

THE EAR DVD

Workbook

Trainer Version

2nd edition June 2011

**Improving the Diagnosis and
Treatment of Otitis Media in Young
Aboriginal Children**

**Designed by the Child Health Division
Menzies School of Health Research**

discovery for a healthy tomorrow



Title: The Ear DVD Workbook.

Improving the diagnosis and treatment of otitis media in young Aboriginal children.

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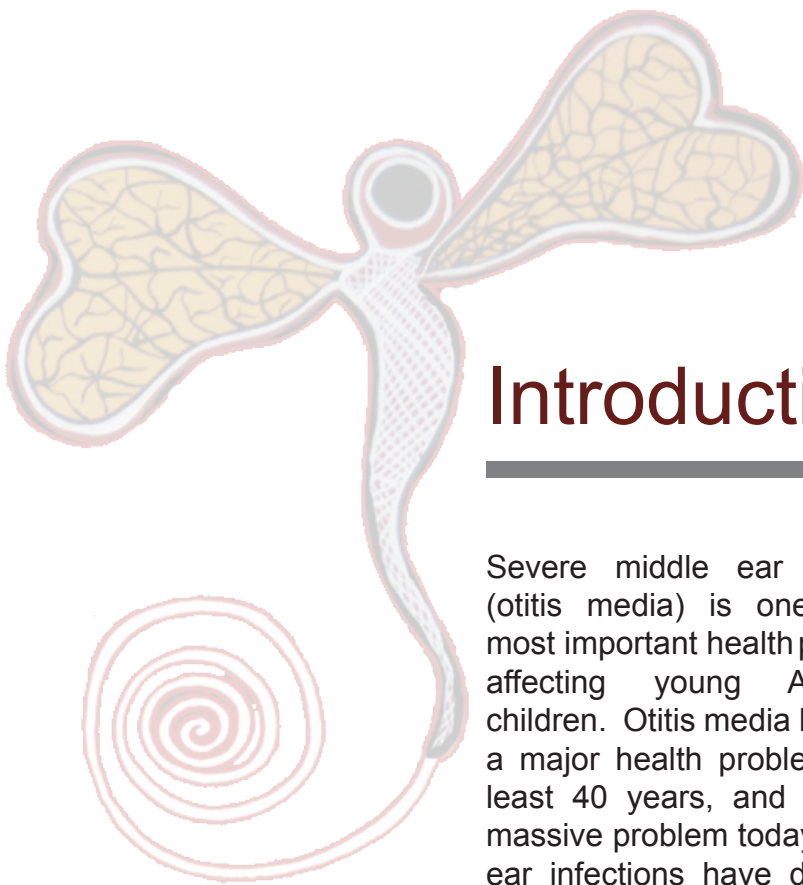
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Contents

Introduction	4 - 6
Definitions	7 - 8
Otitis Media (OM)	
Otitis Media with Effusion (OME)	
Chronic Otitis Media with Effusion	
Acute Otitis Media (AOM)	
Acute Otitis Media without Perforation (AOMwoP)	
Acute Otitis Media with Perforation (AOMwiP)	
Recurrent Acute Otitis Media (rAOM)	
Chronic Suppurative Otitis Media (CSOM)	
Dry Perforation	
Examples One to Example Four	9 - 12
Test 1 to Test 30	13 - 42



Introduction

Severe middle ear infection (otitis media) is one of the most important health problems affecting young Aboriginal children. Otitis media has been a major health problem for at least 40 years, and is still a massive problem today. These ear infections have damaging effects on hearing. This makes it difficult for children to learn at school. We are trying to find out the best way to stop these ear infections in Aboriginal children.

The medical name, 'otitis media', means 'ear infection' (otitis) and 'middle' (media). Otitis media is a general term for all types of inflammation behind the eardrum. The inflammation is usually caused by an infection. The infection starts when bacteria (germs) that are in the nose move along the Eustachian tube into the middle ear. This leads to a build up of fluid behind the eardrum.

Children with a persistent runny nose have a lot of bacteria and are more likely to have otitis media. Children with a runny nose can spread these bacteria to other children by sneezing,

coughing and kissing. The germs can also spread on hands. This happens if a child touches the germs on their own face or nose and then touches other children. Always encourage children to wash their hands and their faces if they have a runny nose.

We have found that a lot of Aboriginal babies have otitis media by 3 months of age. The baby may not show any obvious signs of an infection. This means you have to examine the eardrum with an otoscope if you want to find out if a child has an ear infection.

Ear infections may cause so much pus that the eardrum bulges like a boil. This is called Acute Otitis Media without Perforation (AOMwoP). If it is a severe infection, the eardrum will burst and pus will come out of the ear. This is called Acute Otitis Media with Perforation (AOMwiP). Giving the children antibiotic medicine (usually amoxycillin) can reduce the bulging and stop pus from perforating the eardrum. Therefore, it is important to know when the eardrum is



normal, when it is bulging like a boil (AOMwoP), and when there is a new hole with pus coming out (AOMwiP).

If the hole has pus coming out for a long time (at least 2 to 6 weeks), the infection is called Chronic Suppurative Otitis Media (CSOM). The hole is bigger and there are many bacteria involved. These bacteria come from the ear canal as well as from the nose via the Eustachian tube. There is so much pus and the bacteria germs are too resistant for amoxicillin to work effectively. The child will need cleaning of the pus with tissue “spears” or syringing. Once the ear canal is clean, antibiotic ear drops (usually ciprofloxacin) should be instilled at least twice a day until the ear has been dry for 3 days. This may take up to 16 weeks. This is really difficult for families. Therefore it is important to cure the bulging eardrum before the eardrum bursts.

At the Menzies School of Health Research, we check the ears using a hand-held otoscope or a special head lamp called a ‘Lumiview’ every

time we see a child. We use the ‘Lumiview’ so that we have both hands free to clean the ears if wax or pus are blocking the view. If there are no signs of bulging eardrum (AOMwoP), we also check to see if there is any mild build up of fluid behind the eardrum. This is called Otitis Media with Effusion (OME). We do this by puffing air against the eardrum (pneumatic otoscopy) or by using a machine called a tympanometer. A normal eardrum has very fast movement when air is puffed against it. If the eardrum is intact but moves slowly, the child probably has OME. This may cause the child to have a hearing problem. Referral for a hearing test, ENT review for possible grommet insertion and follow-up are recommended when OME has been present in both ears for more than 3 months.

If we see a bulging eardrum, or new pus, we try to explain clearly to the parents what is happening. We encourage them to give the antibiotic medicine to the child to stop any more pus building up. Sometimes the medicine has to be given for many weeks before the ear infection gets

better. Regular ear checks are very important.

Children are often very small when they first get otitis media. This means that examining the ears can be difficult. In ‘The Ear DVD’, we will show you how to recognise different types of ear infections in children less than 2 years old. Some of the images are hard to see clearly, so please ask questions if you are not sure what you are looking at.

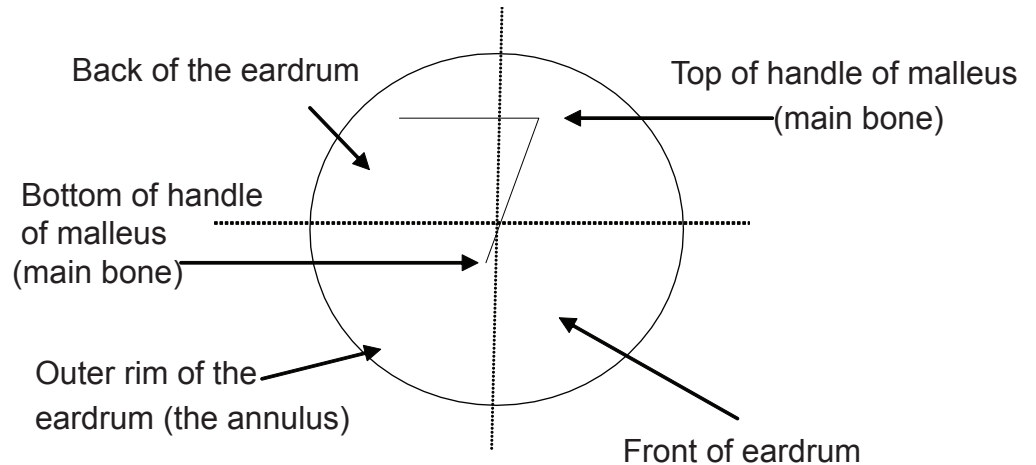
When you are examining ears yourself, make sure you always have someone who can hold a child very still. It is a good idea to ask someone else to check the ears if you are not sure what sort of ear infection the child has. We hope ‘The Ear DVD’ (taken from a study of over 100 Tiwi babies) will make it easier for you to recognise new ear infections in the children living in your own community.

