

DEFINITION

Acute otitis media (AOM) is an acute suppurative infection of the middle ear, characterized by the acute onset of signs and symptoms of inflammatory middle ear effusion (MEE), often preceded by a viral upper respiratory tract infection (URTI).

IMMEDIATE CONSULTATION REQUIRED IN THE FOLLOWING SITUATIONS

- Toxic appearing child: Toxic appearing infants and children may be pale or cyanotic and are often lethargic or inconsolably irritable. In addition, they may have tachypnea and tachycardia with poor capillary refill.
- Signs of meningeal irritation
- Mastoid process erythema, tenderness, swelling with fever, protrusion of pinna
- Facial nerve palsy
- Lateral neck abscess
- Any other unstable vital signs, symptoms, or signs
- Another bacterial infection is present
- Immunocompromised client
- < 2 months of age
- Signs of complications of AOM
- Failure of second antibiotic therapy
- Lethargy

CAUSES

Viral Organism

- *Respiratory syncytial virus* (RSV)
- Picornaviruses (rhinovirus, enterovirus)
- Influenza viruses
- Coronaviruses
- Adenovirus
- *Human metapneumovirus*

Common Bacterial Organisms

- *Streptococcus pneumoniae*
- *Moraxella catarrhalis*
- *Haemophilus influenzae*
- *Pseudomonas aeruginosa*
- *Staphylococcus aureus*

OTITIS MEDIA PEDIATRIC

- Streptococcus pyogenes

Less Common Organisms

- Mycoplasma
- Chlamydia
- Staphylococci
- *Mycobacterium tuberculosis*
- *Streptococcus viridians*
- Gram-negative rods
- *Pseudomonas pyocyaneus*

Other Causes

- Immuno reactivity
- Allergic rhinitis

Bilateral AOM is more likely than unilateral AOM to be associated with bacterial isolation, specifically *H. influenzae*.

Bronchiolitis associated AOM is likely bacterial.

PREDISPOSING AND RISK FACTORS

- 3 months-3 years of age
- Eustachian tube dysfunction
- URTI
- Allergies
- Cleft palate
- Immunocompromised client
- Children exposed to cigarette smoke
- Children with Down syndrome
- Day care environment
- Children of Aboriginal origin including Alaskan, Canadian Inuit and Indigenous Australian
- In utero exposure to maternal smoking
- Possibly bottle-fed children
- Children who use pacifiers when sleeping at night
- Fall and winter months
- Male gender

OTITIS MEDIA PEDIATRIC

- Family member with otitis media
- Low socioeconomic status
- Craniofacial abnormalities
- Formula feeding
- Exposure to secondhand smoke

HISTORY

- Ootalgia (pain is absent in 20% of children)
- Fever
- Irritability
- Sensation of fullness, ear “popping”
- Hearing decreased
- Tinnitus or roaring in ear, vertigo
- Tugging at ears
- Vomiting or diarrhea may be present
- Restless sleep
- History of URTI or recurrent AOM
- Lethargy and anorexia

PHYSICAL FINDINGS

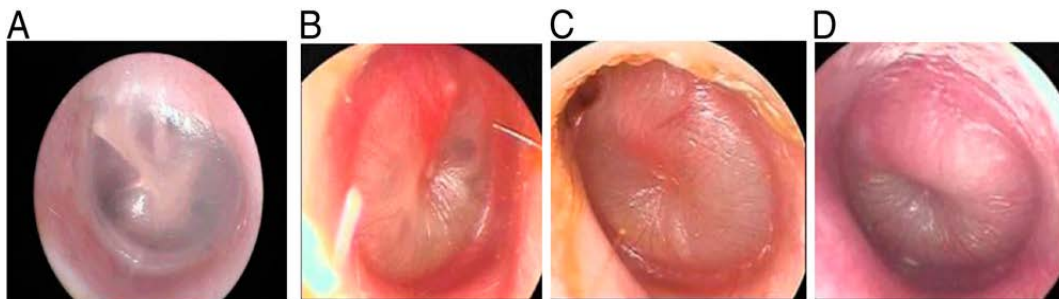
Redness of the tympanic membrane (TM) in the absence of other signs may be due to crying, agitation, a common cold, aggressive examination or manipulation of the external ear canal, myringitis, or serous otitis media with effusion.

