

Module 13: Antimicrobial Stewardship in Management of Acute Otitis Media



Session Objectives

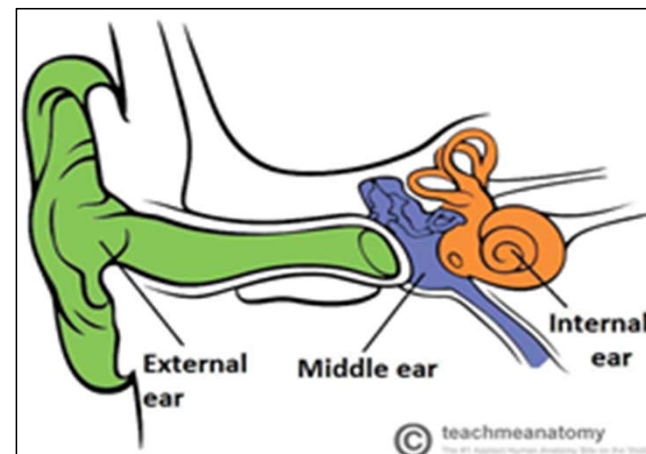
By the end of this session, you should be able to:

1. Define otitis media and differentiate its types i.e., Acute Otitis Media and Otitis Media with Effusion.
2. Outline clinical features that guide appropriate antibiotic use.
3. Apply national and global guidelines for managing acute otitis media.
4. Implement non-antibiotic treatment and preventive strategies effectively.
5. Integrate antimicrobial stewardship principles into clinical decision-making.

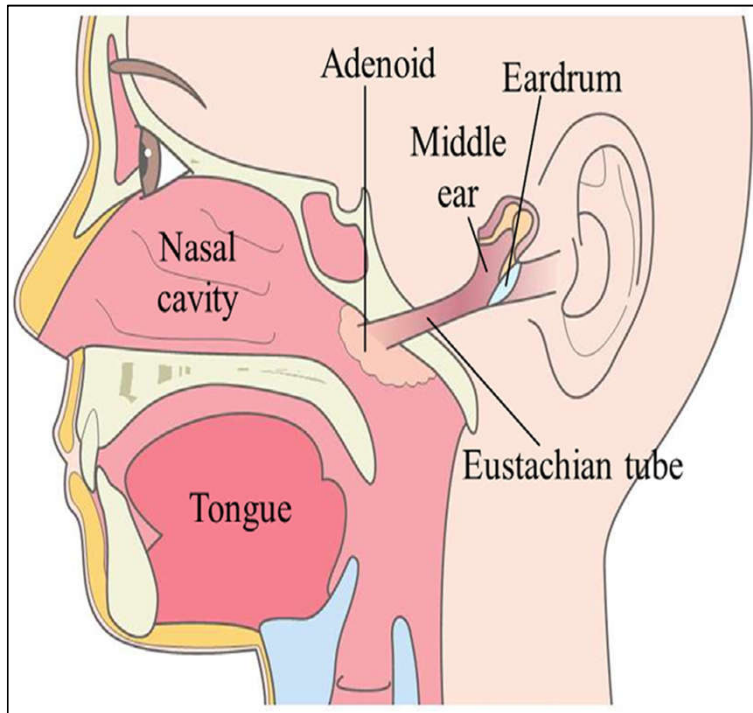


Definition and Spectrum of Otitis Media

- Otitis media, commonly known as a middle ear infection, is a condition characterized by inflammation or infection of the middle ear
- Otitis media can be further characterised into:
 - Acute otitis media (AOM)
 - Otitis media with Effusion (OME)
 - Chronic suppurative otitis media (CSOM)



Anatomy of Nasopharynx and Middle Ear



- Proximity of the inner ear to the upper respiratory tract (pharynx) easily facilitates movement of pathogens to the middle ear
- Otitis media therefore often occurs following a cold, sore throat, or respiratory infection

(<https://www.researchgate.net/profile/Ryoukichi-Ikeda>, 2022)

