Chronic illness (adults present with long-standing malabsorption syndrome and children present with failure-to-thrive syndrome)

Unusual presentations include:
- Allergic manifestations, such as urticaria
- Erythema multiforme
- Bronchospasm
- Reactive arthritis
- Biliary tract disease

PHYSICAL FINDINGS
- Physical examination generally unremarkable
- Abdominal examination may reveal nonspecific tenderness without evidence of peritoneal irritation
- Rectal examination should reveal no occult blood in stool
- In severe cases, evidence of dehydration or wasting may be present

DIFFERENTIAL DIAGNOSIS
- Gastroenteritis (viral, bacterial)
- Amebiasis
- Bacterial overgrowth syndromes
- Crohn's ileitis
- Cryptosporidium enteritis
- Irritable bowel syndrome
- Sprees (celiac [nontropical or tropical])
- Lactose intolerance

COMPLICATIONS
- Dehydration
- Malabsorption and weight loss

DIAGNOSTIC TESTS
Stool samples (three) taken at 2-day intervals; each one should be examined for ova and parasites.

MANAGEMENT

**Goals of Treatment**
- Relieve symptoms
- Prevent complications
- Prevent spread to others
**Communicable Diseases**

**Clinical Practice Guidelines for Nurses in Primary Care**

**Appropriate Consultation**
Consultation is generally not necessary for giardiasis unless there is no improvement with treatment.

If there is concern that there is giardia infection in the community, beyond what would be considered normal, consultation with the Medical Officer of Health is warranted.

**Adjuvant Therapy**
Emergency care consists of restoration of volume status through oral rehydration or IV administration of crystalloid solution if client is dehydrated upon presentation (see "Dehydration" in the chapter "Gastrointestinal System").

**Nonpharmacologic Interventions**
- Advise client to eat foods as tolerated; low-lactose and low-fat diet may be helpful until symptoms diminish
- Advise client to undertake activity as tolerated
- Frequent, impeccable hand-washing, especially after toileting, is essential
- Drinking water should be purified by keeping it at a rolling boil for 1 minute until water is ruled out as source of infection
- Ensure that close contacts of the client are also examined for giardiasis and treated, if appropriate

**Pharmacologic Interventions**
Antibacterial, antiprotozoan to treat infection:
- metronidazole (Flagyl), 250 mg PO tid for 5 days
- High-dose, short-course regimens are less efficacious and should be avoided. The most common side effects include a metallic taste in the mouth, nausea, dizziness and headache.

Consult a physician for treatment of pregnant women.

**Monitoring and Follow-Up**
- Follow up closely (for example, daily) if dehydrated on presentation: monitor hydration status, weight and symptoms
- Obtain repeat stool samples in 1–2 weeks to ensure resolution of infection

**Referral**
Refer to a physician as soon as possible if symptoms persist or worsen despite treatment.

**VIRAL HEPATITIS**
Systemic viral infection resulting in inflammatory necrosis of liver cells.

**CAUSES**
Five distinct viruses: hepatitis A virus, hepatitis B virus, hepatitis C virus, hepatitis D virus and hepatitis E virus (not seen in Canada) (see Table 2, “Comparison of Five Forms of Viral Hepatitis”).

<table>
<thead>
<tr>
<th>Form</th>
<th>Transmission</th>
<th>Incubation Time</th>
<th>Chronicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Fecal-oral</td>
<td>15–50 days</td>
<td>No</td>
</tr>
<tr>
<td>B</td>
<td>Parenteral, sexual, perinatal</td>
<td>45–180 days</td>
<td>Yes (10% of cases)</td>
</tr>
<tr>
<td>C</td>
<td>Parenteral</td>
<td>14–180 days</td>
<td>Yes (70% of cases)</td>
</tr>
<tr>
<td>D</td>
<td>Parenteral; can only exist in the presence of hepatitis B</td>
<td>14–56 days</td>
<td>Yes</td>
</tr>
<tr>
<td>E</td>
<td>Fecal-oral</td>
<td>14–60 days</td>
<td>No</td>
</tr>
</tbody>
</table>

**HISTORY**
The five types of hepatitis are similar in clinical presentation and therefore cannot be readily distinguished by clinical features. However, clinical history of risk factors may be helpful. Serologic testing is needed for accurate diagnosis. The severity of symptoms depends on the infective agent, and many of those infected are asymptomatic.

- Fever (unusual with hepatitis B or C, occurs in 60% of those with hepatitis A)
- Malaise
- Nausea and vomiting
- Anorexia
- Dark, tea-coloured urine
- Abdominal pain, especially in right upper quadrant
- Jaundice (in 60% of affected adults)
- Headache
PHYSICAL FINDINGS
Findings depend on stage of disease.
- Temperature may be elevated in pre-icteric phase
- Client appears mildly to moderately ill
- Lethargy
- Sclera jaundiced
- Skin jaundiced
- Liver may be tender and enlarged; edge of liver smooth and soft
- Bowel sounds normal
- Bruising (a sign of severe disease)

DIFFERENTIAL DIAGNOSIS
- Hepatic cancer
- Cirrhosis
- Infectious mononucleosis
- Alcohol-induced hepatitis
- Drug-induced hepatitis
- Obstructive jaundice (related to cholelithiasis, pancreatic tumour)

COMPLICATIONS
- Fulminant hepatitis (occurs in 0.1% of cases, but prevalence is higher among pregnant women)
- Spread to close contacts or community (hepatitis A)
- Persistent infection (subclinical)
- Chronic liver disease
- Cirrhosis
- Hepatocellular carcinoma

DIAGNOSTIC TESTS
- Take sample for urinalysis: urine dark, tea-coloured; dipstick test positive for bilirubin
- Perform liver enzyme tests: increased AST (aspartate aminotransferase) and ALT (alanine aminotransferase) (ALT in particular shows marked elevation)
- Measure alkaline phosphatase (mild to moderate increase)
- Measure bilirubin (normal to markedly elevated)
- Perform hepatitis serology screening (see Table 3, “Serologic Features of Viral Hepatitis” for details of findings)
- Liver function tests (LFTs) (international normalized ratio [INR], partial thromboplastin time [PTT], fasting glucose)

It is impossible to distinguish a flare-up of chronic hepatitis B or C from acute cases; only over time will it be possible to identify a carrier of the virus.

Table 3 – Serologic Features of Viral Hepatitis

<table>
<thead>
<tr>
<th>Form</th>
<th>Serologic Marker</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>IgM anti-HAV</td>
<td>Acute disease</td>
</tr>
<tr>
<td></td>
<td>IgG anti-HAV</td>
<td>Remote infection and immunity</td>
</tr>
<tr>
<td>B</td>
<td>HBsAg</td>
<td>Acute or chronic disease</td>
</tr>
<tr>
<td></td>
<td>HBeAg</td>
<td>Active replication and at increased risk of transmission of HBV</td>
</tr>
<tr>
<td></td>
<td>IgM anti-HBcAg</td>
<td>Acute disease</td>
</tr>
<tr>
<td></td>
<td>IgG anti-HBcAg</td>
<td>Acute disease</td>
</tr>
<tr>
<td></td>
<td>• HBsAg positive</td>
<td>Chronic disease</td>
</tr>
<tr>
<td></td>
<td>• HBsAg negative</td>
<td>Immune or susceptible depending upon results of anti- HBsAg antibodies (Infection or Immunization)</td>
</tr>
<tr>
<td>C</td>
<td>Anti-HCV</td>
<td>Acute, chronic or unresolved disease; co-infection with HIV</td>
</tr>
<tr>
<td>D</td>
<td>HBsAg and anti-HDV</td>
<td>Acute disease</td>
</tr>
<tr>
<td></td>
<td>• IgM anti-HBcAg positive</td>
<td>Co-infection with HBV</td>
</tr>
<tr>
<td></td>
<td>• IgG anti-HBcAg positive</td>
<td>Superinfection</td>
</tr>
<tr>
<td>E</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

HAV = hepatitis A virus; HBsAg = hepatitis B surface antigen; HBcAg = hepatitis B core antigen; HBcAg = hepatitis C virus; HDV = hepatitis D virus; HBV = hepatitis B virus.
MANAGEMENT

Hepatitis is a reportable communicable disease. In most cases no specific therapy is indicated, and it usually resolves spontaneously in 4–8 weeks without complications or sequelae.

Clients are most infective before the onset of jaundice. Virus may be shed for up to 1 week after jaundice appears.

Goals of Treatment

– Prevent disease
– Minimize liver damage
– Reduce spread of infection

Appropriate Consultation

Consult a physician for all cases except those that are clearly mild hepatitis A and for any client who is acutely ill at the time of presentation.