‘The Ear DVD’ includes 34 video images of different eardrums. Pneumatic otoscopy (puffing air onto the eardrum) is used in all examinations. If the eardrum is intact this will cause the eardrum to move. The first 4 examples

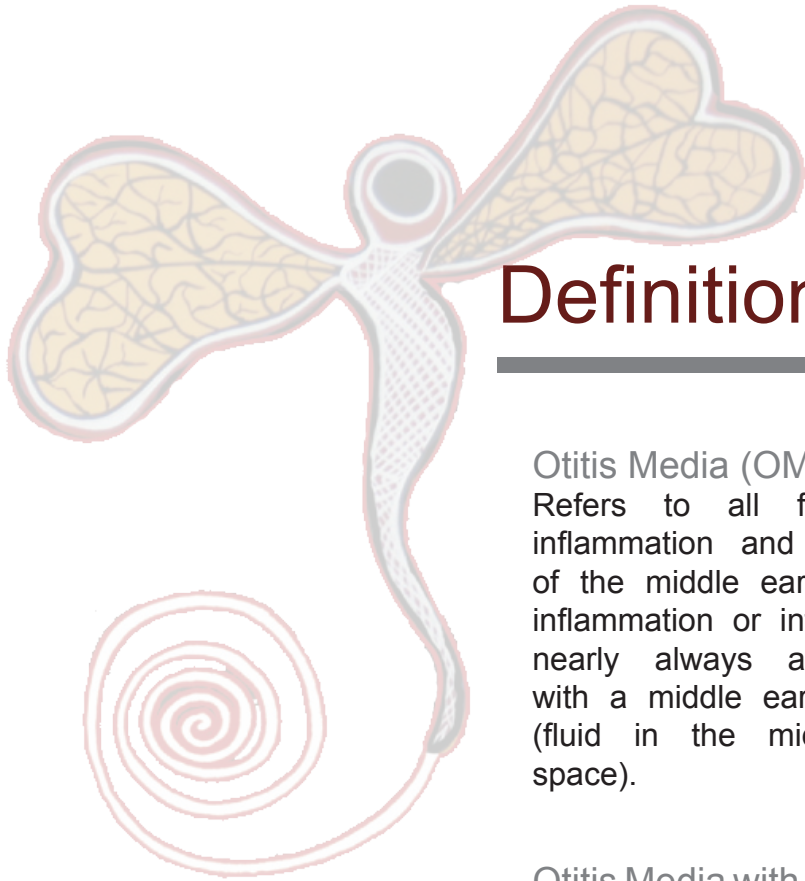
are guided images. For these images, a description of what you are seeing, the diagnosis, and the recommended clinical management are given on 'The Ear DVD'. After this, trainees should work through the 30 test images on their own. After each image, pause the DVD and discuss the answers with

the group. Ask everyone to write their own answers in 'The Ear DVD Workbook' provided. Once they've all decided, you can check their answers with the ones in 'The Ear DVD Workbook - Trainer Version'. Good luck!

Figure 1. Diagram of the right eardrum showing the position of the 4 quadrants of the tympanic membrane in relation to the handle of the malleus



- Top front (anterior superior quadrant)
- Bottom front (anterior inferior quadrant)
- Bottom back (posterior inferior quadrant)
- Top back (posterior superior quadrant)



Definitions

Otitis Media (OM):
Refers to all forms of inflammation and infection of the middle ear. Active inflammation or infection is nearly always associated with a middle ear effusion (fluid in the middle ear space).

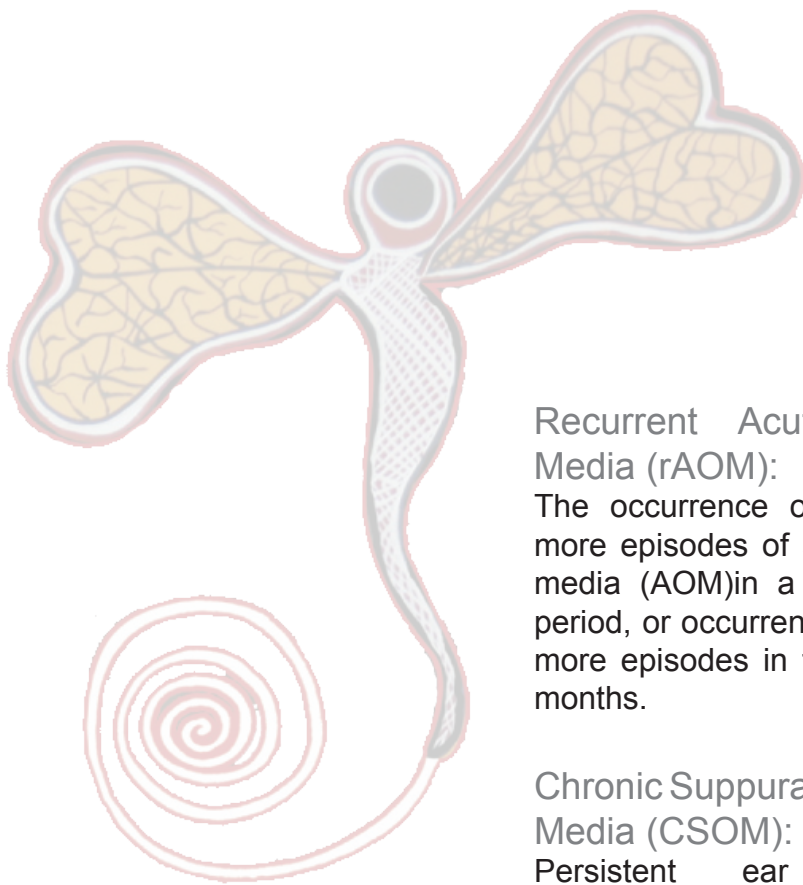
Otitis Media with Effusion (OME):
Presence of fluid behind the eardrum without any symptoms or signs of acute otitis media. Other terms have also been used to describe OME (including 'glue ear', 'serous otitis media' and 'secretory otitis media'). OME may be episodic or persistent. A type B tympanogram or reduced mobility of the eardrum on pneumatic otoscopy are the most reliable indicators of OME.

Persistent (Chronic) Otitis Media with Effusion:
Presence of fluid in the middle ear for more than 3 months without any symptoms or signs of inflammation.

Acute Otitis Media (AOM):
General term for both acute otitis media without perforation and acute otitis media with perforation. It is defined as the presence of fluid behind the eardrum plus at least one of the following: bulging eardrum, red eardrum, recent discharge of pus, fever, ear pain or irritability. A bulging eardrum, recent discharge of pus, and ear pain are the most reliable indicators of AOM.

Acute Otitis Media without Perforation (AOMwoP):
Presence of fluid behind the eardrum plus at least one of the following: bulging eardrum, red eardrum, fever, ear pain or irritability. Bulging eardrum and/or ear pain are the most reliable indicators of AOMwoP.

Acute Otitis Media with Perforation (AOMwiP):
Discharge of pus through a perforation (hole) in the eardrum within the last 6 weeks. The perforation is usually very small (a pinhole) when the eardrum first ruptures. The perforation can heal and re-perforate after the initial onset of AOMwiP.



Recurrent Acute Otitis Media (rAOM):

The occurrence of three or more episodes of acute otitis media (AOM) in a six month period, or occurrences of 4 or more episodes in the last 12 months.

Chronic Suppurative Otitis Media (CSOM):

Persistent ear discharge through a persistent perforation (hole) in the eardrum. Definitions of CSOM vary according to the duration of persistent ear discharge required (from 2 weeks to 12 weeks). Importantly, the diagnosis of CSOM is only appropriate if the tympanic membrane perforation is seen. The perforation should be large enough to allow the discharge to flow out of the middle ear space and for ear drops to be pumped into the middle ear space. Practically, this means the perforation should cover more than 2% of the eardrum.

Dry Perforation:

Presence of a perforation (hole) in the eardrum without any signs of discharge or fluid behind the eardrum. Some people also refer to this as inactive CSOM.

Definitions are adapted from the Recommendations for Clinical Care Guidelines on the Management of Otitis Media in Aboriginal and Torres Strait Islander Populations (Office for Aboriginal and Torres Strait Islander Health - OATSIH 2010). This document can be accessed through the OATSIH website www.health.gov.au/oatsih, the EarInfoNet website www.earinonet.org.au or by contacting Menzies School of Health Research.

Example One

A 6 month old girl attends the clinic for her immunisations. She is currently well. Routine ear examination reveals bulging eardrums.

Which ear is it?

- Left ear

Description of what you are seeing.

- Intact, bulging eardrum.
- The eardrum is white and has moderate bulging. The build up of pus behind the eardrum makes it bulge like a boil. It looks a bit like a doughnut.
- The build up of pus behind the eardrum makes it hard to see the main bone (the malleus). There is also an air fluid level present behind the top front part of the eardrum. A clump of wax at the top right hand side of the eardrum is obstructing the view of the top of the handle of the malleus.
- The movement of the eardrum during pneumatic otoscopy is slow. Pneumatic otoscopy allows you to see how the eardrum moves when pressure is applied. When air is present behind the eardrum, the movement will be fast. When fluid is present behind the eardrum, the movement will be slow.

Diagnosis given to image

- Acute Otitis Media without Perforation (AOMwoP)

Comments on Acute Otitis Media without Perforation (AOMwoP)

- AOM without perforation is an acute infection of the middle ear space. It is defined by the presence of fluid behind the eardrum plus at least one of the following: bulging eardrum, red eardrum, fever, ear pain or irritability. Redness is not a reliable sign on its own. Bulging eardrum and ear pain are the most reliable indicators of AOM without perforation.
- Babies and toddlers may cry and rub or pull at the infected ear. However most often there are no symptoms at all. This means that it is important that all health staff can recognise bulging eardrums in Aboriginal children.