Definition and Spectrum of Otitis Media

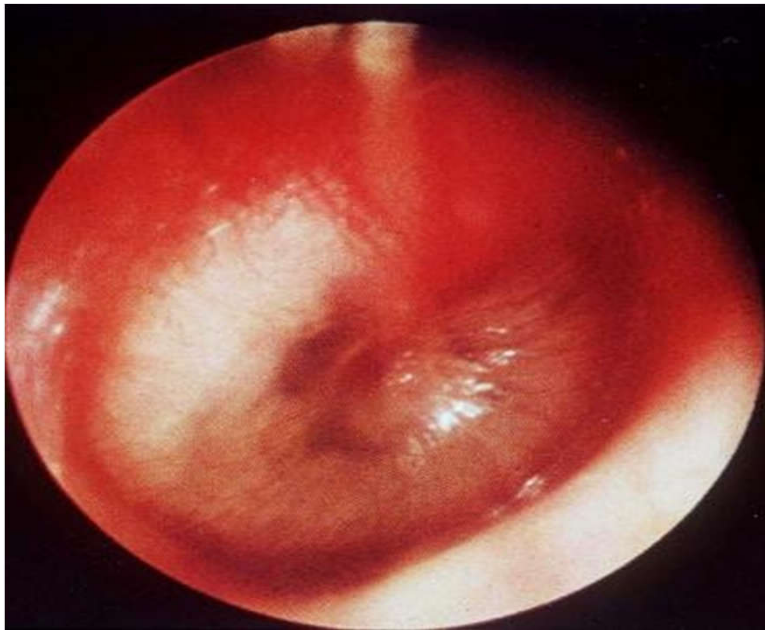
- 1. Acute otitis media (AOM):** A sudden onset of infection or inflammation in the middle ear that is often caused by bacteria or viral infection
- 2. Otitis media with Effusion (OME):** Fluid accumulation in the middle ear which is located behind the eardrum ,without active infection
- 3. Chronic suppurative otitis media (CSOM):** Persistent or recurrent inflammation or infection of the middle ear



Spectrum of Otitis Media

Otoscopy findings

Acute otitis media



Chronic otitis media



<https://emedicine.medscape.com/article/994656-overview>

Why Otitis Media is a Candidate for AMS ?

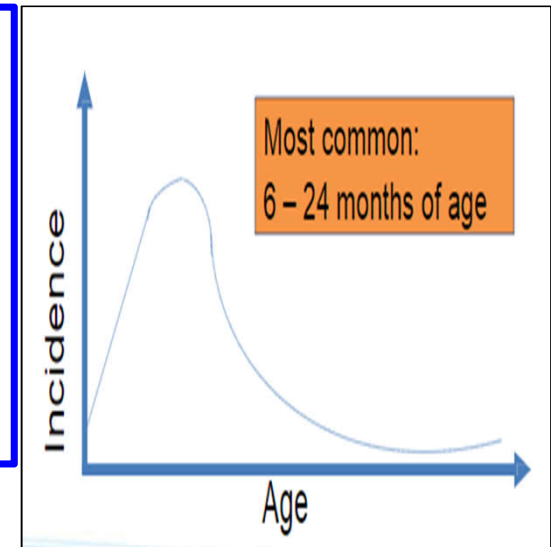
Acute otitis media is a common target of antimicrobial stewardship because:

- It is most commonly caused by viral infections
- It is one of the most common reasons for prescribing antibiotics, particularly in children yet many cases do not require antibiotics for effective treatment
- Overuse of antibiotics contributes to the growing problem of antimicrobial resistance (AMR)



Prevalence of Acute Otitis Media

- This condition is particularly prevalent in children, with about 75% experiencing at least one episode by the age of 3
- Acute otitis media most commonly occurs in children 6 to 24 months of age with declining prevalence as children reach school age
- Acute otitis media is uncommon in adolescents and adults