Nonpharmacologic Interventions

– Increase hydration (8–10 glasses of fluid daily)
– Adequate, well-balanced diet
– Abstention from alcohol for 3–4 months
– Activity as tolerated
– Client should be symptom free before returning to work and usual routines

Community Outbreaks of Hepatitis A

During community outbreaks of hepatitis A, while working in consultation with the Environmental Health Officer, Regional Community Medicine Specialist, or Regional Communicable Disease Advisor, advise community members about the following preventive measures:

– Water purification (boiling of water for 1 minute of a rolling boil) before drinking
– Impeccable hand-washing to reduce fecal-oral spread
– Sanitary disposal of fecal material
– Use of separate linens and dishes may be helpful but proper cleansing of these items is more important

Pharmacologic Interventions

Provide symptomatic treatment of symptoms such as fever, nausea and vomiting, pruritus and abdominal pain:

acetaminophen (Tylenol), 325 mg 1–2 tabs PO q4h prn. Use with caution as acetaminophen is metabolized by liver. Some experts recommend not exceeding 2 g of acetaminophen in 24 hours.

and
dimenhydrinate (Gravol), 50 mg PO q6h prn

Any hepatotoxic drugs should be identified and discontinued until recovery is complete.

Monitoring and Follow-Up

– Follow up all acute cases of hepatitis A in 24–48 hours to re-evaluate condition. After that, see client weekly for 2–4 weeks and again at 6 weeks to verify resolution of symptoms
– Repeat LFTs at 6 weeks (in acute hepatitis B and C, elevation of liver enzymes may be prolonged, so LFTs should be repeated every 3 months until normal)
– Clients with chronic hepatitis B and C should be seen every 3–4 months for symptoms and signs, and liver function should be monitored; they are at increased risk of liver cancer

Referral

– Referral to a physician is required for further assessment, diagnosis and investigation for all but hepatitis A, as hepatitis B, C and D can become chronic
– Medevac anyone who is acutely ill at time of presentation

PREVENTION OF SPREAD AND MANAGEMENT OF CONTACTS

Management of contacts to prevent spread depends on the underlying cause of disease.

HEPATITIS A

Nonpharmacologic Interventions

Control measures: Impeccable hand-washing to prevent fecal-oral spread is the key. Sanitary disposal of feces is also important.

Children and adults with hepatitis A should be excluded from school, daycare and work places, especially if they are food workers, until at least 1 week after onset of illness (until jaundice disappears).
Adults with hepatitis A should not be involved with food preparation until at least 1 week after onset of jaundice.

Schoolroom exposure does not generally pose a risk to others, and mass vaccination with immune globulin is not indicated.

Pharmacologic Interventions

Hepatitis A Immunization is considered the first line of treatment in post-exposure prophylaxis in some jurisdictions. This requires timely identification of contacts of a confirmed case. This requires the contact to have been in contact with the index case within the past 14 days during the time of communicability (defined as 15 days before onset of symptoms to 7 days after onset of jaundice). If the contact falls outside of this time frame, immune serum globulin is effective as an alternative to vaccine in post-exposure prophylaxis. Give:

Hepatitis A immune globulin, 0.02 mL/kg IM

Use of immune globulin more than 2 weeks after last exposure is not indicated.

Routine prophylaxis with hepatitis A vaccine is not indicated but is advisable for people travelling to areas of high prevalence, for people living in areas where disease is endemic and there are recurrent outbreaks, for immunocompromised people (for example, HIV-positive clients), for chronic hepatitis C clients, for men who have sex with men and for all workers exposed to potential sources of infection (for example, sewage truck operators).

This vaccine is not yet one of those routinely supplied by provincial government programs, although some public health agencies may provide individuals in some high-risk groups with the vaccine. Check with the public health department in your region for information on how to obtain this vaccine for a client who might benefit from prophylaxis.

HEPATITIS B

Pharmacologic Interventions

Immunoprophylaxis with hepatitis B vaccine is indicated for all persons at risk, and in many provinces it has become a routine part of the childhood vaccination program. For further information, see the latest “Canadian Immunization Guide” (available at: http://www.atlantique.phac.gc.ca/naci-ccni/index-eng.php). Nurses should follow their provincial immunization schedule and regional guidelines.

Groups at risk: health care workers, dialysis patients, recipients of blood or blood products, injection drug users, sexually active homosexual males, people in household or sexual contact with an infected person, people with potential for needlestick injury, people engaging in high-risk sexual behaviour (for example, receptive anal intercourse), newborns of infected mothers and people with chronic hepatitis C.

Post-Exposure

Hepatitis B human immune globulin 0.06 mL/kg IM can be given within 7 days of percutaneous or permucosal exposure (for example, needlestick injury) in a previously un-immunized person, but is ideally given within 24–72 hours. It can be given within 14 days of sexual exposure. Follow with three doses of hepatitis B vaccine as outlined above.

Clarification of risk of exposure to other bloodborne pathogens such as hepatitis C and HIV should also be considered if there is risk of exposure to hepatitis B.

The Medical Officer of Health should be consulted in these situations.

Prevention

– Screen prenatal women for hepatitis B
– If a newborn is exposed to hepatitis B (that is, mother is positive for hepatitis B surface antigen [HBsAg]), hepatitis B immune globulin (0.5 mL IM) is given within 24 hours of birth, and hepatitis B vaccine (0.5 mL) may be administered within 7 days after birth and at 1 and 6 months of age
– Because administration of immune globulin and vaccine is not consistent or routine across all provinces, check provincial guidelines

HEPATITIS C

Nonpharmacologic Interventions

Educate patients about harm reduction strategies, like recommending that intravenous drug users do not share equipment (for example, needles, skin cleansers) with others, to decrease their risk of contracting hepatitis C.

There are no specific prevention strategies other than avoidance of contact with the blood of an infected person through universal blood and body fluid precautions. Safe sex practices are recommended. Once infected, minimal alcohol use (< 4 drinks a week) is important to prevent liver damage.
**Pharmacologic Interventions**

There are specific treatments for hepatitis C clients to prevent liver damage; these can be prescribed by a specialist physician.


**HEPATITIS D**

*Nonpharmacologic Interventions*

Hepatitis D cannot be transmitted except in the presence of hepatitis B virus. Prevention of hepatitis B is therefore key in preventing hepatitis D. Universal precautions for blood and body fluids should be observed.

**HEPATITIS E**

It is rare in North America, however, it is spread under conditions of poor sanitation.

Immunoprophylaxis for hepatitis E exists but is undergoing efficacy trials and is not yet commercially available.

**HUMAN IMMUNODEFICIENCY VIRUS**

Human immunodeficiency virus (HIV) disease is a virus that attacks the immune system. Gradually, over time, the immune system grows weak. At first it may cause simple diseases like skin or yeast infections, but the illnesses become more serious. The amount of time that it takes HIV to begin to affect a person’s health varies widely from one individual to another.

For information about HIV infection and AIDS, refer to Health Canada (2008), “HIV/AIDS and Hepatitis C – A Reference for Nurses Providing Care for On-reserve First Nations People”.

**INVASIVE GROUP A STREPTOCOCCAL (GAS) INFECTION**

Invasive GAS infections may manifest as any of several clinical syndromes, including pneumonia, bacteremia in association with cutaneous infection (for example, cellulitis, erysipelas or infection of a surgical or nonsurgical wound), deep soft tissue infection (for example, myositis or necrotizing fasciitis), meningitis, peritonitis, osteomyelitis, septic arthritis, postpartum sepsis (that is, puerperal fever), neonatal sepsis or nonfocal bacteremia.

Two of the most severe, but least common, forms of invasive GAS disease are necrotizing fasciitis (infection of muscle and fat tissue) and streptococcal toxic shock syndrome (STSS). Approximately 20% of patients with necrotizing fasciitis and 80% with STSS die. Only about 10% to 15% of patients with other forms of invasive GAS disease die.

**CAUSE**

– Group A Streptococcus

**RISK FACTORS**

Although anyone can get GAS disease (including STSS), people with underlying health problems such as diabetes mellitus, chronic heart, lung or kidney problems, immunosuppression, cancer or HIV infection are at greater risk for invasive GAS disease.

A break in the skin, such as a cut, surgical wound, burn or chickenpox may increase a person’s risk. Close contacts of a case (family or household members, health care providers and nursing home staff) may be at increased risk for infection because of direct contact with secretions from the infected person.

**HISTORY AND PHYSICAL FINDINGS**

Presence of risk factors as identified above.