- May be febrile
- May appear acutely ill
- Conjunctivitis may also be present
- TM may be red, dull, cloudy or yellow, often bulging and opaque
- Bony landmarks obscured or absent
- Purulent discharge if drum perforated
- Decreased mobility of TM
- Bullae seen on TM
- Peri-auricular and anterior cervical nodes enlarged and tender

OTITIS MEDIA PEDIATRIC

Picture of TM:

- A. Normal TM
- B. TM with mild bulging
- C. TM with moderate bulging
- D. TM with severe bulging



Taken from: Lieberthal, A.S., Carroll, A.E, & Chonmaitree, T., . . . Tunkel, E. (2013). The diagnosis and management of acute otitis media. *Pediatrics*, 131(3), e964-e999.

DIFFERENTIAL DIAGNOSIS

- Acute otitis externa
- Pharyngitis or tonsillitis
- Noninfectious MEE
- Trauma to or foreign body in ear canal
- Referred pain from dental abscess
- Mastoiditis (rare)
- Eustachian tube disorders
- Viral URTI
- Allergic rhinitis
- Otitis media with effusion
- Chronic suppurative otitis media
- Myringitis

COMPLICATIONS

- Perforated TM
- Serous otitis media
- Mastoiditis (rare)
- Meningitis (rare)

OTITIS MEDIA PEDIATRIC

- Iron deficiency anemia associated with recurrent otitis media
- Bezold mastoiditis (lateral neck abscess)
- Sub-periosteal abscess
- Petrous apicitis or petrositis
- Facial nerve palsy
- Other Rare Complications:
 - Lateral sinus thrombosis
 - Otitic hydrocephalus
 - Septic shock
 - Encephalitis
 - Extradural abscess
 - Labyrinthitis

INVESTIGATIONS AND DIAGNOSTIC TESTS

- Do not universally swab otorrhea for culture and sensitivity. Consider culture and sensitivity swab for chronic otorrhea or complex cases. Consultation with a physician/RN(NP) is recommended.
- Pneumatic otoscopy may be used to confirm the presence of MEE.

MAKING THE DIAGNOSIS

Diagnosis of AOM can be made if:

- recent, acute onset symptoms and signs of AOM:
 - Irritability
 - Otagia
- the presence of MEE:
 - Bulging of TM
 - Limited or absent mobility of TM
 - Air fluid level behind the TM
 - Otorrhea
 - Loss of bony landmarks
- signs and symptoms of middle ear inflammation as indicated by either:
 - Distinct erythema of TM; or
 - Distinct otalgia

For a diagnosis of AOM, the TM must be both red and bulging or have acute

OTITIS MEDIA PEDIATRIC

inflammation present with decreased TM movement (as demonstrated by pneumatic otoscopy, if available).

Redness of the TM in the absence of other signs may be due to crying, agitation, a common cold, aggressive examination or manipulation of the external ear canal, or serous otitis media with effusion.

MANAGEMENT AND INTERVENTIONS

Goals of Treatment

- Relieve pain and fever
- Eradicate infection
- Prevent complications
- Avoid unnecessary use of antibiotics to reduce antibiotic resistance

Appropriate Consultation

- Usually not necessary if condition is uncomplicated.

Non-Pharmacological interventions

- None

Pharmacological Interventions

Note: All drugs must be calculated by weight until 12 years of age.

Doses should not exceed recommended adult doses.

Watchful waiting approach

- Observation for 48-72 hours without antimicrobial agents is appropriate in the following instances:
 - Children 6-24 months of age with unilateral AOM without otorrhea
 - Children > 24 months of age with bilateral AOM without otorrhea
 - The child does not have immunodeficiency, chronic cardiac or pulmonary disease, anatomical abnormalities of the head or neck, a history of complicated otitis media (otitis media accompanied by suppurative complications or chronic perforation), or Down syndrome
 - The illness is not severe - otalgia appears to be mild and fever is < 39°C oral in the absence of antipyretics

OTITIS MEDIA PEDIATRIC

- Parents/caregivers are capable of recognizing signs of worsening illness and can readily access medical care if the child does not improve

