Objectives

When you have completed this unit you should be able to:

- Diagnose and manage children with measles, chickenpox and mumps.
- Diagnose and manage children with herpes stomatitis.
- Diagnose and manage children with viral hepatitis.
- Diagnose and manage children with tickbite fever.
- Diagnose and treat children with acute conjunctivitis.

Intr Oduct IO n

10-1 Which are the common childhood infections?

- Measles
- Chickenpox
- Mumps
- Herpes stomatitis
- Viral hepatitis
- Tickbite fever
- Conjunctivitis

Some infections, such as measles, mumps and viral hepatitis, are becoming uncommon in communities where vaccines against these viral illness are routinely given.

MEASLES

10-2 What is the cause of measles?

Measles is caused by a virus. It is an acute, very infectious (contagious) illness and is transmitted from person to person when the measles virus is breathed, coughed or sneezed into the air and then inhaled by another person who becomes infected by droplet spread. Measles often occurs in epidemics and is an important cause of childhood death in poor, unimmunised communities.

Measles is a highly infectious and serious disease.

10-3 What are the signs and symptoms of measles?

Measles has an incubation period of about 10 days (the delay between infection and the start of the illness).

At first the child develops a fever, runny nose, conjunctivitis and cough, and is generally unwell.

Two days after the start of the illness, Koplik spots appear. These are numerous small white
spots on a granular red base inside the cheeks, opposite the back teeth.

After a further 2 days the typical pink or red blotchy maculopapular (both seen and felt) rash appears, starting on the face and neck and slowly spreading down to the hands and feet. The rash therefore appears 4 days after the child first becomes unwell.

The fever increases and the child becomes increasingly ill with the onset of the rash. Over a few days the rash fades, the temperature drops and the child feels better.

Skin pigmentation (brown) and peeling may follow the rash (post-measles staining).

**NOTE** The diagnosis is usually clinical but it can be confirmed by serum antibody tests.

### 10-4 What are the complications of measles?

- Otitis media
- Laryngotracheobronchitis with a severe cough and stridor (measles croup)
- Pneumonia. This may be viral (measles, herpes or adenovirus) or bacterial
- Gastroenteritis
- Oral herpes or candidiasis (thrush)
- Keratitis (infection of the cornea) with possible corneal ulcers due to measles or herpes virus
- Encephalitis (rare but serious)
- Reactivation of tuberculosis
- Immunosuppression

Measles depresses the immune system resulting in other infections such as herpes stomatitis and adenoviral pneumonia. HIV infection may rapidly progress to AIDS while tuberculosis is often reactivated following measles. The Mantoux skin test may be negative despite active tuberculosis for a few months after measles.

### 10-5 What is the relationship between measles and malnutrition?

There is a close and important relationship between measles and malnutrition (i.e. undernutrition).

Measles is far more severe in children who are malnourished, especially if they are also vitamin A deficient. In addition, complications are more common and more serious in malnourished children.

Measles, especially with complications such as diarrhoea, often results in failure to thrive. Measles may lead to kwashiorkor or marasmus in children who are underweight at the time that they get measles. Therefore, measles may result in, or aggravate, malnutrition.

### 10-6 How can measles be prevented?

By immunising all children with measles vaccine. This is usually given at 9 months and again at 18 months. Measles vaccine is a highly effective and has resulted in the disappearance of measles in many communities. Measles, mumps and rubella vaccines (MMR) are often combined and given together.

**NOTE** Clinical measles can be prevented in an unimmunised child if measles vaccine is given within 12 hours of exposure to a child with measles.

### 10-7 What is the management of a child with measles?

1. The child should be kept away from other children until 5 days after the rash first appears. By this time the child is no longer infectious to others. Measles is most infectious during the 4 days of illness before the rash appears.
2. Paracetamol for fever
3. Adequate oral fluids to prevent dehydration

**Measles complications may be severe and result in death.**
4. Vitamin A for all children with measles: 100 000 IU orally daily for 2 days (50 000 IU daily for 2 days in children under 1 year).
5. Look out for and treat complications (acyclovir for herpes stomatitis and stridor; antibiotics for otitis media and pneumonia).
6. Measles is a notifiable disease in South Africa.