Early signs and symptoms of necrotizing fasciitis:

– Fever
– Severe pain, swelling and redness at the wound site
– Pain may be out of proportion to visible evidence of infection

Early signs and symptoms of STSS:

– Fever
– Dizziness
– Confusion
– Rash and abdominal pain
– Severe pain, swelling and redness at the wound site
STREPTOCOCCAL TOXIC SHOCK SYNDROME

STSS is an illness with the following clinical manifestations occurring within the first 48 hours of illness: hypotension (defined by systolic blood pressure \( \leq 90 \) mm Hg for adults or less than the fifth percentile by age for children < 16 years of age) and multiorgan involvement characterized by two or more of the following:

- Renal impairment
- Coagulopathy
- Liver involvement
- Acute respiratory distress syndrome (defined by acute onset of diffuse pulmonary infiltrates and hypoxemia in the absence of cardiac failure or by evidence of diffuse capillary leak manifested as acute onset of generalized edema or pleural or peritoneal effusion with hypoalbuminemia)
- Generalized erythematous macular rash that may show desquamation

DIFFERENTIAL DIAGNOSIS

- Cellulitis
- Sepsis
- Septic shock

COMPLICATIONS

- Sepsis
- Septic shock
- Amputation
- Death

DIAGNOSTIC TESTS

- None

MANAGEMENT

Appropriate Consultation

Consult a physician immediately if there is suspicion of invasive GAS infection. Inclusion of the Medical Officer of Health will also be necessary to help identify contacts of an index case of invasive GAS. The Medical Officer of Health will also be able to provide advice on the appropriate management of these contacts.

Nonpharmacologic Interventions

- Protect airway and ensure adequate ventilation
- Bed rest
- Protect infected area from further injury
- In addition to antibiotics, supportive care in an intensive care unit and sometimes surgery are necessary with these diseases

Adjuvant Therapy

- Oxygen 6–10 L/min or more prn to keep oxygen saturation > 97% to 98%
- Start IV therapy with normal saline to keep vein open

If client presents with signs of sepsis or septic shock, aggressive fluid resuscitation is necessary, as follows:

Start two large-bore IV lines with normal saline (for details, see “Shock” in the chapter “General Emergencies and Major Trauma”).

Pharmacologic Interventions

If client’s symptoms are suspicious for GAS disease or he or she would be at higher risk of invasive disease (for example, if he or she has diabetes mellitus, cancer, chronic heart disease, alcoholism), antibiotic therapy may be started while waiting for transfer. Choice of antibiotics should be determined in consultation with a physician. Often a combination of penicillin and clindamycin is initiated.

Monitoring and Follow-Up

Monitor ABC (airway, breathing and circulation) and symptoms frequently.

Referral

Medevac.

PREVENTION OF INVASIVE GAS INFECTION

- Spread of all types of GAS infections may be reduced by proper hand-washing, especially after coughing and sneezing, before preparing foods and before eating
- For anyone with a significant sore throat, a throat swab should be taken for culture and sensitivity if clinically indicated (see “The Sore Throat Score” in the section “Pharyngitis” in the chapter “Ear, Nose, Throat and Mouth”) to determine whether it is a streptococcal infection; if so, the person should stay home from work, school or daycare until 24 hours or more after antibiotic therapy has been initiated
All wounds should be kept clean and should be monitored for possible signs of infection (for example, increasing redness, swelling and pain at the wound site); clients should be advised to seek medical help immediately if any of these signs occur, especially if fever is also present.

**MONONUCLEOSIS (INFECTIOUS)**

Acute viral infection with classic triad of symptoms: fever, pharyngitis and enlarged lymph glands.

**CAUSES**

- Epstein-Barr virus
- Spread from person to person by the oropharyngeal route (via saliva), and only rarely by blood transfusion
- Incubation period 4–6 weeks
- Period of communicability is prolonged and indeterminate
- Pharyngeal excretion of virus may persist for a prolonged time, with intermittent shedding of the virus occurring for the rest of the client’s life

**HISTORY**

Adolescents and young adults are most often affected.

- Fever
- Sore throat
- Fatigue, malaise
- Headache
- Eyelid and orbital swelling
- Lymph glands swollen (especially posterior cervical glands)

**PHYSICAL FINDINGS**

- Temperature may be mildly elevated (most clients)
- Client appears tired
- Eyelid and periorbital edema
- Pharynx red, swollen (most clients); may have tonsillar exudate
- Petechiae on the palate
- Enlargement of lymph nodes of the neck (especially posterior cervical nodes) (in most of cases)
- Splenomegaly
- Hepatomegaly
- Rash, especially in those treated recently with amoxicillin or ampicillin. This rash has also been reported in those who have recently been treated with cephalaxin, azithromycin or levofloxacin

**DIFFERENTIAL DIAGNOSIS**

- Group A streptococcal (GAS) pharyngitis
- Hepatitis
- Viral pharyngitis
- Cytomegalovirus infection
- Toxoplasmosis
- Secondary syphilis
- Rubella

**COMPLICATIONS**

- Tonsillar hypertrophy (may be severe)
- Guillain-Barré syndrome
- Hepatitis
- Aseptic meningitis
- Encephalitis
- Hemolytic anemia
- Thrombocytopenia
- Agranulocytosis
- Myocarditis
- Splenic rupture
- Orchitis

**DIAGNOSTIC TESTS**

- Obtain serum sample for mononucleosis spot test
- Complete blood count (lymphocytosis is characteristic)
- Take a throat swab to rule out GAS pharyngitis

**MANAGEMENT**

**Goals of Treatment**

- Provide supportive care until recovery
- Prevent complications
- Prevent transmission

The duration of the illness is variable, with the typical, uncomplicated illness lasting 3–4 weeks. Malaise and fatigue can last several months.

**Appropriate Consultation**

Consult a physician if symptoms persist for more than 3 weeks or if there are any complications, such as impending airway obstruction from tonsillar hypertrophy, jaundice or neurological symptoms.

**Nonpharmacologic Interventions**

- Warm salt water gargles for sore throat
Client Education
- Advise client to eat foods as tolerated, but recommend well-balanced nutrition
- Advise client to undertake activity as tolerated; help client to plan a realistic schedule of rest, with modification of school or work responsibilities as needed
- Suggest increasing fluid intake, which may be beneficial
- Teach client good hand-washing technique to prevent spread, but client does not need to be isolated from others
- Suggest that client decrease stress if possible
- Recommend that client avoid contact sports for at least 1 month or until full resolution of enlarged spleen because of the increased risk of splenic rupture

Pharmacologic Interventions
Mild analgesic:
- ibuprofen (Motrin), 200 mg, 1–2 tabs PO q4h prn
- or
- acetaminophen (Tylenol), 325 mg, 1–2 tabs PO q4h prn

Monitoring and Follow-Up
Follow up once weekly until symptoms and splenomegaly resolve.

Referral
Not usually required.

RABIES EXPOSURE
Rabies does not usually present as rabies disease in primary care, but as potential or actual rabies exposure. This needs to be considered for preventative purposes. Nurses need to be able to identify situations of potential rabies exposure and have the knowledge to initially manage these situations. This is the focus of this section.

Rabies disease is a preventable viral infection that is fatal once reaching the central nervous system (CNS). The virus initially replicates in muscle fibres at the site of the infection and then travels to the CNS. Disease can be prevented through the use of Rabies Immune Globulin and Rabies Vaccine in exposed individuals prior to the virus spreading to the CNS. Primarily infects wild and domestic warm-blooded animals but can be transmitted to humans primarily by direct contact with the saliva of an infected animal, typically through animal bites.

CAUSES
Transmission
- A bite from a rabid animal that penetrates skin. The most common sources of rabies in Canada are wild carnivores (for example, foxes, skunks, raccoons), stray dogs and cats, cattle and bats
- Contamination of scratches, abrasions or cuts of skin or mucous membranes by saliva or other potentially contaminated material, such as brain tissue of a rabies-infected animal
- Rare instances have been noted in recipients of organ transplantation or blood products from a contaminated individual

WHEN TO SUSPECT RABIES EXPOSURE
Rabies should be considered in any and all animal bites and exposure to the saliva of a potentially rabid animal. Rabies exposures must be reported immediately to your Regional Communicable Disease (CD) Coordinator or Medical Officer of Health (MOH). Be suspicious that there has been rabies exposure:
- when an animal bites a person or another animal, particularly if there is no apparent reason (unprovoked), or if rabies is known to be present in the local animal population
- when the bite is severe and the skin is broken (more urgent to consider rabies exposure)
- if the animal cannot be confined and put under observation
- when there has been direct contact with a bat and a bite, scratch, or saliva exposure into a wound or mucous membrane cannot be ruled out

INCUBATION
After exposure to rabies, the incubation period before clinical symptoms develop in humans is generally about 20–60 days (but some sources report symptoms as early as 5 days and as long as 7 years after). This period varies depending on several factors including the severity of the encounter (for example, multiple wounds), the entry site in relation to a rich nerve supply, the entry site’s distance from the brain and the amount of virus introduced.
COMMUNICABILITY IN ANIMALS

- **Dogs and cats**: usually 3–7 days before onset of clinical symptoms and throughout course of the disease
- **Bats**: may shed virus for 12 days before evidence of illness
- **Skunks**: shed for at least 8 days before onset of clinical symptoms and up to 18 days before death
- **Horses**: about 10 days before onset of symptoms
- **Cows**: don’t shed virus before developing symptoms