Antibiotic Treatment

- Consider a delayed antibiotic prescribing strategy:
 - A delayed prescribing strategy (delayed antibiotic use) is defined as the use of, or advice to use, antibiotics more than 48 hours after the initial consultation. This strategy is used when it is not clear to the clinician that antibiotic therapy is needed immediately.
 - The decision to use a delayed strategy should only be made if the client can return for follow-up within the agreed upon time.
 - Reassure the client the antibiotics are not needed immediately as they will make little difference to symptoms and may have adverse effects.
 - Advise the client to use the delayed prescription (or dispensed antibiotic) and return for reassessment if symptoms do not settle or get significantly worse.
 - Further information to assist with client education about appropriate antibiotic use is available at: <http://www.dobugsneeddrugs.org/guide/ear-ache/>
- Antihistamines, decongestants, intranasal corticosteroids, topical analgesic, ear drops, adenoidectomy and adenotonsillectomy are not effective for treating AOM.
- If the child's status worsens or does not improve during the observation period, and the primary diagnosis still appears to be AOM, antimicrobial therapy must be started.
- Failure of initial treatment of AOM with antibiotics is defined as the persistence or worsening of moderately severe symptoms (pain and fever) after 3-5 days of antibiotic therapy with findings of continued pressure and inflammation (bulging) behind the TM.
- Since fever could be due to many other infections, when deciding to treat with a second antibiotic due to the failure of initial treatment, clinicians must ascertain that there are no other causes for the fever except AOM.
- MEE can persist even after the successful treatment of AOM and there is no need for further antibiotics. When determining initial antibiotic failure, it is important to differentiate between MEE and unresolved AOM. Only unresolved AOM requires further treatment.

SASKATCHEWAN REGISTERED NURSES' ASSOCIATION

RNs WITH ADDITIONAL AUTHORIZED PRACTICE
CLINICAL DECISION TOOL
DECEMBER 1, 2016

OTITIS MEDIA PEDIATRIC

Table 1 – Approach to Antibiotic Use

HOLD ANTIBIOTICS	OBSERVATION or ANTIBIOTICS with FOLLOW-UP	ANTIBIOTICS No watchful waiting
<ul style="list-style-type: none"> • Uncertain diagnosis • Until confirming the diagnosis of AOM 	<ul style="list-style-type: none"> • 6-24 months of age with unilateral AOM without severe symptoms or signs and no otorrhea • 24 months of age and older with bilateral or unilateral AOM without otorrhea • The decision to use a delayed strategy should only be made if the client can return for follow-up within the agreed upon time. 	<ul style="list-style-type: none"> • 2-6 months of age AOM with or without otorrhea • 6 months of age and older AOM with otorrhea • 6 months of age and older with unilateral or bilateral AOM with severe symptoms • 6-24 months of age with bilateral AOM without otorrhea • No improvement of symptoms 72 hours after watchful waiting

SASKATCHEWAN REGISTERED NURSES' ASSOCIATION

RNs WITH ADDITIONAL AUTHORIZED PRACTICE
CLINICAL DECISION TOOL
DECEMBER 1, 2016

OTITIS MEDIA PEDIATRIC

Table 2 - Analgesic and Antibiotic Therapy

Client Type	Agents Used	Dose	Comments
<p>Otherwise healthy with mild symptoms</p> <p>(See comments)</p>	Acetaminophen	<p>15 mg/kg/dose orally q4-6h prn</p> <p>(maximum 75 mg/kg/day)</p>	<p>For ages 6-24 months of age, observation with the use of systemic analgesics without the use of antibiotics is an option for selected children with uncomplicated AOM, based on diagnostic certainty, age, illness severity and assurance and follow-up.</p>
	Ibuprofen	<p>10 mg/kg/dose orally q8h prn</p> <p>(maximum 40 mg/kg/day)</p>	
<p>Has not received amoxicillin in past 30 days.</p> <p>Does not have concurrent purulent conjunctivitis.</p> <p>No allergy to penicillin.</p>	Amoxicillin	<p>80-90 mg/kg/day orally in 2 divided doses</p> <p>(maximum 3 g/day)</p>	<p>Recommended duration:</p> <p>< 2 years of age or severe: 10 days</p> <p>≥ 2 years of age: treat for 5 days</p>
<p>Amoxicillin received in past 30 days.</p> <p>Concurrent purulent conjunctivitis.</p>	Amoxicillin/ Clavulanate	<p>90/6.4 mg/kg/day orally in 2 divided doses</p>	Duration 10 days