**NOTE** Other viral infections may have a rash similar to measles: rubella (German measles), erythema infectiosum (slapped cheek disease) due to parvovirus, roseola infantum (‘baby measles’) due to herpes virus 6, infectious mononucleosis (glandular fever) due to Epstein-Barr virus and common viral infections of the bowel, e.g. coxsackie and ECHO.

### CHICKENPOX

**10-8 What is the cause of chickenpox?**

Chickenpox is caused by the *Varicella zoster* virus. Like measles, it is very infectious and transmitted from person to person by droplet spread. Chickenpox is most infectious at the time that the rash starts. Following chickenpox, the same virus may remain silent (dormant) in the body for many years before being reactivated to result in shingles (acute pain and vesicular rash affecting only part of the body). Children can therefore also be infected and get chickenpox from an adult with shingles.

**10-9 What are the signs and symptoms of chickenpox?**

The incubation period of chickenpox is long at 2 to 3 weeks. The child becomes pyrexial and feels generally unwell. Within hours the rash appears on the face, scalp, chest, back and abdomen.

The rash starts as a pink macule (spot) which soon becomes a papule (palpable) and then a vesicle (with clear fluid) which progresses to a pustule (containing pus) and finally a scab. The progression takes 1–2 days and the rash, which is very itchy, appears in crops for about 5 days. The rash also appears in the mouth as multiple small ulcers. Unless there is secondary infection (impetigo), the rash does not leave scars.

The diagnosis can almost always be made by finding the typical rash. Usually the illness is mild and is not complicated.

**NOTE** Rarely pneumonia or encephalitis may complicate chickenpox.

**10-10 How is a child with chickenpox managed?**

1. They should not come into contact with other children or adults who have not had chickenpox until there are no more crops of new rash and all the rash has formed scabs.
2. Paracetamol for fever.
3. Try to prevent secondary bacterial infection following scratching. Baby powder often helps reduce the itching. Antibiotics may be needed for impetigo.
4. Ensure an adequate fluid intake, especially if the child has a sore mouth.
5. A new vaccine, recently available, is very effective in preventing chickenpox and shingles.
6. Hyperimmune immunoglobulin should be given prophylactically to high-risk children (leukaemia, AIDS, newborns) who are exposed to chickenpox.

**NOTE** Acyclovir is indicated for pneumonia or encephalitis or severe rash or in immunocompromised children.

### MUMPS

**10-11 What are the clinical features of mumps?**

Mumps is an acute illness which presents with fever as well as swelling and tenderness of one or both parotid glands. The enlarged parotid glands lift the lower part of the ear. Chewing may be painful due to the swollen glands. Sometimes the submandibular glands (below the jaw) may be involved.
Mumps is infectious and is caused by the droplet spread of mumps virus. Like chickenpox, the incubation period is 2 to 3 weeks. The parotid swelling has usually resolved by 10 days.

**NOTE** The virus can be cultured, and serum antibodies and mumps DNA detected, if the clinical diagnosis needs to be confirmed. This is uncommon. Mumps infection may be asymptomatic. Painless chronic parotid enlargement unrelated to mumps is common with AIDS.

### 10-12 What are the complications of mumps?

Mumps usually has no complications and recovery takes about 1 to 2 weeks. However, mumps may cause very painful orchitis (inflammation of the testes) in postpubertal males. Mumps may also cause a viral meningitis.

### 10-13 What is the management of children with mumps?

1. Mumps is infectious until the parotid swelling disappears.
2. Paracetamol for fever and discomfort is usually all the treatment that is needed.
3. Ensure adequate fluid intake.
4. Good mouth hygiene with antiseptic mouthwashes

Mumps is becoming uncommon in many communities as the very effective mumps vaccine is often given together with measles and rubella vaccine (MMR).

### HERPES STOMATITIS

### 10-14 What is herpes stomatitis?

Herpes stomatitis (or oral herpes) is an acute infection of the mouth caused by the herpes simplex virus. The infection is common and often asymptomatic. However, some children get numerous small, shallow ulcers on the tongue, gums and mucosa inside the cheeks. As the ulcers are very painful the child salivates and often refuses to eat or drink. The child is also pyrexial and generally unwell. The stomatitis slowly resolves by 10 days. An important complication of herpes stomatitis is dehydration.