HISTORY

- History of exposure from a bite and/or contamination of scratches, abrasions or cuts of skin or mucous membranes
- Details of incident
- What kind of animal was involved (small rodents usually do not carry rabies)
- Where the exposure occurred (geographic location)
- Why the exposure occurred (provoked or not)
- Who owns the animal and contact information (if applicable)
- Animal vaccination history
- Current status of animal
- Initial symptoms
  - headache, fever, malaise, poor appetite, tingling or itching at bite site, depression
- Symptoms after 2–10 days
  - hyperexcitability, anxiety, hypersalivation, muscle spasms, painful spasm of swallowing muscles, agitation
  - 20% have flaccid paralysis
  - delirium and convulsions
- Immunization history
- Previous exposure to rabies vaccination or immune globulin
- Medication history

PHYSICAL FINDINGS

- Examine the wound: type, site
- Immediately intervene with nonpharmacologic interventions listed below
- Observe for signs of infection

DIFFERENTIAL DIAGNOSES

For signs and symptoms of rabies:
- Delirium tremens
- Drug reaction (for example, crack, speed)
- Actue psychosis and hysteria
- Tetanus
- Meningitis
- Cerebral abscess
- Encephalitis
- Herpes simplex

COMPLICATIONS

- Spread of disease to others
- Encephalitis
- Respiratory depression
- Flaccid paralysis
- Delirium
- Convulsions
- Death

DIAGNOSTIC TESTS

Usually none, unless symptoms of disease are present. If rabies is suspected, the decision to sacrifice the source animal and arrange for source animal testing should be made in conjunction with the CD Coordinator or MOH and the Environmental Health Office.

MANAGEMENT

Rabies is a reportable disease.

Goals of Treatment

- Prevent disease
- Provide supportive care
- Prevent complications
- Prevent spread to others

Appropriate Consultation

Consult a physician immediately if rabies exposure is suspected or cannot be ruled out. All animal bites should be discussed with a physician. The CD Coordinator or MOH will determine if rabies vaccine and immune globulin should be given and advise on additional measures to be taken.

Nonpharmacologic Interventions

Post-Exposure Management

- Immediately wash and flush the wound thoroughly with soap and water for several minutes. The wound may then be rinsed with an antiseptic such as povidone iodine
- Complete regional reporting documentation
– Notify your Regional CD Coordinator or MOH and Environmental Health Office as soon as possible: 1) fax both groups the Rabies Exposure Report form or your regional reporting documentation and 2) phone your CDC Coordinator or MOH for treatment recommendations
– Carry out CD Coordinator/MOH recommendations regarding follow-up of client. This may include administration of rabies post-exposure prophylaxis and tetanus prophylaxis (see “Pharmacologic Interventions”)
– If prophylaxis immunization is to be given, provide teaching about immunization
– Do not suture or close a bite wound, even after administration of Rabies Immune Globulin, if needed
– Teach patient wound care and signs of infection (for example, fever, wound drainage, increased pain at the wound site)
– In any bite always consider rabies, but see also “Skin Wounds of traumatic origin” in the chapter “Skin”
– For more information on rabies see the Public Health Agency of Canada web site at: http://www.phac-aspc.gc.ca/im/rabies-faq-eng.php

Preventing Spread to Others
All animals involved in biting incidents must be considered rabid until proven otherwise. To facilitate the determination whether or not the animal that was involved in a biting or close contact incident has rabies, the nurse or CHR must work in consultation with the zone or region’s Environmental Health Office and CD Coordinator or MOH. Their recommendations regarding follow-up of the animal must be followed. This may include monitoring the status of the animal after a 10-day quarantine period or destroying the animal and submitting the head for laboratory analysis. Follow zone policies regarding these procedures.

Pharmacologic Interventions
For all cases where rabies vaccine and/or immune globulin might be needed, the CD Coordinator or MOH, the Environmental Health Office and the physician must be consulted prior to administration, according to regional policy. Decision to start rabies treatment is often made by the provincial MOH. Rabies vaccine and immune globulin volumes are the same for adult and pediatric patients.

Post-Exposure Prophylaxis
If a person has been exposed to rabies, clinical disease will be prevented if they receive post-exposure prophylaxis prior to the onset of symptoms. See the latest “Canadian Immunization Guide” (available at: http://www.atlantique.phac.gc.ca/naci-ccni/index-eng.php) and Regional Immunization Manual.

A. For Persons with NO History of Pre- or Post-Exposure Prophylaxis:
Rabies Vaccine (IMOVAX Rabies) 1 mL IM on days 0 (first day of treatment), 3, 7, 14 and 28 (after first dose) in deltoid or anterolateral upper thigh in infants. The vaccine should never be given in the gluteal area.
– The vaccine series may be discontinued after consultation with public health if the direct fluorescent antibody test of the brain of an animal killed at the time of attack is negative. However, if suspicion of rabies in the animal remains high, even in the presence of a negative test, the series should be continued.

Rabies Immune Globulin (HyperRAB S/D) 20 IU/kg body weight (see “Formula for Calculating the Dosage of Rabies Immune Globulin Required”) on first day of treatment only. It should be offered to exposed individuals regardless of elapsed time interval.
– If anatomically feasible, the full dose of Rabies Immune Globulin should be infiltrated into area around and into exposed wounds (see “Wound Infiltration”). Any remaining volume should be injected IM at a site distant from vaccine administration (opposite limb). If multiple wounds, all sites should be infiltrated, if possible (Rabies Immune Globulin can be diluted 2–3-fold with a solution of 0.9% sodium chloride to provide enough volume). Infiltration into a tissue compartment (for example, finger tip) is not recommended
– If no exposed wound is present, give entire dose of Rabies Immune Globulin IM with no more than 4 mL per injection site (no more than 2 mL in deltoid)
– Giving slow injections over 10 seconds is less painful than quick injection of the same volume
– Can be given up to 7 days after the first dose of rabies vaccine has been given
– Never give it in the same syringe or in the same site as Rabies Vaccine
– Do not give in the gluteal area

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Wound Infiltration
There are two techniques. The plane of injection for both wound infiltration techniques is with the needle parallel to and immediately below the dermis at the junction of the superficial fascia. Prior to starting, provide anesthesia to the area with 1% lidocaine to increase client comfort. See “Local Anesthetic for suturing” in the section “Skin wounds of traumatic origin” in the chapter “Skin”.

Direct Wound Infiltration
- Can be used for small lacerations if minimally contaminated
- Inject a small amount of the Rabies Immune Globulin directly into the superficial fascia parallel to and just deeper than the dermis through the wound itself. Remove the needle and move it along the wound to another area that has not been infiltrated by the immune globulin. Repeat this procedure until the area around the wound has been infiltrated
- Is less painful than parallel margin infiltration

Parallel Margin Infiltration
- Preferred method for dirty wounds where there may be a risk of spreading contaminants away from the wound surface
- Cleanse skin prior to injection
- Needle is inserted into the skin around the laceration and advanced almost to the hub of the needle, parallel to the dermis. Aspirate and then slowly inject a “track” of Rabies Immune Globulin as the needle is being withdrawn. Then reinsert at the end of the first track and provide another track of RabIg. Reinsertion and injection is repeated on all sides of the wound until complete infiltration has been achieved

Formula for Calculating the Dosage of Rabies Immune Globulin Required:

\[20 \text{ IU/kg} \times (\text{client weight in kg}) \div 150 \text{ IU/mL} = \text{dose in mL}\]

Antibiotic Treatment
If wound appears infected or if physician advises, start antibiotic treatment. See “Antibiotics for Bites” in the section “Skin wounds of traumatic origin” in the chapter “Skin”.

Clients with Rabies Disease Symptoms
The disease is usually fatal once disease signs or symptoms start and there is no specific treatment. Strict isolation precautions should be initiated and the client immediately transferred to an acute care facility for diagnostic confirmation and further management.

Monitoring and Follow-Up
- Monitor client’s wound according to severity
- If rabies post-exposure prophylaxis provided:
  - monitor client reaction to vaccine and Rabies Immune Globulin
  - teach client wound care and signs of infection (fever, wound drainage, increased pain at the wound site)
  - encourage client to return for medical follow-up and the importance of completing the vaccine schedule as initiated
  - tell patient that they should not have live vaccines for 4 months after Rabies Immune Globulin is given

Referral
If you suspect a client may have rabies, consult a physician immediately. If a client is experiencing symptoms of rabies disease, initiate a medevac after consultation with a physician.

Prevention
Educate clients to:
- Have pets vaccinated regularly
- Report unusual animal behaviour to veterinarian, Environmental Health Office or police
- Be vaccinated if they are at high risk for exposure occupationally

Pre-Exposure Prophylaxis
May be warranted for those who work in higher risk occupations due to potential occupational exposure (for example, veterinarians, animal control officers) and for travellers to endemic areas where there is poor access to post-exposure management. See the latest “Canadian Immunization Guide” (available at: http://www.atlantique.phac.gc.ca/naci-ccni/index-eng.php) and Regional Immunization Manual.
For all cases where rabies vaccine might be needed, the Communicable Disease Coordinator or MOH should be consulted prior to administration, according to regional policy.