SASKATCHEWAN REGISTERED NURSES' ASSOCIATION

RNs WITH ADDITIONAL AUTHORIZED PRACTICE
CLINICAL DECISION TOOL
DECEMBER 1, 2016

OTITIS MEDIA PEDIATRIC

<p>History of recurrent AOM - unresponsive to amoxicillin. Failure of initial treatment with amoxicillin and amoxicillin/clavulanate.</p>	<p>CefTRIAxone (Only with physician/ RN(NP) consult)</p>	<p>50 mg/kg/day IM (maximum 2 g/day)</p>	<p>Duration 1 or 3 days</p>
<p>Non anaphylactic allergy to penicillin or Failure to Amoxicillin/clavulanate use. (Consult when failure to second antibiotic therapy)</p>	<p>Cefuroxime axetil For > 3 months of age or</p>	<p>30 mg/kg/day orally in 2 divided doses</p>	<p>Recommended duration: ≥ 2 years of age: treat for 5 days < 2 years of age: treat for 10 days</p>
<p>Anaphylactic allergy to penicillin or cephalosporin allergy.</p>	<p>Clarithromycin Or</p>	<p>15 mg/kg/day orally in 2 divided for 10 days for < 2 years of age 5-7 days for > 2 years of age</p>	<p>Consider referral to Ear, Nose and Throat (ENT) specialist for tympanoentesis as these agents are inferior options due to high resistance rates and clinical failure rates</p>

SASKATCHEWAN REGISTERED NURSES' ASSOCIATION

RNs WITH ADDITIONAL AUTHORIZED PRACTICE
CLINICAL DECISION TOOL
DECEMBER 1, 2016

OTITIS MEDIA PEDIATRIC

	<p>Sulfamethoxazole/ Trimethoprim (SMX/TMP) Or</p>	<p>6-12 mg TMP/kg/day orally in 2 divided doses 2-24 months of age or severe: treat for 10 days ≥ 2 years of age: treat for 5 days</p>	
	<p>Azithromycin</p>	<p>30 mg/kg orally single dose Or 10 mg/kg/day orally for 3 days Or 10 mg/kg/day orally DAY 1 then 5 mg/kg/day orally for DAYS 2-5</p>	
<p>Pregnancy and/or Breast feeding</p>	<ul style="list-style-type: none"> • Acetaminophen, amoxicillin, amoxicillin/clavulanate and azithromycin may be used as listed above. • Ibuprofen and TMP/SMX are not recommended in pregnancy. 		

Client and Caregiver Education

- Advise client/caregiver on timelines of treatment and expected course of disease process.
- Recommend increased rest in the acute febrile phase.
- Counsel parents or caregiver about appropriate use of medications (dose, frequency, compliance, etc.).
- Recommend avoidance of air travel until symptoms have resolved.
- Avoid feeding in a flat supine position.
- Breastfeeding is recommended.
- Avoid exposure to tobacco smoke.
- Frequent and thorough handwashing.
- Update immunizations if necessary.

OTITIS MEDIA PEDIATRIC

Prevention/Health Promotion

- Prevention of AOM is directed at risk factor reduction
- Influenza vaccine may provide a reduction in the rate of AOM
- Exclusive breastfeeding for at least 6 months
- Pneumococcal conjugate vaccine
- For prevention of recurrent AOM, tympanostomy tubes may be recommended
- Prophylactic antibiotics NOT recommended

Monitoring and Follow-Up

Short term monitoring and follow-up:

- For those on observation, follow-up in 2-3 days for reassessing AOM
- Clients who have severe symptoms and recurrence as well as young children
- Advise caregiver of follow-up if condition does not improve in 48 hours or sooner if condition deteriorates
- Otherwise, follow-up in 14 days as follows:
 - If ear is normal, do not give any treatment
 - If condition is unresolved, consider treatment with a second-line antibiotic
 - If ear is still dull but asymptomatic (no pain or hearing loss), follow-up again in 6 weeks

Follow-up 6 weeks and later:

- Look for development of serous otitis media
- Hearing should be assessed 1 month after treatment is complete if recurrent infections
- In 70-80% of clients, effusion persists after 2 weeks, and 10% still have effusion at 3 months and may exhibit conductive loss of hearing
- Not necessary if condition is uncomplicated
- More than three infections in 6 months or four infections in 1 year
- Failure of second antibiotic use
- Assess hearing for those with otitis media with effusion (OME) and refer if decreased hearing and/or persistent OME for ventilation tube insertion

Referral

- Refer children who have frequent AOM (usually more than three episodes in 6 months or four episodes over a year period).