Undernourished children with measles, and children with AIDS, are at high risk of severe herpes stomatitis. Children may also have severe stomatitis due to oral candidiasis.

**NOTE** Most stomatitis in children is caused by the type I Herpes simplex virus. The type II virus is more common in sexually-transmitted genital infection in adults (genital herpes).

### 10-15 What is the management of a child with herpes stomatitis?

1. Paracetamol for pain and fever
2. Good mouth hygiene with Glyco Thymol mouthwashes
3. Ensure adequate hydration. A nasogastric tube may be needed if the child refuses to drink or swallow.
4. Acyclovir in severe stomatitis, especially children with HIV infection. These children need hospitalisation.

Children with severe herpes stomatitis should be referred to hospital.

### 10-16 What are fever blisters?

The herpes simplex virus can remain hidden (dormant) and then become reactivated to cause fever blisters on the lips. This is similar to the varicella virus in chickenpox which can live on in the body for years before becoming reactivated to cause shingles. The onset of fever blisters may be started by other viral illnesses with fever or excessive exposure to sunlight.

Fever blisters present as a few very painful vesicles on the lips which soon form ulcers and then scabs. They can be treated with acyclovir cream if the treatment is started as soon as the discomfort begins. Herpes virus is present in fever blisters and can be spread to others by direct contact such as kissing. Therefore, adults with fever blisters should never kiss a child.
Unlike fever blisters, which occur on the lip, painful aphthous ulcers occur repeatedly on the mucosa of the mouth. The cause of aphthous ulcers is still unknown.

**ACUTE VIRAL HEPATITIS**

10-17 What is hepatitis?

Hepatitis is an inflammation of the liver. Although there are many causes of hepatitis, the main cause in children is viral.

During the early stages of hepatitis both bilirubin and urobilin are present in the urine when tested with reagent strips. This is a useful way of confirming the diagnosis of hepatitis.

**NOTE** With hepatitis there is an increase in the serum concentration of the liver enzymes. The bilirubin concentration may also be raised.

10-18 What are the common causes of acute viral hepatitis?

There are 2 common causes of acute viral hepatitis in children:

- **Hepatitis A virus:** This has a shorter incubation period (15–50 days) and is spread by swallowing the virus in contaminated food or water. Hepatitis A is the most common type of hepatitis in children.
- **Hepatitis B virus:** This has a longer incubation period (5–150 days) and in children is usually spread from a mother to her newborn infant at or soon after delivery. However it may also be spread orally like hepatitis A or by an unscreened blood transfusion or traditional scratching or cutting. In adults it is spread by sexual contact.

**NOTE** Antibodies to hepatitis A or B can be used to identify each virus. Hepatitis surface antigen (HBSAg) or e antigen (HBeAg) indicate persistent infection and probable viral shedding with hepatitis B.

10-19 What is the clinical presentation of acute viral hepatitis?

Acute viral hepatitis in children is often asymptomatic or presents with loose stools and a general feeling of being unwell. Clinical hepatitis may develop with loss of appetite, nausea and vomiting and pain over the liver. The liver is enlarged and tender. Some children have jaundice with dark urine and pale stools. Acute hepatitis is the most common cause of jaundice in children. The clinical symptoms and signs usually resolve over 2–4 weeks.

**Acute viral hepatitis is the most common cause of jaundice in children.**

Hepatitis A virus only causes acute hepatitis but hepatitis B virus may also cause chronic hepatitis.

10-20 What are the complications of acute viral hepatitis?

- Liver failure with acute viral hepatitis is uncommon. Liver failure presents with drowsiness and confusion or severe vomiting. These children need urgent referral to hospital. Some of these children die.
- Chronic hepatitis due to the hepatitis B virus may lead to cirrhosis and liver cancer in adulthood. Therefore, it is important to prevent hepatitis due to the hepatitis B virus.

**NOTE** In acute liver failure there is usually hypoglycaemia, low clotting factors and raised serum ammonia. Chronic (active) hepatitis is recognised by persistent raised liver enzymes.

10-21 How can viral hepatitis be prevented?

**Hepatitis A:**

- This virus is spread by the virus in stool-contaminated food or water, which is then eaten or drunk by someone else (the faeco-oral route). Good sanitation, clean water, hand-washing before meals and the
hygienic preparation of food are therefore important to prevent the spread of the virus.