Rabies Vaccine (IMOVAX Rabies) 1 mL IM doses on days 0, 7 and 21 (after first dose) in deltoid or anterolateral upper thigh in infants (never in gluteal area).

**SEXUALLY TRANSMITTED INFECTIONS**

There are numerous sexually transmitted infections (STIs) that can be considered. For more complete and specific information on specific syndromes and infections, refer to the latest “Canadian Guidelines on Sexually Transmitted Infections” (available at: http://www.phac-aspc.gc.ca/std-nts/sti-its/guide-lignesdir-eng.php).

Some STIs can be asymptomatic in both males and females. Having no symptom(s) in a person who has one or more risk factors does not exclude an STI. When investigating any possible sexually transmitted infection, the practitioner must obtain the following information in a nonjudgmental, factual manner.

**CAUSES**

STIs may be caused by bacteria, viruses or parasites.

**HISTORY**

**General History**
A detailed, comprehensive sexual history is mandatory.

- Site(s) of sexual contact (vaginal, oral, anal)
- Sexual orientation (homosexual, bisexual, heterosexual)
- Use of condoms to prevent STIs
- Use of other birth control methods
- Number of sexual partners in recent past
- History of sex with injection drug users
- Exchange of sex for money or drugs
- Period since last sexual intercourse with most recent partner
- Previous history of STIs
- Present symptoms of STIs in client and in his or her partner(s)
- Injection drug use, needle-sharing
- Enlargement of lymph nodes
- Fever or chills

**Specific History**

**Men**
- Urethral discharge (amount, colour and time of day it is most noticeable [in urethritis the discharge is most prominent after a long period without voiding])
- Dysuria
- Itch or irritation in distal urethra or meatus
- Pain or swelling in the scrotum or inguinal region
- Genital rash or lesions
- Rectal discharge, itch or pain
- Joint pain, arthritis, conjunctivitis, rash at other body sites

**Women**
- Vaginal discharge (amount and colour, presence of vaginal itch)
- Painful intercourse on penetration or deep dyspareunia
- Burning sensation with urination (as urine passes over the external genitalia)
- Genital rashes or lesions
- Lower abdominal pain
- Postcoital, midcycle or excessive menstrual bleeding
- Dysuria, frequency, urgency, nocturia, hematuria
- Joint pain, arthritis, conjunctivitis, rash at other body sites, enlargement of lymph nodes, fever
- Last menstrual period and any possibility of pregnancy

**PHYSICAL EXAMINATION**

When an STI is suspected perform a detailed, comprehensive genitourinary examination, as well as a full physical examination to detect other manifestations of the possible STI. Remember to inspect the pubic hair for lice and nits and the perianal region for abnormalities.

Pay special attention to the pharynx, the conjunctiva, the lymph nodes, the joints and the skin on the lower abdomen, thighs, buttocks, palms, forearms and soles.

**Men**
- Inspect and palpate the penis and glans for lesions
- Retract foreskin if required
- Examine meatus for urethral discharge
- Milk urethra from base of penis to glans three or four times to detect small amounts of discharge
- Inspect and palpate scrotum for heat, tenderness, swelling and lesions
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Examine perianal area for lesions, fissures, discharge
Perform digital rectal exam if patient has rectal symptoms and has practised receptive anal intercourse
Palpate for inguinal lymphadenopathy

Women
Genital examination must also include a speculum examination with adequate visualization of the cervical os
Inspect and palpate the external genitalia, including the labia, to detect lesions, swelling, erythema, discharge
Inspect colour of vaginal walls
Observe the amount and colour of vaginal and endocervical discharge

- Examine perianal area for lesions, fissures, discharge
- Perform digital rectal exam if patient has rectal symptoms and has practised receptive anal intercourse
- Palpate for inguinal lymphadenopathy

DIFFERENTIAL DIAGNOSIS

The client’s signs and symptoms may suggest the specific STI (see Table 4, "Symptoms and Signs of Some Sexually Transmitted Infections").

Table 4 – Symptoms and Signs of Some Sexually Transmitted Infections

<table>
<thead>
<tr>
<th>Symptoms and Signs</th>
<th>Possible STI Syndrome</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>In men</strong></td>
<td></td>
</tr>
<tr>
<td>Urethral discharge, burning on urination, urethral or meatal itch</td>
<td>Urethritis</td>
</tr>
<tr>
<td>Painful genital ulcers or lesions, painful inguinal lymphadenopathy</td>
<td>Genital ulcer disease (for example, genital herpes, syphilis, chancroid)</td>
</tr>
<tr>
<td>Painless genital lesions with or without inguinal lymphadenopathy</td>
<td>Genital ulcer disease, genital warts (condyloma accuminata or human papillomavirus infection)</td>
</tr>
<tr>
<td>Acute onset of unilateral scrotal pain or swelling</td>
<td>Epididymitis</td>
</tr>
<tr>
<td>Rectal discharge, rectal bleeding, tenesmus constipation</td>
<td>Proctitis</td>
</tr>
<tr>
<td><strong>In women</strong></td>
<td></td>
</tr>
<tr>
<td>Vaginal discharge, odour, genital itch, introital dyspareunia, external dysuria</td>
<td>Vulvovaginitis (for example, Trichomonas vaginalis infection)</td>
</tr>
<tr>
<td>Recent onset of abdominal pain, unusual vaginal bleeding, deep dyspareunia, with or without genital discharge</td>
<td>Cervicitis or pelvic inflammatory disease</td>
</tr>
<tr>
<td>Painful genital ulcers or lesions, painful inguinal lymphadenopathy</td>
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<td>Proctitis</td>
</tr>
</tbody>
</table>

COMPLICATIONS

Numerous complications can arise from STIs but each is infection specific.

DIAGNOSTIC TESTS

The diagnostic tests section was revised in March 2012.

Testing depends on the degree of suspicion for certain infectious process(es).

Selecting diagnostic tests is based on patient history, risk factors, physical exam findings and availability of laboratory tests, biologic samples and specimens. Refer to the Public Health Agency of Canada’s reference document tilted: Primary Care and Sexually transmitted Diseases (available at: http://www.phac-aspc.gc.ca/std-mts/sti-its/pdf/secii-eng.pdf) for selected screening and serology tests.46
VDRL (Venereal Disease Research Laboratory) and/or RPR (Rapid Plasma Reagin) are useful as screening tests for syphilis. Testing will be dependent on the presenting symptoms and the stage of the disease. Refer to the Public Health Agency of Canada’s guideline titled “Syphilis – Updated January 2012” (available at: http://www.phac-aspc.gc.ca/std-mts/sti-its/pdf/510syphilis-eng.pdf).

In December 2011, the Public Health Agency of Canada updated the guidelines on the management of gonococcal infections in response to increasing gonococcal antimicrobial resistance being observed in Canada. Gonorrhea cultures are recommended, when possible, to allow for antimicrobial sensitivity testing under the following circumstances:

- In men who have sex with men (MSM), cultures are recommended in symptomatic patients prior to treatment. Nucleic acid amplification testing (NAAT [also known as the Polymerase Chain Reaction – PCR test]) should continue to be used for screening asymptomatic individuals. Due to increased sensitivity of NAAT over culture, both gonococcal culture and NAAT may be indicated.
- For all cases, test of cure with an appropriate sample for gonococcal culture is recommended for any of the following situations:
  - All pharyngeal infections
  - Persistent symptoms or signs post-treatment
  - Cases treated using a regimen other than the preferred treatment
  - Case who is linked to a drug resistant/treatment failure case and was treated with that same antibiotic

**Men**
- Obtain samples from urethra, rectum and pharynx to be cultured for *Chlamydia* and *Neisseria gonorrhoea* (a urine sample can replace the urethral swab)
- Obtain serology sample for Venereal Disease Research Laboratory (VDRL) test (for syphilis)
- Obtain samples for viral culture (for example, herpes; dark-field smear for syphilis), which may be warranted if there are genital lesions
- Offer HIV counselling and blood testing if client has apparent risk factors

**Women**
- Obtain samples from the endocervix, rectum and pharynx to be cultured for *Chlamydia, N. gonorrhoea* and other bacteria (a urine sample can replace the endocervical swab)
- Obtain potassium hydroxide wet mount (to test for *Candida*) and saline wet mounts (to test for *Trichomonas* and bacterial vaginosis)
- Perform “whiff test” of vaginal secretions
- Obtain samples for viral culture (for example, herpes; dark-field smear for syphilis), which may be warranted if there are genital lesions
- Obtain serology sample for Venereal Disease Research Laboratory (VDRL) test (for syphilis)
- Offer HIV counselling and blood testing if client has apparent risk factors

**MANAGEMENT**

Many STIs are reportable diseases. Be aware of which ones are reportable in your province or territory. See contact tracing below.