Treatment recommended in the OATSIH guidelines

- Paracetamol for pain relief if child is complaining of ear pain or irritable.
- Antibiotics for at least 7 days (amoxycillin 50mg/kg/day given 2 times a day).
- Check the ears after a week. If no improvement, increase amoxycillin to 90mg/kg/day. Continue antibiotics until no signs of bulging or recent discharge.

Example Two

A 12 month old boy attends the clinic with 3 days of cough and runny nose. His mother noticed pus from his left ear 3 days ago. Ear examination reveals some pus in the canal but you can't see a perforation.

Which ear is it?

- Left ear

Description of what you are seeing

- Perforated eardrum with pus discharging through a very small perforation.
- The perforation is just below and in front of the main bone (the malleus). This is the place where perforations usually start. The perforation covers less than 1% of the eardrum. This is often called a "pinhole perforation".
- The eardrum is red and has marked bulging. A small amount of pus is able to move through the perforation during pneumatic otoscopy. You can't actually see the perforation but you know where it is by the movement of the pus.
- Thick pus will sometimes block small perforations. This causes the pus to build up behind the eardrum, and for the eardrum to start bulging again.

Diagnosis given to image

- Acute Otitis Media with Perforation (AOMwiP)

Comments on Acute Otitis Media with Perforation (AOMwiP)

- AOM with perforation is an acute infection of the middle ear space. It is defined by discharge of pus through a perforation (hole) in the eardrum within the last 7 days. The discharge is persistent for less than 6 weeks, or associated with a very small perforation (perforation size usually not more than 2% of the eardrum). Don't worry if you can't see the perforation. Even perforations that have just healed are still called AOM with perforation.
- The eardrum always bulges before it perforates. When the perforation is very small it often heals and then perforates again. This can happen every few days.
- Better treatment of AOM with perforation will be the quickest way to reduce high rates of chronic discharging ears. Oral antibiotics may be needed for many weeks. Antibiotic ear drops need to go through the perforation to work.

Treatment recommended in the OATSIH guidelines

- Antibiotics for at least 14 days (amoxicillin 50-90mg/kg/day given 2 or 3 times a day). If pus is present, dry mop the ears with 'tissue spears'.
- Check the ears every week. If no improvement, increase amoxicillin to 90mg/kg/day. If AOM with perforation persists for greater than 7 days, use high dose amoxicillin clavulanate (90mg/kg/day given 2 - 3 times a day). Continue antibiotics until no signs of bulging or recent discharge. This may need several weeks of treatment. If perforation is still present after 7-14 days, start cleaning the discharge followed by the application of antibiotic ear drops (e.g. ciprofloxacin drops 2 - 5 drops 2 - 4 times per day).
- Treat as CSOM if pus discharges for longer than 6 weeks and the perforation covers more than 2% of the eardrum.

Example Three

A 3 year old boy attends the clinic with extensive skin sores but is otherwise well. Routine ear examination reveals bilateral dull, featureless eardrums. His mother believes that his hearing is normal.

Which ear is it?

- Left ear

Description of what you are seeing

- Intact, dull, neutral eardrum.
- The eardrum is white and in a retracted position. You can't see through the eardrum. In this image, it is hard to judge the position because the main bone (the malleus) looks a bit retracted (sucked back) but fluid is also starting to build up at the back of the eardrum.
- There is a fluid level at the front of the eardrum in front of the main bone. A fluid level means that there is a mix of fluid and air behind the eardrum.
- The movement of the eardrum is slow. Pneumatic otoscopy allows you to see how the eardrum moves when pressure is applied. When air is present behind the eardrum, the movement will be fast. When fluid is present behind the eardrum, the movement will be slow. The fluid behind the eardrum also reduces hearing.

Diagnosis given to image

- Otitis Media with Effusion (OME)

Comments on Otitis Media with Effusion (OME)

- OME (also known as 'glue ear') is the presence of fluid behind the eardrum without any symptoms or signs consistent with AOM i.e. There will be no pain, bulging of the eardrum or recent discharge of pus.
- The hearing loss associated with OME is equivalent to sticking your fingers in your ears. Sounds are muffled i.e. normal speech is heard as a whisper.

Treatment recommended in the OATSIH guidelines

- Children with chronic OME should be referred for a hearing test. Antibiotic treatment is optional for infants at high risk of perforation and prior to surgical intervention. (e.g. amoxicillin 50mg/kg/day given 1 - 2 times a day for 3 - 6 months).

Example Four

A 4 year old girl is seen at school screening. She has purulent nasal discharge and discharging ears. Her mother says it started when she was a baby. The eardrums have central perforations that cover about 10-20% of the eardrum.

Which ear is it?

- Left ear

Description of what you are seeing

- Perforated eardrum with pus in the ear canal.
- The perforation is in front and below the main bone (the malleus). It covers about 15% of the eardrum.
- The eardrum is red and there is thick white discharge in the middle ear space and in the ear canal. The discharge moves in and out of the perforation during pneumatic otoscopy.

Diagnosis given to image

- Chronic Suppurative Otitis Media (CSOM)

Comments on Chronic Suppurative Otitis Media (CSOM)

- CSOM is a severe chronic infection of the middle ear space. It is defined by the persistent discharge of pus through a perforation (hole) in the eardrum for at least six weeks despite appropriate treatment for AOM with perforation. The perforation should cover more than 2% of the eardrum.
- The amount of discharge can be described as being: i) scant- discharge only behind the eardrum in middle ear space; ii) moderate - discharge also in the canal; or iii) profuse - discharge coming out of the ear canal and able to be seen without an otoscope. In this example, there is at least a moderate amount of discharge present.
- CSOM usually causes the greatest amount of hearing loss i.e. even worse than putting your fingers in your ears.

Treatment given in the OATSIH guidelines

- Dry mop with 'tissue spears' and then insert antibiotic drops (e.g. ciprofloxacin 2 - 5 drops) in the ear at least 2 times a day for up to 16 weeks. After insertion of the ear drops, press several times on the flap of skin in front of the ear canal (the tragus). This will pump the drops through the perforation.
- Check the ears every week. Continue cleaning and antibiotic drops until no discharge for at least 3 days. This may need several weeks of treatment.
- Refer the child for a hearing test and advise parents/teachers of hearing loss.

Test 1

Which ear is it?

- Left ear

Description of what you are seeing

- Intact, retracted eardrum.
- The eardrum is white and retracted (sucked back). The eardrum gets retracted when the tube between the nose and the middle ear space is blocked. You can't see through the entire eardrum, but some parts of it are translucent. There is also some wax blocking the view of the outer eardrum.
- The movement of the eardrum is fast. Pneumatic otoscopy allows you to see how the eardrum moves when pressure is applied. When air is present behind the eardrum, the movement will be fast. When fluid is present behind the eardrum, the movement will be slow. When there is air behind the eardrum (aerated middle ear), the hearing is usually normal.
- If the eardrum isn't translucent (see through), the only way you can tell if it has air behind it is by pneumatic otoscopy or tympanometry. You need an attachment for your otoscope to do pneumatic otoscopy. You need a special machine to do tympanometry (a tympanometer).

Diagnosis given to image

- Normal Aerated Middle Ear

Comments of a Normal Aerated Middle Ear

- Good hearing relies on the middle ear being full of air (aerated middle ear). This allows the eardrum and the middle ear bone (malleus) to move normally when sound comes into the ear. If the eardrum is moving normally, it usually doesn't matter if there is scarring or if the eardrum is retracted (sucked back).
- Fluid in the middle ear stops the eardrum from moving normally which results in hearing problems.

Treatment recommended in the OATSIH guidelines

- No medical management required.
- Encourage the family to bring the child back for regular ear check ups.

Test 2

Which ear is it?

- Right ear

Description of what you are seeing

- Intact, dull, retracted eardrum.
- The eardrum is white and retracted (sucked back). You can see the main bone (the malleus) and it is pointing backwards. You can't see through the eardrum.
- In this image, it looks like fluid might be starting to build up at the back of the eardrum. It would be a good idea to check the ear in 1-2 days to see if it is bulging.
- The movement of the eardrum is slow. Pneumatic otoscopy allows you to see how the eardrum moves when pressure is applied. When air is present behind the eardrum, the movement will be fast. When fluid is present behind the eardrum, the movement will be slow. The fluid behind the eardrum also reduces hearing.

Diagnosis given to image

- Otitis Media with Effusion (OME)

Comments on Otitis Media with Effusion (OME)

- OME (also known as 'glue ear') is the presence of fluid behind the eardrum without any symptoms or signs consistent with AOM i.e. there will be no pain, bulging of the eardrum or recent discharge of pus.
- The hearing loss associated with OME is equivalent to sticking your fingers in your ears. Sounds are muffled i.e. normal speech is heard as a whisper.