- A very effective vaccine to prevent Hepatitis A is now available. Hopefully it will be added to the routine programme of immunisation in children.

**Hepatitis B:**

- As children usually acquire this virus from their mother who has the virus in her stool, it is important to identify women who have hepatitis before or during pregnancy. Their infants should be given hyperimmune immunoglobulin for hepatitis B after delivery when the first dose of hepatitis B vaccine should also be given.
- A very effective vaccine to prevent hepatitis B is available and has been included in the routine programme of immunisation in South Africa.

**10-22 What is the management of a child with acute viral hepatitis?**

1. Allow the child to eat whatever is wanted. A high energy diet with a lot of carbohydrate is best tolerated. Keep the child at home if possible.
2. Good hygiene prevents other children getting hepatitis. Hepatitis A is most infectious in the days just before the onset of jaundice.
3. Look out for danger signs of depressed level of consciousness, severe vomiting, and jaundice that does not clear by 4 weeks. Monitor blood glucose concentration in severely ill children.

**NOTE** Pooled immunoglobulin should be given to hepatitis A contacts and hyperimmune gamma globulin to hepatitis B contacts if affordable and available.

**10-23 What is tickbite fever?**

It is an acute illness caused by a bite from an infected tick. It presents with fever, headache and mild conjunctivitis, often followed in a few days by a maculopapular rash which can include the palms and soles. The headache is the most striking symptom. With careful inspection of the skin and scalp, a typical red, raised bite with a black centre can be found. The local lymph nodes may be enlarged.

The incubation period is 10 days. Usually the bite occurs on one weekend and the illness starts on the following weekend. Infection commonly occurs in the country where cattle are present and carry infected ticks.

Tickbite fever presents with a severe headache.

**NOTE** Tickbite fever is caused by a Rickettsia organism. Tickbite fever may be serious, even fatal, in adults who may have many organs involved. The rash may be haemorrhagic and tender due to a vasculitis. Splenomegaly is common while a positive Weil-Felix test will confirm the clinical diagnosis. However, a negative test does not exclude the diagnosis.

**10-24 What is the treatment of tickbite fever?**

It is best to avoid exposure to ticks or use insecticide spray on shoes, socks and trousers when walking in the country. Immediately remove any ticks found on the skin.

Doxycycline 100 mg orally twice a day for 5 days is effective. However, it should only be used for severe infections in children under 7 years of age as it may stain the teeth.

**NOTE** Chloromycetin can be used in children under 7 years.

**10-25 What are the common causes of acute conjunctivitis?**

Acute conjunctivitis is common and highly infectious. Usually it is caused by a virus (e.g. adenovirus) but it may be bacterial (e.g. Staphylococcus). Acute conjunctivitis may
occur in outbreaks in schools. Measles, tickbite fever and tuberculosis may also cause acute conjunctivitis.

Conjunctivitis due to allergy may be recurrent or chronic, and is usually associated with other allergies.

10-26 What are the clinical features of acute conjunctivitis?

It may involve one or both eyes. The conjunctivae become red and swollen. With viral conjunctivitis there is a watery discharge. With bacterial conjunctivitis the discharge may become purulent (yellow pus) and the eyelashes stick together. Allergic conjunctivitis is very itchy. Sudden onset of pain and redness of the conjunctiva in one eye suggests a foreign body. Very localised swelling of an eyelid is usually due to a stye (infection of a hair follicle). Local antibiotics, removal of the eyelash and warm compresses to open the obstructed hair follicle are needed.

10-27 What is the treatment of acute conjunctivitis?

Topical antibiotic drops or ointment (e.g. chloromycetin) or povidone-iodine drops are used for a few days. If there is marked swelling of the eyelids, give intramuscular ceftriaxone daily for 3 days.

NOTE 1% chloromycetin eye ointment, 1% tetracycline eye ointment or 2.5% povidone-iodine aqueous solution are used to treat bacterial conjunctivitis. Tetracycline and povidone-iodine can also be used to treat conjunctivitis due to Chlamydia.

10-28 What are the less common childhood illnesses?