**Goals of Treatment**
- Differentiate between various STIs
- Relieve symptoms
- Identify predisposing factors
- Prevent recurrence


A learning module on STIs, based on the Canadian Guidelines, is available on-line at the Public Health Agency of Canada at: http://www.phac-aspc.gc.ca/slm-maa/

**Nonpharmacologic Interventions**

**Client Education**
- Counsel client about appropriate use of medications (dose, frequency, importance of compliance)
- Instruct client to abstain from sexual intercourse for duration of treatment
- Teach client about barrier methods they can use to protect themselves and their partner during intercourse
- Teach client about factors in their life that make them more at risk for STIs and how they can modify these factors
**Contact Tracing**

**General Principles**

- A client who presents with symptoms suggestive of an STI should be considered an index case until proven otherwise.
- Investigate this symptomatic client by obtaining appropriate swab and blood samples, and treat with appropriate medications as if the test results were positive.
- At the time samples are collected, obtain a list of all sexual contacts in the past 3 months, although this period may be longer, depending on the infection that is being considered.
- If the test results are negative for an STI, further steps are not necessary. Destroy the list of sexual contacts.
- If the test results are positive for an STI, call in the contacts of the index case. Fill out the appropriate reporting forms and send to the Public Health Department.
- Treat each contact as if he or she were a new index case.
- Obtain the appropriate swab and blood samples from each contact.
- Treat each new index case with appropriate medications as if the test results were positive.
- Index cases should be treated with the appropriate antibiotic(s) at the time of presentation because of the length of time required to receive test results.
- Be alert to the fact that notifiable diseases may differ from one province or territory to another. Become familiar with the notifiable diseases in your province or territory and report accordingly.

**Pharmacologic Interventions**

**Gonorrhea:**

All confirmed or suspected cases must be treated. All patients treated for gonorrhea should also be treated for chlamydial infection, unless a chlamydia test result is available and negative. Directly observed therapy with single-dose regimens is desirable if poor compliance is expected.

As of December 2011, the recommended treatment for urethreal, endocervical, rectal, and/or pharyngeal infection in patients 9 years of age or older is:

- cefixime 800 mg, PO single dose
- ceftriaxone 250 mg IM (for those 9 years of age or older)

Quinolones such as ciprofloxacin and ofloxacin are *no longer recommended* for the treatment of gonococcal infections in Canada. When an anaphylactic allergy to penicillin or known sensitivity to a third generation cephalosporin creates a need for an alternative treatment, a single dose of ciprofloxacin 500 mg or ofloxacin 400 mg may be considered only if:

- there is no contraindication
- antimicrobial susceptibility testing is available and quinolone susceptibility is demonstrated

or

- local quinolone resistance is under 5% and a test of cure can be performed

Consult a physician for other gonococcal presentations and for treatment of children under 9 years of age.

**Chlamydia:**

Adults (non-pregnant and non-lactating): urethral, endocervical, rectal, and/or conjunctival infection:

- azithromycin 1 g PO in a single dose
- doxycycline 100 mg PO bid for 7 days

Consult a physician or nurse practitioner for treatment of pregnant or lactating women or children.


For further discussion on presentation and treatment of vulvovaginitis (for example, *Trichomonas vaginalis* infection) see “Vulvovaginitis.”

**Monitoring and Follow-Up**

- Instruct client to abstain from intercourse until patient and partner have finished treatment and are asymptomatic.
- Follow-up time and test of cure timing after completion of therapy varies according to infection treated. Refer to the specific infection in the “Canadian Guidelines on Sexually Transmitted Infections” (available at: http://www.phac-aspc.gc.ca/std-mts/sti-its/guide-lignesdir-eng.php).
Follow-up for test of cure is recommended for all clients, but essential (in clients with an infection that is curable) if any of the following exist:
- treatment failure has occurred previously
- compliance is uncertain or the entire course is not finished
- there is re-exposure to an untreated partner
- infection occurs during pregnancy
- pelvic inflammatory disease or disseminated gonococcal infection is diagnosed
- patient is a prepubertal child
- infection is acquired from a new partner

TUBERCULOSIS

Tuberculosis (TB) is a chronic communicable disease caused by Mycobacterium tuberculosis, a bacterium. The TB germ is coughed into the air by patients with active pulmonary TB and inhaled into the lungs of persons who may be in contact with those patients. After pulmonary inhalation and the establishment of infection, the organism can spread via the lymphatic system and blood stream to other areas of the body, including the middle ear, bones, joints, meninges, kidneys and skin.


Tuberculosis is a significant cause of morbidity and mortality among Canada’s Aboriginal peoples. The total number of reported cases of TB in Canada has shown a general decrease over the past decade. However, this decrease is mostly a reflection of a decreasing number of cases in the Canadian-born non-Aboriginal population. No significant TB incidence rate change has occurred in the Canadian-born Aboriginal population. The majority of cases of TB in Canada are now occurring in the foreign-born. Approximately 72% of patients present with respiratory disease (which includes pulmonary disease, as well as disease of the pleura and upper respiratory tract). Most active cases are confirmed by culture of Mycobacterium tuberculosis.

Nonrespiratory disease may be diagnosed on the basis of characteristic pathological findings and clinical presentation. Diagnosis may be difficult, so the clinician needs to have a high level of suspicion. Nonrespiratory disease is more common in patients with HIV infection and those from certain population groups, including Asian immigrants and Aboriginal Canadians, than in other patients.

STAGES OF DISEASE

Latent Infection (LTBI)

The person has a primary infection with the organism and has low numbers of tubercle bacilli in the body. They do not have active disease and cannot transmit the organism to others. The risk of active disease is high in certain groups of people with latent infection (see “Risk Groups” and “Risk Factors”).

Active Disease

The person has active disease and is contagious when they have high numbers of tubercle bacilli with involvement of the respiratory tract. The risk of active disease is highest in the first 2 years after infection. For further information see the “Canadian Tuberculosis Standards”, 6th edition (available at: www.phac-aspc.gc.ca/tbpc-latb/pubs/tbstand07-eng.php).

CAUSES

- Primarily, Mycobacterium tuberculosis and rarely other members of the M. tuberculosis complex group

RISK GROUPS

- Persons of Aboriginal ancestry, especially First Nations and Inuit
- Persons residing in Aboriginal communities that have high rates of LTBI and/or active disease
- Elderly persons who lived at a time when TB was more common
- Urban homeless persons
- Persons living in inadequate housing (overcrowding and/or poor ventilation)
- Persons living in an institutional setting (for example, in a correctional facility or nursing home)
- Immunocompromised persons (for example, HIV/AIDS)
- Persons immigrating to Canada from a high-prevalence country
- Close contact of known or suspected case(s) of active pulmonary TB
Persons at risk due to occupational exposure (for example, health care workers)

Persons with a history of active TB or with chest x-ray findings suggestive of past TB who have not received adequate therapy

**RISK FACTORS**

- HIV and AIDS
- Other severe immune-compromising condition including medications that suppress immunity (for example, high-dose corticosteroids or other immunosuppressive drugs given to transplant recipients, cancer patients or patients with chronic inflammatory conditions such as rheumatoid arthritis)
- Chronic renal failure
- Persons who are understood to be recently infected (within the past two years) with *Mycobacterium tuberculosis*
- Diabetes mellitus
- Malnutrition
- Alcoholism

**HISTORY**

Tuberculosis should be considered if the classic symptoms are present in a client from a high-risk group, if unexplained cough and symptoms persist for more than a few weeks or if pneumonia fails to resolve in any client (see the section “Risk Groups”).

Chronic cough (productive or nonproductive) for three weeks or more

- Fever (may be absent in children and elderly)
- Night sweats (may be absent in children and elderly)
- Fatigue
- Hemoptysis (generally associated with advanced disease)
- Anorexia (generally associated with advanced disease)
- Weight loss (generally associated with advanced disease)
- Exposure to TB
- History of active TB and questionable adequacy of previous treatment
- History of positive Mantoux test and questionable adequacy of prophylaxis (if the client had received prophylaxis for LTBI)

Respiratory and nonrespiratory tuberculosis can occur concurrently, thus, it is important to rule out evidence of respiratory TB when nonrespiratory TB has been diagnosed and vice versa.

Be alert to the diseases, drugs and conditions that predispose an infected client to active TB.

**PHYSICAL FINDINGS**

Perform a complete physical examination.

- Client may appear chronically ill, cachectic
- Weight loss
- Signs of pleural effusion on chest examination
- Enlargement of liver or spleen
- Enlargement of lymph nodes, particularly cervical lymph nodes
- Other signs which are based on site of the disease

**DIFFERENTIAL DIAGNOSIS**

- Chronic or subacute pneumonia
- Chronic obstructive pulmonary disease (COPD)
- Bronchiectasis
- Lymphoma or other malignancy
- Fungal infection

**COMPLICATIONS**

- Respiratory failure due to miliary or disseminated TB or due to far advanced pulmonary TB in a patient with pre-existing lung disease
- Pneumothorax
- Massive hemoptysis
- Vital organ failure (for example, cardiac failure due to TB pericarditis, adrenal insufficiency)
- Empyema
- Drug resistance (a strain of *M. tuberculosis* resistant to one or more of the four first-line drugs: isoniazid, rifampin, pyrazinamide or ethambutol).