Treatment recommended in the OATSIH guidelines

- Children with chronic OME should be referred for a hearing test. Antibiotic treatment is optional for infants at high risk of perforation and prior to surgical intervention. (e.g. amoxicillin 50mg/kg/day given 1 - 2 times a day for 3 - 6 months).

Test 3

Which ear is it?

- Right ear

Description of what you are seeing

- Intact, bulging eardrum.
- The eardrum is white and has mild to moderate bulging. The red appearance is from the blood vessels rather than the eardrum itself. The build up of pus behind the eardrum makes it bulge like a boil. It looks a bit like a doughnut.
- The build up of pus behind the eardrum and the wax covering the top of the eardrum means you can't see the main bone (the malleus).

Diagnosis given to image

- Acute Otitis Media without Perforation (AOMwoP)

Comments on Acute Otitis Media without Perforation (AOMwoP)

- AOM without perforation is an acute infection of the middle ear space. It is defined by the presence of fluid behind the eardrum plus at least one of the following: bulging eardrum, red eardrum, fever, ear pain or irritability. Redness is not a reliable sign on its own. Bulging eardrum and ear pain are the most reliable indicators of AOM without perforation.
- Babies and toddlers may cry and rub or pull at the infected ear. However most often there are no symptoms at all. This means that it is important that all health staff can recognise bulging eardrums in Aboriginal children.

Treatment recommended in the OATSIH guidelines

- Paracetamol for pain relief if child is complaining of ear pain or irritable.
- Antibiotics for at least 7 days (amoxicillin 50mg/kg/day given 2 times a day).
- Check the ears after a week. If no improvement, increase amoxicillin to 90mg/kg/day. Continue antibiotics until no signs of bulging or recent discharge.

Test 4

Which ear is it?

- Right ear

Description of what you are seeing

- Intact, dull, neutral eardrum.
- The eardrum is white and in a neutral position. You can't see through the eardrum. There is also some hairs and wax blocking the view of the top part of the eardrum. This makes it difficult to be sure about the position. However, the bottom half of the eardrum does not look bulging or retracted (sucked back).
- The movement of the eardrum is fast. Pneumatic otoscopy allows you to see how the eardrum moves when pressure is applied. When air is present behind the eardrum, the movement will be fast. When fluid is present behind the eardrum, the movement will be slow. When there is air behind the eardrum (aerated middle ear), the hearing is usually normal.
- If the eardrum isn't translucent (see through), the only way you can tell if it has air behind it is by pneumatic otoscopy or tympanometry. You need an attachment for your otoscope to do pneumatic otoscopy. You need a special machine to do tympanometry (a tympanometer).

Diagnosis given to image

- Normal Aerated Middle Ear

Comments of a Normal Aerated Middle Ear

- Good hearing relies on the middle ear being full of air (aerated middle ear). This allows the eardrum and the middle ear bone (malleus) to move normally when sound comes into the ear. If the eardrum is moving normally, it usually doesn't matter if there is scarring or if the eardrum is retracted (sucked back).
- Fluid in the middle ear stops the eardrum from moving normally which results in hearing problems.

Treatment recommended in the OATSIH guidelines

- No medical management required.
- Encourage the family to bring the child back for regular ear check ups.

Test 5

Which ear is it?

- Right ear

Description of what you are seeing

- Intact, bulging eardrum.
- The eardrum is red and has moderate bulging. Some of the skin of the eardrum is peeling off at the top back part of the eardrum. The build up of pus behind the eardrum is bulging like a boil. It looks a bit like a doughnut.
- The build up of pus behind the eardrum means it is impossible to see the main bone (the malleus). The view of the top and the front of the eardrum are partly blocked by wax.

Diagnosis given to image

- Acute Otitis Media without Perforation (AOMwoP)

Comments on Acute Otitis Media without Perforation (AOMwoP)

- AOM without perforation is an acute infection of the middle ear space. It is defined by the presence of fluid behind the eardrum plus at least one of the following: bulging eardrum, red eardrum, fever, ear pain or irritability. Redness is not a reliable sign on its own. Bulging eardrum and ear pain are the most reliable indicators of AOM without perforation.
- Babies and toddlers may cry and rub or pull at the infected ear. However most often there are no symptoms at all. This means that it is important that all health staff can recognise bulging eardrums in Aboriginal children.

Treatment recommended in the OATSIH guidelines

- Paracetamol for pain relief if child is complaining of ear pain or irritable.
- Antibiotics for at least 7 days (amoxicillin 50mg/kg/day given 2 times a day).
- Check the ears after a week. If no improvement, increase amoxicillin to 90mg/kg/day. Continue antibiotics until no signs of bulging or recent discharge.

Test 6

Which ear is it?

- Left ear

Description of what you are seeing

- Intact, retracted eardrum.
- The eardrum is white and retracted (sucked back). The eardrum gets retracted when the tube between the nose and the middle ear space is blocked. You can't see through the entire eardrum, but some parts of it are translucent. There is also some wax blocking the view of the back of the eardrum.
- The movement of the eardrum is fast. Pneumatic otoscopy allows you to see how the eardrum moves when pressure is applied. When air is present behind the eardrum, the movement will be fast. When fluid is present behind the eardrum, the movement will be slow. When there is air behind the eardrum (aerated middle ear), the hearing is usually normal.
- If the eardrum isn't translucent (see through), the only way you can tell if it has air behind it is by pneumatic otoscopy or tympanometry. You need an attachment for your otoscope to do pneumatic otoscopy. You need a special machine to do tympanometry (a tympanometer).

Diagnosis given to image

- Normal Aerated Middle Ear

Comments of a Normal Aerated Middle Ear

- Good hearing relies on the middle ear being full of air (aerated middle ear). This allows the eardrum and the middle ear bone (malleus) to move normally when sound comes into the ear. If the eardrum is moving normally, it usually doesn't matter if there is scarring or if the eardrum is retracted (sucked back).
- Fluid in the middle ear stops the eardrum from moving normally which results in hearing problems.

Treatment recommended in the OATSIH guidelines

- No medical management required.
- Encourage the family to bring the child back for regular ear check ups.

Test 7

Which ear is it?

- Left ear

Description of what you are seeing

- Intact, bulging eardrum.
- The eardrum is white and has mild bulging. The red appearance is from the blood vessels rather than the eardrum itself. The build up of pus behind the eardrum makes it bulge like a boil. It looks a bit like a doughnut.
- The build up of pus behind the eardrum makes it hard to see the main bone (the malleus). You can see the handle of the malleus more clearly during pneumatic otoscopy.

Diagnosis given to image

- Acute Otitis Media without Perforation (AOMwoP)

Comments on Acute Otitis Media without Perforation (AOMwoP)

- AOM without perforation is an acute infection of the middle ear space. It is defined by the presence of fluid behind the eardrum plus at least one of the following: bulging eardrum, red eardrum, fever, ear pain or irritability. Redness is not a reliable sign on its own. Bulging eardrum and ear pain are the most reliable indicators of AOM without perforation.
- Babies and toddlers may cry and rub or pull at the infected ear. However most often there are no symptoms at all. This means that it is important that all health staff can recognise bulging eardrums in Aboriginal children.

Treatment recommended in the OATSIH guidelines

- Paracetamol for pain relief if child is complaining of ear pain or irritable.
- Antibiotics for at least 7 days (amoxicillin 50mg/kg/day given 2 times a day).
- Check the ears after a week. If no improvement, increase amoxicillin to 90mg/kg/day. Continue antibiotics until no signs of bulging or recent discharge.

Test 8

Which ear is it?

- Right ear

Description of what you are seeing

- Intact, dull, neutral eardrum.
- The eardrum is white. The position of the eardrum is quite difficult to assess, but overall it is probably neutral. Wax on the left hand side of the eardrum is obstructing the view of some of the top back part of the eardrum.
- The movement of the eardrum is fast. Pneumatic otoscopy allows you to see how the eardrum moves when pressure is applied. When air is present behind the eardrum, the movement will be fast. When fluid is present behind the eardrum, the movement will be slow. When there is air behind the eardrum (aerated middle ear), the hearing is usually normal.
- If the eardrum isn't translucent (see through), the only way you can tell if it has air behind it is by pneumatic otoscopy or tympanometry. You need an attachment for your otoscope to do pneumatic otoscopy. You need a special machine to do tympanometry (a tympanometer).

Diagnosis given to image

- Normal Aerated Middle Ear

Comments of a Normal Aerated Middle Ear

- Good hearing relies on the middle ear being full of air (aerated middle ear). This allows the eardrum and the middle ear bone (malleus) to move normally when sound comes into the ear. If the eardrum is moving normally, it usually doesn't matter if there is scarring or if the eardrum is retracted (sucked back).
- Fluid in the middle ear stops the eardrum from moving normally which results in hearing problems.

Treatment recommended in the OATSIH guidelines

- No medical management required.
- Encourage the family to bring the child back for regular ear check ups.

Test 9

Which ear is it?

- Left ear

Description of what you are seeing

- Intact, bulging eardrum.
- The eardrum is white and has a mild to moderate bulging. The red appearance is from the blood vessels rather than the eardrum itself. The build up of pus behind the eardrum makes it bulge like a boil. It looks a bit like a doughnut.
- The build up of pus behind the eardrum makes it hard to see the main bone (the malleus). You can see the top of the handle of the malleus more clearly during pneumatic otoscopy.