Some childhood illnesses have almost disappeared due to routine immunisation:

- Poliomyelitis (polio)
- Whooping cough
- Diphtheria

Other infections are more common in adolescents and young adults:

- Infectious mononucleosis (Glandular fever)
- Rubella (German measles)

CASE STUDY 1

A 6-year-old child comes home from school feeling generally unwell. She has a temperature, cough and mild conjunctivitis. When a doctor is called 2 days later he notices Koplik spots and diagnoses measles. After another 2 days she develops a typical measles rash. Another child at school had measles recently.

1. What are Koplik spots?

Small white spots seen on a red, granular mucosa inside the cheeks opposite the back teeth. Only measles displays Koplik spots.

2. What is the incubation period for measles?

10 days from exposure to an infected child until the onset of feeling unwell with fever, cough and conjunctivitis. Another 2 days until the Koplik spots appear and then a further 2 days for the rash to start. Therefore, 14 days from infection to the rash.

3. Describe the typical rash of measles.

A pink or red blotchy maculopapular (both seen and felt) rash starting on the face and spreading down the trunk to the arms and legs. Skin pigmentation and peeling may follow the rash.

4. How can measles be prevented?

By immunising all children. The occasional case of measles still occurs because all children are not fully immunised.

5. What are the common complications of measles?

Otitis media, laryngotracheobronchitis and pneumonia. Gastroenteritis and stomatitis (herpes or fungal) are also seen.
6. What is the relationship between measles and malnutrition?

Measles is often more severe, and can be fatal, in malnourished children. In addition, the degree of malnutrition often becomes worse after measles.

Measles is particularly severe in children with a deficiency of vitamin A. Therefore 200,000 units of vitamin A should be given orally to all children with measles.

7. Can measles cause tuberculosis or AIDS?

No. But measles suppresses the immune system which can result in the reactivation of tuberculosis (a child with an asymptomatic TB infection now develops clinical signs of tuberculosis). A child with asymptomatic HIV infection can also develop clinical AIDS following immunosuppression due to measles.

CASE STUDY 2

A 4-year-old child develops a very painful mouth, drools saliva and refuses all feeds. He has a high temperature and is generally unwell and very miserable. His mother had fever blisters on her lip a week before.

1. What is the likely diagnosis?

Herpes stomatitis. This presents with many small, very painful ulcers in the mouth. The children are also pyrexial and generally unwell. Drooling and refusing to eat is due to the sore mouth.

2. What is the cause of this condition?

The herpes simplex virus. This child almost certainly was infected from his mother’s fever blisters. During the acute phase of fever blisters, the herpes virus can be spread by direct contact such as kissing. Adults with fever blisters should never kiss a child.

3. What is the danger of herpes stomatitis?

Children may become dehydrated if they do not drink enough because of their sore mouth. They may need nasogastric feeds or intravenous rehydration.

4. Which children often get severe herpes stomatitis?

Children with malnutrition or measles

5. What else may cause severe stomatitis?

Candidiasis (thrush) can cause severe stomatitis.

CASE STUDY 3

In an orphanage a number of children become ill. Some have a fever and loose stools while others develop jaundice and a tender abdomen. All have loss of appetite.

1. Why have a number of children in the orphanage become ill?

They probably have acute hepatitis A, which is often spread in crowded situations such as schools or orphanages. The virus is spread from the stools of a child to be ingested by other children (faeco-oral route). This is the most common cause of acute hepatitis in children.

2. Why are some children unwell with loose stools but do not develop jaundice?

Many children with acute hepatitis are asymptomatic while others become ill with loose stools but do not develop jaundice. Some become jaundiced for a few weeks. Rarely children with hepatitis become severely ill and may die of liver failure.

3. How are children usually infected with the hepatitis B virus?

They are infected by their mother at birth. Acute hepatitis due to the hepatitis B virus may not recover after a few weeks but progress
to chronic hepatitis. This can lead to cirrhosis and liver cancer in adulthood.

4. How can acute hepatitis A be prevented?

The spread of hepatitis A virus (and to a lesser extent, hepatitis B virus) can be reduced by washing hands after using the toilet and before eating. The safe distribution of human faeces (toilets) and a clean water supply is important. A vaccine is available.

5. How can acute hepatitis B be prevented?

Hepatitis B can be prevented by routinely immunising all children with hepatitis B vaccine. Mothers who have jaundice before or during pregnancy must be identified for special management.