For additional information regarding the different types of drug resistance, refer to the “*Canadian Tuberculosis Standards*”, 6th edition, Chapter 7: Drug Resistant Tuberculosis (available at: www.phac-aspc.gc.ca/tbpc-latb/pubs/tbstand07-eng.php)

- Death

**DIAGNOSTIC TESTS**

*Mantoux Test (Tuberculin Skin Test)*

The Mantoux test has three indications:

- Diagnosis of latent TB infection
- An aid to the diagnosis of active disease in children and those with nonrespiratory TB
- An epidemiological tool
The test should not be performed in the following situations:

- Client who has had previous severe blistering reactions to the Mantoux test
- Client who has had documented positive TST result in the past that was read by a knowledgeable health care practitioner
- Client known to have active TB or has been treated in the past for active TB
- Client with extensive burns or eczema
- Client who has had a viral infection (such as measles or mumps) in the past month or who has received vaccination with a live-virus vaccine in the past month

False-negative results may occur in seriously ill, anergic people (for example, those with HIV/AIDS or other immune deficiencies or those on corticosteroids and those with active TB).

Reaction to tuberculin antigen may wane to non-reactivity with age, whereas repeat skin testing may boost reactivity. Thus, it is important to perform a two-step Mantoux test in populations who are elderly or are likely to undergo serial testing (for example, health care workers). This will identify those whose response has waned over time.

BCG (Bacille Calmette-Guérin) vaccination may trigger a positive Mantoux result. If BCG was given in the first year of life, this response wanes over time, usually disappearing after the age of 3 or 4 years. If BCG was given after age 1, the positive reaction can persist for years.

The standard dose of the purified protein derivative (PPD) used in the Mantoux test is 5 tuberculin units. Immediately following injection, a wheal 6–10 mm in diameter should appear. If no wheal appears, or a substantial amount of the fluid leaks out, the injection should be re-administered at a different site (at least 10 cm from original site) with a new syringe. Detailed instructions on administration of the TST can be found in *Tuberculosis, Information for Health Care Providers*, 4th edition, The Lung Association.

The result is read 48–72 hours after injection by a trained health care practitioner and the measurement (in millimeters) of the transverse diameter of induration should be recorded (see Table 5, “Diameter of Induration Considered Significant after Purified Protein Derivative (PPD) Skin Test with 5 Tuberculin Units”) (the surrounding erythema should be ignored). No induration or redness in the absence of induration is recorded as 0 mm.

It is insufficient to describe the test result as simply “positive” or “negative.” These designations are arbitrary and have different meanings to different people.

Consult your provincial or territorial TB control office for its guidelines for significant and insignificant Mantoux test results.

**Table 5 – Diameter of Induration Considered Significant after Purified Protein Derivative (PPD) Skin Test with 5 Tuberculin Units**

<table>
<thead>
<tr>
<th>Client</th>
<th>Significant Diameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person with HIV and expected high risk of TB infection</td>
<td>0–4 mm</td>
</tr>
<tr>
<td>Person with HIV infection</td>
<td>≥ 5 mm</td>
</tr>
<tr>
<td>Child suspected of having TB</td>
<td>≥ 5 mm</td>
</tr>
<tr>
<td>Abnormal chest x-ray with fibronodular disease</td>
<td>≥ 5mm</td>
</tr>
<tr>
<td>Other immune suppression: TNF-alpha inhibitors, chemotherapy</td>
<td>≥ 5 mm</td>
</tr>
<tr>
<td>Close contact (especially child or young adult) of person with confirmed active TB</td>
<td>≥ 5 mm</td>
</tr>
<tr>
<td>Person with other risk factors</td>
<td>≥ 10 mm</td>
</tr>
</tbody>
</table>

**Diagnostic Tests for Active Disease**

- Obtain three sputum samples, 5–10 mL each, for acid-fast bacilli and *M. tuberculosis* culture (at least one should be an early morning specimen)
- Chest x-ray

**Other Diagnostic Tests**

- Obtain three urine samples for acid-fast bacilli culture if there is a reason to suspect genitourinary TB
- Complete blood count
- Liver enzymes (aminotransferase levels)
- Glucose
- Creatinine
- HIV serology
MANAGEMENT

Goals of Treatment

– Ensure adequate treatment of active disease; treatment is for the purpose of relieving symptoms, interrupting transmission, preventing drug resistance and providing a lasting cure
– Identify those who are contacts and screen them for evidence of active disease or latent infection; provide treatment for disease or infection as appropriate
– Identify others (for example, the immune-compromised) with latent infection and prevent it from progressing to active disease

Appropriate Consultation

Consult a physician immediately for all cases of suspected active TB and for any client who has a newly positive Mantoux test result (where previous TST was documented as 0 mm or < 5 mm, depending on the patient).

Nonpharmacologic Interventions

– Notify the provincial or territorial Public Health Department of all new cases of active TB, as well as all clients whose Mantoux tests have recently converted to positive
– Carry out contact tracing: all close family, friends and job contacts should undergo a screening Mantoux test, repeated 8–12 weeks later if the initial result is negative. Young children (< 5 years) and the immune-compromised are a high priority as they are especially likely to progress to disease if infected
– Guidelines for contact tracing may vary slightly by province or territory: check with the TB control officer in the province or territory of residence for additional information
– Adequate balanced nutrition, which aids in healing, may help prevent active TB in those with latent infection
– Adequate rest, especially in active disease

Client Education

– Explain disease process, course and prognosis
– Stress importance of strict adherence to medication regimen to ensure a complete cure of the disease and prevention of drug resistance
– Explain risks, benefits and side effects of drugs, as well as the purpose, process and importance of directly observed therapy
– Stress importance of close follow-up
– Provide appropriate information to dispel stigma that may be associated with TB

Pharmacologic Interventions

Latent Infection

Treatment regimens for LTBI may vary according to the provincial/territorial treatment guidelines and/or physician. Provincial/territorial guidelines and/or TB control offices may be consulted for further information.

Therapy with a single drug, isoniazid (INH), can reduce the risk of active TB in those with latent infection. Therefore, for those with a positive Mantoux test result, INH prophylaxis may be considered, upon consultation with a physician. The risk of adverse effects from INH must be weighed against its benefit in reducing the risk of active disease.

isoniazid (INH), 5 mg/kg to maximum 300 mg PO od for 6–12 months

and

pyridoxine (vitamin B6), 25 mg PO od

Rifampin regimens have also been used to treat LTBI. It is recommended to consult a TB specialist if treatment of LTBI with rifampin is indicated. Detailed information on the indication of rifampin for treatment of LTBI can be found in the “Canadian Tuberculosis Standards”, 6th edition, Chapter 6, Treatment of Tuberculosis Disease and Infection (available at: www.phac-aspc.gc.ca/tbpc-latb/pubs/tbstand07-eng.php).

Active Disease

Treatment is always with multiple drugs for 6–12 months on average and only initiated by a physician. Treatment is divided into two phases, the initial, or intensive phase, followed by the continuation phase.

The optimal regimen during the initial or intensive phase of treatment is three or four drugs, including INH, rifampin, pyrazinamide, ethambutol or streptomycin (see Table 6, “Dosage and Common Adverse Reaction Effects to First-Line Antituberculous Drugs”). If drug resistance is a possibility (and drug sensitivities are not available), a four-drug regimen should be considered (in consultation with treating physician and/or a TB specialist).

In addition to the antituberculous drugs, the clients on INH should also be given vitamin B6 (especially in the presence of substance abuse, diabetes mellitus, renal
failure, malnutrition, HIV infection, seizure disorder, breastfeeding or pregnancy) to prevent neurological complications:

- pyridoxine (vitamin B6), 25 mg PO od

After 2 months of “initial phase” therapy, pyrazinamide is usually discontinued if culture results indicate the presence of a fully sensitive organism. Then, INH and rifampin can be given twice weekly in the continuation phase.

Whenever anti-TB drugs are given intermittently, for example a twice-weekly schedule in the continuation phase, they must be fully supervised (directly observed therapy). The usual regimen of anti-TB drug treatment lasts 6 months in total.

A total of 9 months or more may be needed if clinical, radiologic or bacteriologic findings show a slow response (patients with cavitary pulmonary TB who are still culture-positive after 2 months of treatment are usually treated for 9 months in total). If second-line regimens are required, and particularly if there is a concern about drug resistance, much longer courses of treatment (15–18 months) are required. Regimens of 18 months or longer are needed if neither INH nor rifampin is used in the drug regimen.

TB medications are usually prescribed by TB specialists, yet in some provinces (for example, Quebec) they may be prescribed by a non-specialist physician. Consult your local TB medical authority before TB drugs are prescribed.