OTITIS MEDIA PEDIATRIC

- Infants < 8 weeks of age should be referred immediately.

DOCUMENTATION

- As per employer policy

REFERENCES

Acute otitis media. (2013, June 03). Retrieved from <https://dynamed.ebscohost.com>

Acute otitis media. (2013, June 24). Retrieved from <http://www.pemsoft.com>

Acute otitis media. (2013, July 23). Retrieved from <http://www.mdconsult.com>

Alberta Health and Wellness. (2014). *Guide to the wise use of antibiotics: Ear ache.*
Retrieved from <http://www.dobugsneeddrugs.org/guide/ear-ache/>

Anti-Infective Review Panel. (2013). *Anti-infective guidelines for community-acquired infections.* Toronto, ON: MUMS Guideline Clearinghouse.

Casey, J. R., & Pichichero, M. E. (2015). Acute otitis media: Update 2015. *Contemporary Pediatrics, 32*(3), 15–18.

Cash, J. C., & Glass, C. A. (Eds.). (2011). *Family practice guidelines* (2nd ed.). New York, NY: Springer Publishing.

Chen, A., & Tran, C. (Eds.). (2011). *Toronto notes: Comprehensive medical reference & review for MCCQE I & USMLE II* (27th ed.). Toronto, ON: Toronto Notes for Medical Students.

Health Canada. (2011). *First Nations & Inuit health: Clinical practice guidelines for nurses in primary care.* Ottawa, ON: Author. Retrieved from <http://www.hc-sc.gc.ca>

Hirst, S., & Neill, S. (2013). Treatment of acute otitis media in childhood. *Practice Nursing, 24*(8), 407–410.

Harmes, K. M., Blackwood, R. A., Burrows, H. L., Cooke, J. M., Harrison, R. V., &

SASKATCHEWAN REGISTERED NURSES' ASSOCIATION

RNs WITH ADDITIONAL AUTHORIZED PRACTICE
CLINICAL DECISION TOOL
DECEMBER 1, 2016

OTITIS MEDIA PEDIATRIC

Passamani, P. P. (2013). Otitis media: Diagnosis and treatment. *American Family Physician, 88*(7), 435–440.

Le Saux, N., Robinson, J. L., Canadian Paediatric Society, & [Infectious Diseases and Immunization Committee](#). (2016). Management of acute otitis media in children six months of age and older: Position statements and practice points. *Pediatric Child Health, 21*(1), 39-44. Retrieved from <http://www.cps.ca/documents/position/acute-otitis-media>

Lieberthal, A. S., Carroll, A. E., & Chonmaitree, T., ...Tunkel, E. (2013). The diagnosis and management of acute otitis media. *Pediatrics, 131*(3), e964-e999.

Rx Files Academic Detailing Program. (2014). *Rx Files: Drug comparison charts*. Saskatoon, SK: Saskatoon Health Region.

Smith, M. (2013, June 24). *Acute otitis media*. Retrieved from <http://www.essentialevidenceplus.com>

Williamson, I. (2011, January 12). *Otitis media with effusion in children*. Retrieved from <http://clinicalevidence.bmj.com>

NOTICE OF INTENDED USE OF THIS CLINICAL DECISION TOOL

This SRNA Clinical Decision Tool (CDT) exists solely for use in Saskatchewan by an RN with additional authorized practice as granted by the SRNA. The CDT is current as of the date of its publication and updated every three years or as needed. A member must notify the SRNA if there has been a change in best practice regarding the CDT. This CDT does not relieve the RN with additional practice qualifications from exercising sound professional RN judgment and responsibility to deliver safe, competent, ethical and culturally appropriate RN services. The RN must consult a physician/RN(NP) when clients' needs necessitate deviation from the CDT. While the SRNA has made every effort to ensure the CDT provides accurate and expert information and guidance, it is impossible to predict the circumstances in which it may be used. Accordingly, to the extent permitted by law, the SRNA shall not be held liable to any person or entity with respect to any loss or damage caused by what is contained or left out of this CDT.

SRNA © This CDT is to be reproduced only with the authorization of the SRNA.