Diagnosis given to image

- Acute Otitis Media without Perforation (AOMwoP)

Comments on Acute Otitis Media without Perforation (AOMwoP)

- AOM without perforation is an acute infection of the middle ear space. It is defined by the presence of fluid behind the eardrum plus at least one of the following: bulging eardrum, red eardrum, fever, ear pain or irritability. Redness is not a reliable sign on its own. Bulging eardrum and ear pain are the most reliable indicators of AOM without perforation.
- Babies and toddlers may cry and rub or pull at the infected ear. However most often there are no symptoms at all. This means that it is important that all health staff can recognise bulging eardrums in Aboriginal children.

Treatment recommended in the OATSIH guidelines

- Paracetamol for pain relief if child is complaining of ear pain or irritable.
- Antibiotics for at least 7 days (amoxicillin 50mg/kg/day given 2 times a day).
- Check the ears after a week. If no improvement, increase amoxicillin to 90mg/kg/day. Continue antibiotics until no signs of bulging or recent discharge.

Test 10

Which ear is it?

- Right Ear

Description of what you are seeing

- Intact, bulging eardrum.
- The eardrum is white and has marked bulging of the bottom front part of the eardrum. The red appearance is from the blood vessels rather than the eardrum itself. The build up of pus behind the eardrum makes it bulge like a boil.
- The build up of pus behind the eardrum makes it hard to see the main bone (the malleus). In this case, you can't see the malleus at all. The area with marked bulging looks like it is just about to perforate.

Diagnosis given to image

- Acute Otitis Media without Perforation (AOMwoP)

Comments on Acute Otitis Media without Perforation (AOMwoP)

- AOM without perforation is an acute infection of the middle ear space. It is defined by the presence of fluid behind the eardrum plus at least one of the following: bulging eardrum, red eardrum, fever, ear pain or irritability. Redness is not a reliable sign on its own. Bulging eardrum and ear pain are the most reliable indicators of AOM without perforation.
- Babies and toddlers may cry and rub or pull at the infected ear. However most often there are no symptoms at all. This means that it is important that all health staff can recognise bulging eardrums in Aboriginal children.

Treatment recommended in the OATSIH guidelines

- Paracetamol for pain relief if child is complaining of ear pain or irritable.
- Antibiotics for at least 7 days (amoxicillin 50mg/kg/day given 2 times a day).
- Check the ears after a week. If no improvement, increase amoxicillin to 90mg/kg/day. Continue antibiotics until no signs of bulging or recent discharge.

Test 11

Which ear is it?

- Right ear

Description of what you are seeing

- Perforated eardrum with pus discharging through the perforation.
- The perforation is just below and in front of the main bone (the malleus). This is the place where perforations usually start. It covers less than 1% of the eardrum. This is often called a “pinhole perforation”. This is what a perforation looks like when it first starts.
- The eardrum is white and has mild bulging. The pus moves in and out of the perforation during pneumatic otoscopy.
- Thick pus will sometimes block small perforations. This causes the pus to build up behind the eardrum, and for the eardrum to start bulging.

Diagnosis given to image

- Acute Otitis Media with Perforation (AOMwiP)

Comments on Acute Otitis Media with Perforation (AOMwiP)

- AOM with perforation is an acute infection of the middle ear space. It is defined by discharge of pus through a perforation (hole) in the eardrum within the last 7 days. The discharge is persistent for less than 6 weeks, or associated with a very small perforation (perforation size usually not more than 2% of the eardrum). Don't worry if you can't see the perforation. Even perforations that have just healed are still called AOM with perforation.
- The eardrum always bulges before it perforates. When the perforation is very small it often heals and then perforates again. This can happen every few days.
- Better treatment of AOM with perforation will be the quickest way to reduce rates of CSOM. Oral antibiotics may be needed for many weeks. Antibiotic ear drops are only effective when they can go through the perforation to get to the infection. This is difficult when the perforation is very small or blocked by thick pus.

Treatment recommended in the OATSIH guidelines

- Antibiotics for at least 14 days (amoxicillin 50-90mg/kg/day given 2 or 3 times a day). If pus is present, dry mop the ears with 'tissue spears'.
- Check the ears every week. If no improvement, increase amoxicillin to 90mg/kg/day. If AOM with perforation persists for greater than 7 days, use high dose amoxicillin clavulanate (90mg/kg/day given 2 - 3 times a day). Continue antibiotics until no signs of bulging or recent discharge. This may need several weeks of treatment. If perforation is still present after 7-14 days, start cleaning the discharge followed by the application of antibiotic ear drops (e.g. ciprofloxacin drops 2 - 5 drops 2 - 4 times per day).
- Treat as CSOM if pus discharges for longer than 6 weeks and the perforation covers more than 2% of the eardrum.

Test 12

Which ear is it?

- Right ear

Description of what you are seeing

- Perforated eardrum with pus discharging through a very small perforation.
- The perforation is just below and in front of the main bone (the malleus). This is the place where perforations usually start. It covers less than 1% of the eardrum. This is often called a “pinhole perforation”. This is what a perforation looks like when it first starts.
- The eardrum is red and has marked bulging. A small amount of pus is able to move in and out of the perforation during pneumatic otoscopy. You can't actually see the perforation but you know where it is by the movement of the pus.
- Thick pus will sometimes block small perforations. This causes the pus to build up behind the eardrum, and for the eardrum to start bulging again.

Diagnosis given to image

- Acute Otitis Media with Perforation (AOMwiP)

Comments on Acute Otitis Media with Perforation (AOMwiP)

- AOM with perforation is an acute infection of the middle ear space. It is defined by discharge of pus through a perforation (hole) in the eardrum within the last 7 days. The discharge is persistent for less than 6 weeks, or associated with a very small perforation (perforation size usually no more than 2% of the eardrum). Note that a perforation that has just healed is still called AOM with perforation. Pus on the drum even if a perforation is not seen is still called an AOM with perforation.
- The eardrum always bulges before it perforates. When the perforation is very small it often heals and then perforates again. This can happen every few days.
- Better treatment of AOM with perforation will be the quickest way to reduce rates of CSOM. Oral antibiotics may be needed for many weeks. Antibiotic ear drops are only effective when they can go through the perforation to get to the infection. This is difficult when the perforation is very small or blocked by thick pus.

Treatment recommended in the OATSIH guidelines

- Antibiotics for at least 14 days (amoxicillin 50-90mg/kg/day given 2 or 3 times a day). If pus is present, dry mop the ears with 'tissue spears'.
- Check the ears every week. If no improvement, increase amoxicillin to 90mg/kg/day. If AOM with perforation persists for greater than 7 days, use high dose amoxicillin clavulanate (90mg/kg/day given 2 - 3 times a day). Continue antibiotics until no signs of bulging or recent discharge. This may need several weeks of treatment. If perforation is still present after 7-14 days, start cleaning the discharge followed by the application of antibiotic ear drops (e.g. ciprofloxacin drops 2 - 5 drops 2 - 4 times per day).
- Treat as CSOM if pus discharges for longer than 6 weeks and the perforation covers more than 2% of the eardrum.

Test 13

Which ear is it?

- Left ear

Description of what you are seeing

- Intact, bulging eardrum.
- The eardrum is white and has moderate bulging. The red appearance is from the blood vessels rather than the eardrum itself. The build up of pus behind the eardrum makes it bulge like a boil. It looks a bit like a doughnut.
- The build up of pus behind the eardrum makes it hard to see the main bone (the malleus). You can see the top of the handle of the malleus during pneumatic otoscopy.

Diagnosis given to image

- Acute Otitis Media without Perforation (AOMwoP)

Comments on Acute Otitis Media without Perforation (AOMwoP)

- AOM without perforation is an acute infection of the middle ear space. It is defined by the presence of fluid behind the eardrum plus at least one of the following: bulging eardrum, red eardrum, fever, ear pain or irritability. Redness is not a reliable sign on its own. Bulging eardrum and ear pain are the most reliable indicators of AOM without perforation.
- Babies and toddlers may cry and rub or pull at the infected ear. However most often there are no symptoms at all. This means that it is important that all health staff can recognise bulging eardrums in Aboriginal children.

Treatment given in accordance to the OATSIH guidelines

- Paracetamol for pain relief if child is complaining of ear pain or irritable.
- Antibiotics for at least 7 days (amoxicillin 50mg/kg/day given 2 or 3 times a day).
- Check the ears after a week. If no improvement, increase amoxicillin to 90mg/kg/day. Continue antibiotics until no signs of bulging or recent discharge.

Test 14

Which ear is it?

- Left ear

Description of what you are seeing

- Perforated eardrum with pus discharging through the perforation.
- The eardrum is red and bulging at the site of the perforation. The view is blocked by discharge covering a large part of the eardrum.
- The pinhole perforation is actually in the middle of the red bulging part of the eardrum just in front of the main bone (the malleus). You can only see the pinhole perforation during pneumatic otoscopy.
- Thick pus will sometimes block small perforations. This causes the pus to build up behind the eardrum, and for the eardrum to start bulging again.