### Table 6 – Dosages and Common Adverse Reactions to First-Line Antituberculous Drugs

<table>
<thead>
<tr>
<th>Drug</th>
<th>Usual Daily Dose</th>
<th>Adverse Reactions*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Isoniazid</td>
<td>300 mg</td>
<td>Hepatitis, paresthesia</td>
</tr>
<tr>
<td>Rifampin</td>
<td>600 mg</td>
<td>Drug interactions, flu-like illness</td>
</tr>
<tr>
<td>Pyrazinamide</td>
<td>1500–2000 mg</td>
<td>Hepatitis, elevated serum level of uric acid, arthralgia</td>
</tr>
<tr>
<td>Ethambutol</td>
<td>800–1600 mg</td>
<td>Ocular toxicity (retrobulbar neuritis)</td>
</tr>
<tr>
<td>Streptomycin</td>
<td>1000 mg</td>
<td>Vertigo, tinnitus, renal failure</td>
</tr>
</tbody>
</table>

*All of these drugs may cause rash, nausea and fever.

### Monitoring and Follow-Up

- Follow client closely while on treatment (most will be followed for directly observed therapy)
- Monitor adherence to medication regimen for symptoms of disease and for drug side effects
- Liver enzyme levels should be checked regularly, based on the recommendations of the prescribing physician
- Clients receiving ethambutol should have a baseline visual activity and colour vision screen and it should be repeated every 6 months while on treatment (this may vary according to the provincial/territorial treatment guidelines and/or the treating physician)
- Clients with active pulmonary TB require monthly chest x-rays for the first 3 months
- Have a physician assess or monitor client at every opportunity during therapy, especially if problems arise or are suspected

### Referral

Clients with suspected active TB may need to be admitted to hospital for investigation and treatment. Public transportation (for example, aircraft) of such patients is discouraged. During transportation, the client should wear a surgical or procedure mask while those in attendance should wear an N95 mask (one that can filter particles of 1 µm in diameter and that provides a tight facial seal).

### Prevention

Prevention initiatives to support TB reduction could include TB education to increase knowledge and decrease any stigma associated with TB in the community; promotional activities to encourage the early detection of active disease; training to highlight the importance of identifying individuals in the community that would benefit from LTBI treatment, as well as the reasoning behind LTBI prophylaxis. These are just a few areas that could be used to enhance TB prevention through awareness and education.

Nurses may advocate for and encourage communities to participate in TB prevention programming.

One example of a resource that is available for communities to support TB prevention and control programming is the Strategic Community Risk Assessment and Planning for Enhanced Tuberculosis Programming (SCRAP TB). SCRAP TB is a resource and set of tools available for use within Aboriginal...
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Communities to support local TB programming and enhance knowledge of TB at the local level. The process includes establishing a community level working group to work through a process to understand the level of risk that exists in their community and to prioritize TB program areas based on this assessment. Once established, interventions are developed by the working group and are applied to meet the specific needs of the community. The resource also incorporates a guided evaluation component. The working group is made up of participants interested in TB prevention and control that live, work or have ties in the community. This resource is meant to be community driven and can be championed by a clinic staff member like the Community Health Representative or other community members. Additional information can be provided by the TB Coordinator in your FNIH Regional Office.

VULVOVAGINITIS (CANDIDA, TRICHOMONAS AND BACTERIAL VAGINOSIS)

Inflammation and irritation of the vaginal mucosa.

CAUSES

– Most common causes: infection with Candida, Trichomonas or Gardnerella vaginalis (bacterial vaginosis)
– Less common: other anaerobic vaginal bacteria
– Other causes: atrophy of vaginal mucosa in postmenopausal women, chemical irritants, foreign body such as a forgotten tampon

HISTORY

– Vaginal discharge
– Vaginal irritation, itching or burning
– Secondary vulvar irritation, itching, burning
– Superficial dyspareunia (pain at the introitus during intercourse)
– Symptoms may be recurrent
– Identify any association with recent antibiotic use
– Urinary symptoms may be present
– Vaginal spotting may be present
– Determine IUD use
– Use of tampons
– Also inquire about diabetes mellitus or symptoms associated with diabetes, steroid use, menopause or symptoms suggestive of menopause

PHYSICAL FINDINGS

The physical findings associated with vulvovaginitis (various causes) are presented in Table 7, “Physical Findings of Vulvovaginitis.”

Speculum and bimanual examination may be mildly to moderately irritating, depending on severity of vaginitis.

Table 7 – Physical Findings of Vulvovaginitis

<table>
<thead>
<tr>
<th>Candidiasis</th>
<th>Trichomonas infection</th>
<th>Bacterial vaginosis</th>
<th>Atrophic vaginitis</th>
</tr>
</thead>
<tbody>
<tr>
<td>External genitalia reddened; vaginal walls covered with adherent white exudate; when exudate is removed, underlying area may bleed</td>
<td>External genitalia reddened; copious frothy, green, foul-smelling exudate; cervix excoriated and bleeds easily</td>
<td>Scant-to-moderate grey, foul-smelling (“fishy”) discharge</td>
<td>Dry, thin, smooth, pale vaginal mucosa; tiny breaks in mucosal surface may be present</td>
</tr>
</tbody>
</table>

DIFFERENTIAL DIAGNOSIS

– Concurrent STIs
– Atrophic vaginitis in postmenopausal women
– Cystitis

DIAGNOSTIC TESTS

– Obtain vaginal swab for routine culture and sensitivity and cervical swabs for gonorrhea and chlamydial infection (polymerase chain reaction [PCR] urine testing, if available, is the alternative)
– Obtain urine sample for routine microscopy and culture plus PCR testing for chlamydia and gonorrhea
**MANAGEMENT**

**Goals of Treatment**
- Differentiate between various causes of vaginitis
- Relieve symptoms
- Identify predisposing factors
- Prevent recurrence

**Nonpharmacologic Interventions**

**Client Education**
- Counsel client about appropriate use of medications (dose, frequency, importance of compliance)
- Instruct client to abstain from sexual intercourse (or always use condoms during sexual intercourse)
- Recommend lubricants if atrophic vaginitis is present
- Recommend avoidance of tightly fitting synthetic underwear if Candida infections are recurrent
- Teach client proper perineal hygiene to prevent recurrence; avoid strong, scented soaps, perfumed products and bubble baths; take showers rather than baths

**CANDIDIASIS**

**PHARMACOLOGIC INTERVENTIONS**
Asymptomatic – no treatment is necessary.

Symptomatic:
- clotrimazole (Canesten), 1% cream intravaginally daily for 6 or 7 days or 3-day combi-pak therapy
- fluconazole 150 mg PO; 1 dose is effective – contraindicated in pregnancy

**MONITORING AND FOLLOW-UP**
- Follow up in 7–10 days, after completion of therapy
- Check blood glucose level if yeast vaginitis is recurrent
- In oral contraceptive pill (OCP) users with frequent infections, the OCP may be a contributing factor
- For recurrent yeast vaginal infections of unknown cause it may be helpful to treat the client’s asymptomatic partner
- Candida balanitis in the male sexual partner should be treated with a topical skin preparation of clotrimazole

**BACTERIAL VAGINOSIS**

**PHARMACOLOGIC INTERVENTIONS**
- metronidazole (Flagyl), 500 mg PO bid for 7 days
- or
- metronidazole 2 g PO for 1 dose

Instruct client to abstain from alcohol while taking metronidazole because of the Antabuse-like side effects of this drug.

Consult a physician for the treatment of pregnant or lactating women or for those with chronic alcoholism.

**MONITORING AND FOLLOW-UP**
- Follow up in 7–10 days, after completion of therapy
- Treatment of sexual partner is not usually indicated

**TRICHOMONAS VAGINALIS INFECTION**

**PHARMACOLOGIC INTERVENTIONS**
- metronidazole (Flagyl), 2 g PO stat in a single dose
- or
- metronidazole (Flagyl), 500 mg PO bid for 7 days

Instruct client to abstain from alcohol while taking metronidazole because of the Antabuse-like side effects of this drug.

Do not use metronidazole in the first trimester of pregnancy, in lactating women or in those with chronic alcoholism. In these cases discuss alternatives with a physician.

Treat sexual partner:
- metronidazole (Flagyl), 2 g PO stat in a single dose

**MONITORING AND FOLLOW-UP**
- Follow up in 7–10 days, after completion of therapy
- Instruct client to abstain from intercourse until patient and partner have finished treatment and are asymptomatic
Internet addresses are valid as of March 2012.


Health Canada. (2006). Strategic community risk assessment and planning for enhanced tuberculosis programming: A guide for working with communities to develop, implement and evaluate TB action plans: Coordinator’s guide. See also Participant’s guide.

INTERNET GUIDELINES, STATEMENTS AND OTHER DOCUMENTS


A Complement to the Canadian guidelines is also available in French only at: http://www.inspq.qc.ca/publications/notice.asp?E=p&NumPublication=653

ENDNOTES