Diagnosis given to image

- Acute Otitis Media with Perforation (AOMwiP)

Comments on Acute Otitis Media with Perforation (AOMwiP)

- AOM with perforation is an acute infection of the middle ear space. It is defined by discharge of pus through a perforation (hole) in the eardrum within the last 7 days. The discharge is persistent for less than 6 weeks, or associated with a very small perforation (perforation size usually not more than 2% of the eardrum). Don't worry if you can't see the perforation. Even perforations that have just healed are still called AOM with perforation.
- The eardrum always bulges before it perforates. When the perforation is very small it often heals and then perforates again. This can happen every few days.
- Better treatment of AOM with perforation will be the quickest way to reduce rates of CSOM. Oral antibiotics may be needed for many weeks. Antibiotic ear drops are only effective when they can go through the perforation to get to the infection. This is difficult when the perforation is very small or blocked by thick pus.

Treatment recommended in the OATSIH guidelines

- Antibiotics for at least 14 days (amoxicillin 50-90mg/kg/day given 2 or 3 times a day). If pus is present, dry mop the ears with 'tissue spears'.
- Check the ears every week. If no improvement, increase amoxicillin to 90mg/kg/day. If AOM with perforation persists for greater than 7 days, use high dose amoxicillin clavulanate (90mg/kg/day given 2 - 3 times a day). Continue antibiotics until no signs of bulging or recent discharge. This may need several weeks of treatment. If perforation is still present after 7-14 days, start cleaning the discharge followed by the application of antibiotic ear drops (e.g. ciprofloxacin drops 2 - 5 drops 2 - 4 times per day).
- Treat as CSOM if pus discharges for longer than 6 weeks and the perforation covers more than 2% of the eardrum.

Test 15

Which ear is it?

- Left ear

Description of what you are seeing

- Perforated eardrum with pus discharging through the perforation.
- The perforation is just in front of the main bone (the malleus). It covers 1% of the eardrum.
- The eardrum is red and has mild bulging. The pus moves in and out of the perforation during pneumatic otoscopy.
- Thick pus will sometimes block small perforations. This causes the pus to build up behind the eardrum, and for the eardrum to start bulging.

Diagnosis given to image

- Acute Otitis Media with Perforation (AOMwiP)

Comments on Acute Otitis Media with Perforation (AOMwiP)

- AOM with perforation is an acute infection of the middle ear space. It is defined by discharge of pus through a perforation (hole) in the eardrum within the last 7 days. The discharge is persistent for less than 6 weeks, or associated with a very small perforation (perforation size usually not more than 2% of the eardrum). Don't worry if you can't see the perforation. Even perforations that have just healed are still called AOM with perforation.
- The eardrum always bulges before it perforates. When the perforation is very small it often heals and then perforates again. This can happen every few days.
- Better treatment of AOM with perforation will be the quickest way to reduce rates of CSOM. Oral antibiotics may be needed for many weeks. Antibiotic eardrops are only effective when they can go through the perforation to get to the infection. This is difficult when the perforation is very small or blocked by thick pus.

Treatment recommended in the OATSIH guidelines

- Antibiotics for at least 14 days (amoxicillin 50-90mg/kg/day given 2 or 3 times a day). If pus is present, dry mop the ears with 'tissue spears'.
- Check the ears every week. If no improvement, increase amoxicillin to 90mg/kg/day. If AOM with perforation persists for greater than 7 days, use high dose amoxicillin clavulanate (90mg/kg/day given 2 - 3 times a day). Continue antibiotics until no signs of bulging or recent discharge. This may need several weeks of treatment. If perforation is still present after 7-14 days, start cleaning the discharge followed by the application of antibiotic ear drops (e.g. ciprofloxacin drops 2 - 5 drops 2 - 4 times per day).
- Treat as CSOM if pus discharges for longer than 6 weeks and the perforation covers more than 2% of the eardrum.

Test 16

Which ear is it?

- Right ear

Description of what you are seeing

- Perforated eardrum with pus in the ear canal.
- The perforation is just below the main bone (the malleus). It covers about 30% of the eardrum.
- There is a large amount of discharge in the middle ear space and the canal. The discharge may move in and out of the perforation during pneumatic otoscopy.
- There is some bleeding of the ear canal after cleaning. This is because the pus in the canal has made it very easy to break the skin when cleaning the ear canal.

Diagnosis given to image

- Chronic Suppurative Otitis Media (CSOM)

Comments of Chronic Suppurative Otitis Media (CSOM)

- CSOM is a severe chronic infection of the middle ear space. It is defined by the persistent discharge of pus through a perforation (hole) in the eardrum for at least six weeks despite appropriate treatment for AOM with perforation. The perforation should cover more than 2% of the eardrum.
- The amount of discharge can be described as being: i) scant - discharge only behind the eardrum in middle ear space; ii) moderate - discharge also in the canal; or iii) profuse - discharge coming out of the ear canal and able to be seen without an otoscope. In this example, there is at least a moderate amount of discharge present.
- CSOM usually causes the greatest amount of hearing loss.

Treatment recommended in the OATSIH guidelines

- Dry mop with 'tissue spears' and then insert antibiotic drops (e.g. ciprofloxacin 2 -5 drops) in the ear at least 2 times a day for up to 16 weeks. After insertion of the ear drops, press several times on the flap of skin in front of the ear canal (the tragus). This will pump the drops through the perforation.
- Check the ears every week. Continue cleaning and antibiotic drops until no discharge for at least 3 days. This may need several weeks of treatment.
- Refer the child for a hearing test and advise parents/teachers of hearing loss.

Test 17

Which ear is it?

- Left ear

Description of what you are seeing

- Perforated eardrum with pus in the ear canal.
- The perforation is in the central area of the eardrum. It is large and is covering about 50% of the eardrum.
- There is white discharge in the middle ear space and the canal.

Diagnosis given to image

- Chronic Suppurative Otitis Media (CSOM)

Comments on Chronic Suppurative Otitis Media (CSOM)

- CSOM is a severe chronic infection of the middle ear space. It is defined by the persistent discharge of pus through a perforation (hole) in the eardrum for at least six weeks despite appropriate treatment for AOM with perforation. The perforation should cover more than 2% of the eardrum.
- The amount of discharge can be described as being: i) scant - discharge only behind the eardrum in middle ear space; ii) moderate - discharge also in the canal; or iii) profuse - discharge coming out of the ear canal and able to be seen without an otoscope. In this example, there is at least a moderate amount of discharge present.
- CSOM usually causes the greatest amount of hearing loss.

Treatment recommended in the OATSIH guidelines

- Dry mop with 'tissue spears' and then insert antibiotic drops (e.g. ciprofloxacin 2 -5 drops) in the ear at least 2 times a day for up to 16 weeks. After insertion of the ear drops, press several times on the flap of skin in front of the ear canal (the tragus). This will pump the drops through the perforation.
- Check the ears every week. Continue cleaning and antibiotic drops until no discharge for at least 3 days. This may need several weeks of treatment.
- Refer the child for a hearing test and advise parents/teachers of hearing loss.

Test 18

Which ear is it?

- Right ear

Description of what you are seeing

- Intact, dull, neutral eardrum.
- The eardrum is white and in a neutral position. You can't see through the eardrum.
- The dull, featureless appearance of the eardrum is common in children who have had OME for a long time. This leads to thickening of the eardrum. This can make it difficult to see the main bone (the malleus).
- The movement of the eardrum is slow. Pneumatic otoscopy allows you to see how the eardrum moves when pressure is applied. When air is present behind the eardrum, the movement will be fast. When fluid is present behind the eardrum, the movement will be slow. The fluid behind the eardrum also reduces hearing.

Diagnosis given to image

- Otitis Media with Effusion (OME)

Comments on Otitis Media with Effusion (OME)

- OME (also known as 'glue ear') is the presence of fluid behind the eardrum without any symptoms or signs consistent with AOM i.e. there will be no pain, bulging of the eardrum or recent discharge of pus.
- The hearing loss associated with OME is equivalent to sticking your fingers in your ears. Sounds are muffled i.e. normal speech is heard as a whisper.

Treatment recommended in the OATSIH guidelines

- Children with chronic OME should be referred for a hearing test. Antibiotic treatment is optional for infants at high risk of perforation and prior to surgical intervention. (e.g. amoxicillin 50mg/kg/day given 1 - 2 times a day for 3 - 6 months).

Test 19

Which ear is it?

- Right ear

Description of what you are seeing

- Perforated eardrum with no pus visible.
- The perforation is just below the main bone (the malleus). It covers about 3% of the eardrum. It looks like it might have been larger before it started healing.
- The ear canal and the eardrum are dry and there are no signs of discharge in the middle ear space.
- The white patches at the back of the eardrum behind the malleus are tympanosclerosis of the eardrum. It is not a fungal infection.

Diagnosis given to image

- Dry Perforation

Comments of a Dry Perforation

- Dry perforation is the presence of a perforation (hole) in the eardrum without any signs of discharge of fluid behind the eardrum.

Treatment recommended in the OATSIH guidelines

- People with dry perforations should be advised to attend the clinic for oral and topical antibiotics for any new episodes of discharge.
- Advise the family about the likely hearing loss. Refer the child for a hearing test if this hasn't been done before. Small dry perforations on their own (like this one) usually don't cause much hearing loss.
- Re-examine the child in three months time, emphasising the importance of regular ear check ups.

Test 20

Which ear is it?

- Left ear

Description of what you are seeing

- Intact, dull, retracted eardrum.
- The eardrum is white and in a retracted position (sucked back). You can't see through the eardrum.
- The dull, featureless appearance of the eardrum is common in children who have had OME for a long time. This leads to thickening of the eardrum. This can make it difficult to see the main bone (the malleus).
- The movement of the eardrum is slow. Pneumatic otoscopy allows you to see how the eardrum moves when pressure is applied. When air is present behind the eardrum, the movement will be fast. When fluid is present behind the eardrum, the movement will be slow. The fluid behind the eardrum also reduces hearing.

Diagnosis given to image

- Otitis Media with Effusion (OME)

Comments on Otitis Media with Effusion (OME)

- OME (also known as 'glue ear') is the presence of fluid behind the eardrum without any symptoms or signs consistent with AOM i.e. there will be no pain, bulging of the eardrum or recent discharge of pus.
- The hearing loss associated with OME is equivalent to sticking your fingers in your ears. Sounds are muffled i.e. normal speech is heard as a whisper.

Treatment recommended in the OATSIH guidelines

- Children with chronic OME should be referred for a hearing test. Antibiotic treatment is optional for infants at high risk of perforation and prior to surgical intervention. (e.g. amoxicillin 50mg/kg/day given 1 - 2 times a day for 3 - 6 months).

Test 21

Which ear is it?

- Right ear

Description of what you are seeing

- Perforated eardrum with pus in the ear canal.
- The perforation is just below the main bone (the malleus). It covers about 12% of the eardrum.
- The eardrum is red and there is thick white discharge in the middle ear space.
- There is also some discharge in the ear canal and stuck to the eardrum. The discharge moves up and down in the middle ear space during pneumatic otoscopy.

Diagnosis given to image

- Chronic Suppurative Otitis Media (CSOM)

Comments on Chronic Suppurative Otitis Media (CSOM)

- CSOM is a severe chronic infection of the middle ear space. It is defined by the persistent discharge of pus through a perforation (hole) in the eardrum for at least six weeks despite appropriate treatment for AOM with perforation. The perforation should cover more than 2% of the eardrum.
- The amount of discharge can be described as being: i) scant - discharge only behind the eardrum in middle ear space; ii) moderate - discharge also in the canal; or iii) profuse - discharge coming out of the ear canal and able to be seen without an otoscope. In this example, there is at least a moderate amount of discharge present.
- CSOM usually causes the greatest amount of hearing loss i.e even worse than putting your fingers in your ears.

Treatment given in the OATSIH guidelines

- Dry mop with 'tissue spears' and then insert antibiotic drops (e.g. ciprofloxacin 2 - 5 drops) in the ear at least 2 times a day for up to 16 weeks. After insertion of the ear drops, press several times on the flap of skin in front of the ear canal (the tragus). This will pump the drops through the perforation.
- Check the ears every week. Continue cleaning and antibiotic drops until no discharge for at least 3 days. This may need several weeks of treatment.
- Refer the child for a hearing test and advise parents/teachers of hearing loss.

Test 22

Which ear is it?

- Right ear

Description of what you are seeing

- Perforated eardrum with pus behind the eardrum in the middle ear space.
- The perforation is in front and below the main bone (the malleus). It covers about 25% of the eardrum.
- There is a small amount of discharge in the middle ear space and some old dry pus stuck to the back of the eardrum.
- If you look through the perforation, you can just see the end of the Eustachian tube (the tube from the nose to the ear).

Diagnosis given to image

- Chronic Suppurative Otitis Media (CSOM)

Comments on Chronic Suppurative Otitis Media (CSOM)

- CSOM is a severe chronic infection of the middle ear space. It is defined by the persistent discharge of pus through a perforation (hole) in the eardrum for at least six weeks despite appropriate treatment for AOM with perforation. The perforation should cover more than 2% of the eardrum.
- The amount of discharge can be described as being: i) scant - discharge only behind the eardrum in middle ear space; ii) moderate- discharge also in the canal; or iii) profuse - discharge coming out of the ear canal and able to be seen without an otoscope. In this example, there is a scant amount of discharge present.
- CSOM usually causes the greatest amount of hearing loss. However, the hearing usually improves if the discharge can be reduced to a scant amount.

Treatment recommended in the OATSIH guidelines

- Dry mop with 'tissue spears' and then insert antibiotic drops (e.g. ciprofloxacin 2 - 5 drops) in the ear at least 2 times a day for up to 16 weeks. After insertion of the ear drops, press several times on the flap of skin in front of the ear canal (the tragus). This will pump the drops through the perforation.
- Check the ears every week. Continue cleaning and antibiotic drops until no discharge for at least 3 days. This may need several weeks of treatment.
- Refer the child for a hearing test and advise parents/teachers of hearing loss.

Test 23

Which ear is it?

- Left ear

Description of what you are seeing

- Perforated eardrum with no pus visible.
- The perforation is in the front bottom part of the eardrum. It covers about 5% of the eardrum. It looks like it might have been larger before it started healing.
- The ear canal and the eardrum are dry and there are no signs of discharge in the middle ear space.
- The white patches behind the malleus and in front of the malleus are tympanosclerosis of the eardrum. It is not a fungal infection.

Diagnosis given to image

- Dry Perforation

Comments of a Dry Perforation

- Dry perforation is the presence of a perforation (hole) in the eardrum without any signs of discharge of fluid behind the eardrum.

Treatment recommended in the OATSIH guidelines

- People with dry perforations should be advised to attend the clinic for oral and topical antibiotics for any new episodes of discharge.
- Advise the family about the likely hearing loss and organise a hearing test if this hasn't been done before. Small dry perforations on their own (like this one) usually don't cause much hearing loss.
- Re-examine the child in three months time, emphasising the importance of regular ear check ups.

Test 24

Which ear is it?

- Right ear

Description of what you are seeing

- Perforated eardrum with pus discharging through the perforation.
- The perforation is just below and in front of the main bone (the malleus). This is the place where perforations usually start. It covers about 3% of the eardrum. In this case, we know that the perforation has not been discharging for a long time.
- The eardrum is mildly red and has very slight bulging. The pus moves in and out of the perforation during pneumatic otoscopy.
- Thick pus will sometimes block small perforations. This causes the pus to build up behind the eardrum, and for the eardrum to start bulging.

Diagnosis given to image

- Acute Otitis Media with perforation (AOMwiP)

Comments on Acute Otitis Media with Perforation (AOMwiP)

- AOM with perforation is an acute infection of the middle ear space. It is defined by discharge of pus through a perforation (hole) in the eardrum within the last 7 days. The discharge is persistent for less than 6 weeks, or associated with a very small perforation (perforation size usually not more than 2% of the eardrum). Note that a perforation that has just healed is still called AOM with perforation. Pus on the eardrum even if a perforation is not seen is still called an AOM with perforation.
- The eardrum always bulges before it perforates. When the perforation is very small it often heals and then perforates again. This can happen every few days.
- Better treatment of AOM with perforation will be the quickest way to reduce rates of CSOM. Oral antibiotics may be needed for many weeks. Antibiotic ear drops are only effective when they can go through the perforation to get to the infection. This is difficult when the perforation is very small or blocked by thick pus.

Treatment recommended in the OATSIH guidelines

- Antibiotics for at least 14 days (amoxicillin 50-90mg/kg/day given 2 or 3 times a day). If pus is present, dry mop the ears with 'tissue spears'.
- Check the ears every week. If no improvement, increase amoxicillin to 90mg/kg/day. If AOM with perforation persists for greater than 7 days, use high dose amoxicillin clavulanate (90mg/kg/day given 2 - 3 times a day). Continue antibiotics until no signs of bulging or recent discharge. This may need several weeks of treatment. If perforation is still present after 7-14 days, start cleaning the discharge followed by the application of antibiotic ear drops (e.g. ciprofloxacin drops 2 - 5 drops 2 - 4 times per day).
- Treat as CSOM if pus discharges for longer than 6 weeks and the perforation covers more than 2% of the eardrum.

Test 25

Which ear is it?

- Left ear

Description of what you are seeing

- Perforated eardrum with pus behind the eardrum and in the ear canal.
- The perforation is just below the main bone (the malleus). It covers about 8% of the eardrum.
- There is thick pus discharging through the perforation. The pus moves in and out of the perforation during pneumatic otoscopy.

Diagnosis given to image

- Chronic Suppurative Otitis Media (CSOM)

Comments on Chronic Suppurative Otitis Media (CSOM)

- CSOM is a severe chronic infection of the middle ear space. It is defined by the persistent discharge of pus through a perforation (hole) in the eardrum for at least six weeks despite appropriate treatment for AOM with perforation. The perforation should cover more than 2% of the eardrum.
- The amount of discharge can be described as being: i) scant - discharge only behind the eardrum in middle ear space; ii) moderate - discharge also in the canal; or iii) profuse - discharge coming out of the ear canal and able to be seen without an otoscope. In this example, there is at least a moderate amount of discharge present.
- CSOM usually causes the greatest amount of hearing loss.

Treatment recommended in the OATSIH guidelines

- Dry mop with 'tissue spears' and then insert antibiotic drops (e.g. ciprofloxacin 2 - 5 drops) in the ear at least 2 times a day for up to 16 weeks. After insertion of the ear drops, press several times on the flap of skin in front of the ear canal (the tragus). This will pump the drops through the perforation.
- Check the ears every week. Continue cleaning and antibiotic drops until no discharge for at least 3 days. This may need several weeks of treatment.
- Refer the child for a hearing test and advise parents/teachers of hearing loss.

Test 26

Which ear is it?

- Left ear

Description of what you are seeing

- Intact, dull, retracted eardrum.
- The eardrum is white and in a retracted position (sucked back). You can't see through the eardrum. The view of the top of the eardrum is blocked by hard wax. This makes it difficult to see the position of the eardrum clearly.
- The movement of the eardrum is slow. Pneumatic otoscopy allows you to see how the eardrum moves when pressure is applied. When air is present behind the eardrum, the movement will be fast. When fluid is present behind the eardrum, the movement will be slow. The fluid behind the eardrum also reduces hearing.

Diagnosis given to image

- Otitis Media with Effusion (OME)

Comments on Otitis Media with Effusion (OME)

- OME (also known as 'glue ear') is the presence of fluid behind the eardrum without any symptoms or signs consistent with AOM i.e. there will be no pain, bulging of the eardrum or recent discharge of pus.
- The hearing loss associated with OME is equivalent to sticking your fingers in your ears. Sounds are muffled i.e. normal speech is heard as a whisper.

Treatment recommended in the OATSIH guidelines

- Children with chronic OME should be referred for a hearing test. Antibiotic treatment is optional for infants at high risk of perforation and prior to surgical intervention. (e.g. amoxicillin 50mg/kg/day given 1 - 2 times a day for 3 - 6 months).

Test 27

Which ear is it?

- Right ear

Description of what you are seeing

- Intact, bulging eardrum.
- The eardrum is mildly red and has marked bulging. Most of the red appearance is from the blood vessels rather than the eardrum itself. The build up of pus behind the eardrum makes it bulge like a boil. It looks a bit like a doughnut.
- The build up of pus behind the eardrum makes it hard to see the main bone (the malleus). You can just see the top of the handle of the malleus during pneumatic otoscopy.

Diagnosis given to image

- Acute Otitis Media without perforation (AOMwoP)

Comments on Acute Otitis Media (AOMwoP)

- AOM without perforation is an acute infection of the middle ear space. It is defined by the presence of fluid behind the eardrum plus at least one of the following: bulging eardrum, red eardrum, fever, ear pain or irritability. Redness is not a reliable sign on its own. Bulging eardrum and ear pain are the most reliable indicators of AOM without perforation.
- Babies and toddlers may cry and rub or pull at the infected ear. However most often there are no symptoms at all. This means that it is important that all health staff can recognise bulging eardrums in Aboriginal children.

Treatment recommended in the OATSIH guidelines

- Paracetamol for pain relief if child is complaining of ear pain or irritable.
- Antibiotics for at least 7 days (amoxicillin 50mg/kg/day given 2 times a day).
- Check the ears after a week. If no improvement, increase amoxicillin to 90mg/kg/day. Continue antibiotics until no signs of bulging or recent discharge.

Test 28

Which ear is it?

- Right ear

Description of what you are seeing

- Perforated eardrum with pus in the ear canal.
- The perforation is just in front of the malleus (the main bone). It covers about 2% of the eardrum.
- The eardrum is red and has mild bulging. There is thick white discharge in the middle ear space and in the ear canal. The discharge moves in and out of the perforation during pneumatic otoscopy.
- Thick pus will sometimes block small perforations. This causes the pus to build up behind the eardrum, and for the eardrum to start bulging again.

Diagnosis given to image

- Acute Otitis Media with Perforation (AOMwiP)

Comments on Acute Otitis Media with Perforation (AOMwiP)

- AOM with perforation is an acute infection of the middle ear space. It is defined by discharge of pus through a perforation (hole) in the eardrum within the last 7 days. The discharge is persistent for less than 6 weeks, or associated with a very small perforation (perforation size usually not more than 2% of the eardrum). Don't worry if you can't see the perforation. Even perforations that have just healed are still called AOM with perforation.
- The eardrum always bulges before it perforates. When the perforation is very small it often heals and then perforates again. This can happen every few days.
- Better treatment of AOM with perforation will be the quickest way to reduce high rates of chronic discharging ears. Oral antibiotics may be needed for many weeks. Antibiotic ear drops need to go through the perforation to work.

Treatment recommended in the OATSIH guidelines

- Antibiotics for at least 14 days (amoxicillin 50-90mg/kg/day given 2 or 3 times a day). If pus is present, dry mop the ears with 'tissue spears'.
- Check the ears every week. If no improvement, increase amoxicillin to 90mg/kg/day. If AOM with perforation persists for greater than 7 days, use high dose amoxicillin clavulanate (90mg/kg/day given 2 - 3 times a day). Continue antibiotics until no signs of bulging or recent discharge. This may need several weeks of treatment. If perforation is still present after 7-14 days, start cleaning the discharge followed by the application of antibiotic ear drops (e.g. ciprofloxacin drops 2 - 5 drops 2 - 4 times per day).
- Treat as CSOM if pus discharges for longer than 6 weeks and the perforation covers more than 2% of the eardrum.

Test 29

Which ear is it?

- Right ear

Description of what you are seeing

- Intact, bulging eardrum with pus in the canal.
- The eardrum is red and has marked bulging. There is dry pus in the canal and this is blocking the view of the front of the eardrum.
- The movement of the eardrum is slow. If a perforation is present, the pus usually moves in and out of the middle ear, but the eardrum is immobile. This means that the eardrum is currently intact.
- The eardrum is like a boil that has recently burst. The pus has built up again and the eardrum will probably burst again.

Diagnosis given to image

- Acute Otitis Media with Perforation (AOMwiP)

Comments on Acute Otitis Media with Perforation (AOMwiP)

- AOM with perforation is an acute infection of the middle ear space. It is defined by discharge of pus through a perforation (hole) in the eardrum within the last 7 days. The discharge is persistent for less than 6 weeks, or associated with a very small perforation (perforation size usually not more than 2% of the eardrum). Note that a perforation that has just healed is still called AOM with perforation. Pus on the eardrum even if a perforation is not seen is still called an AOM with perforation.
- The eardrum always bulges before it perforates. When the perforation is very small it often heals and then perforates again. This can happen every few days.

Treatment recommended in the OATSIH guidelines

- Antibiotics for at least 14 days (amoxicillin 50-90mg/kg/day given 2 or 3 times a day). If pus is present, dry mop the ears with 'tissue spears'.
- Check the ears every week. If no improvement, increase amoxicillin to 90mg/kg/day. If AOM with perforation persists for greater than 7 days, use high dose amoxicillin clavulanate (90mg/kg/day given 2 - 3 times a day). Continue antibiotics until no signs of bulging or recent discharge. This may need several weeks of treatment. If perforation is still present after 7-14 days, start cleaning the discharge followed by the application of antibiotic ear drops (e.g. ciprofloxacin drops 2 - 5 drops 2 - 4 times per day).
- Treat as CSOM if pus discharges for longer than 6 weeks and the perforation covers more than 2% of the eardrum.

Test 30

Which ear is it?

- Right ear

Description of what you are seeing

- Perforated eardrum with pus in the ear canal.
- The perforation is in a central position. It covers about 50% of the eardrum.
- There is discharge in the middle ear space and a small amount of discharge in the canal next to the eardrum.

Diagnosis given to image

- Chronic Suppurative Otitis Media (CSOM)

Comments on Chronic Suppurative Otitis Media (CSOM)

- CSOM is a severe chronic infection of the middle ear space. It is defined by the persistent discharge of pus through a perforation (hole) in the eardrum for at least six weeks despite appropriate treatment for AOM with perforation. The perforation should cover more than 2% of the eardrum.
- The amount of discharge can be described as being: i) scant - discharge only behind the eardrum in middle ear space; ii) moderate - discharge also in the canal; or iii) profuse - discharge coming out of the ear canal and able to be seen without an otoscope. In this example, there is at least a moderate amount of discharge present.
- CSOM usually causes the greatest amount of hearing loss i.e. even worse than putting your fingers in your ears.

Treatment given in the OATSIH guidelines

- Dry mop with 'tissue spears' and then insert antibiotic drops (e.g. ciprofloxacin 2 - 5 drops) in the ear at least 2 times a day for up to 16 weeks. After insertion of the ear drops, press several times on the flap of skin in front of the ear canal (the tragus). This will pump the drops through the perforation.
- Check the ears every week. Continue cleaning and antibiotic drops until no discharge for at least 3 days. This may need several weeks of treatment.
- Refer the child for a hearing test and advise parents/teachers of hearing loss.