Difference Between AOM and OME

Feature	Acute Otitis Media (AOM)	Otitis Media with Effusion (OME)
Definition	Infection of the middle ear with rapid onset of symptoms	Fluid in the middle ear without signs of acute infection
Cause	Usually bacterial or viral infection	Often due to eustachian tube dysfunction (post-infection or allergy)
Symptoms	Ear pain, fever, irritability, reduced hearing, tugging at ear	Hearing loss, fullness in ear, no pain or fever
Duration	Less or equal to 3 weeks	May persist for more than 3 months
Tympanic Membrane	Bulging, red, limited mobility, possible pus	Retracted or neutral position, fluid visible, normal color
Onset	Sudden and acute	Gradual or after a cold/URI
Systemic Signs	Often present (fever, malaise)	Absent
Antibiotics Needed?	Often indicated , especially in children under 2 or severe cases	Not recommended – usually self-resolving
Complications (if untreated)	Mastoiditis, perforation, hearing loss	Delayed speech in children, but generally benign
Management	Analgesia + antibiotics (per STGs)	Watchful waiting ; follow-up for resolution

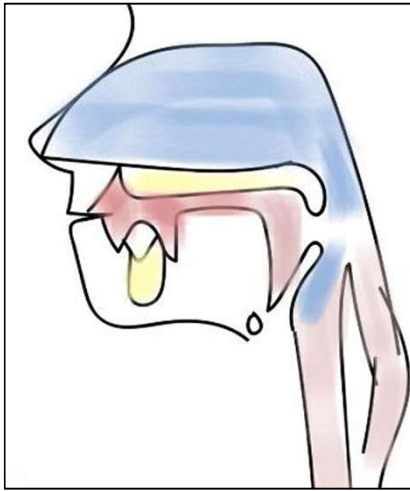


Difference Between AOM and OME...

- Differentiating between Acute otitis Media and Otitis Media with Effusion: which often exist on a continuum, takes skill and practice.
- Developing this skill set is critical to incorporating stewardship principles into your practice.
- Distinguishing between these clinical scenarios and following widely accepted guidelines will reduce the inappropriate use of antimicrobials, thus diminishing the selective pressure that allows for the emergence of antimicrobial resistance.



Middle Ear Syndromes



- A viral upper respiratory tract infection leading to Eustachian tube dysfunction is thought to cause the middle ear abnormalities
- The Eustachian tube is a narrow canal that connects the middle ear to the nasopharynx allowing for pressure normalization.
- However, inflammatory edema narrows this canal leading to increased pressure within the middle ear and allowing for the accumulation of fluid.
- Pathogens causing the upper respiratory tract infection and those colonizing the nasopharynx then gain access to the fluid and the middle ear causing acute inflammation

Middle Ear Syndromes...

Otitis media with effusion

Middle ear fluid **WITHOUT** evidence of inflammation

Acute otitis media

Middle ear fluid **WITH** evidence of inflammation

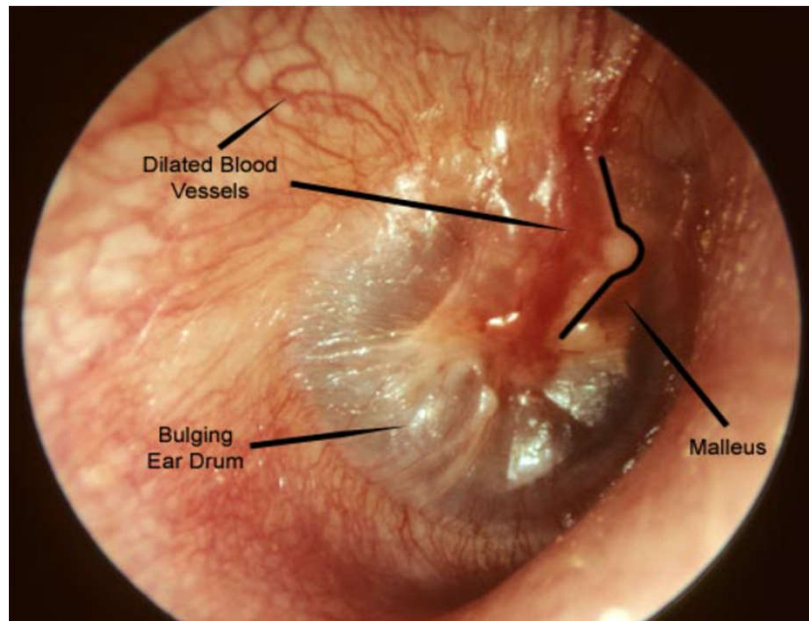
Middle ear effusions may persist for weeks to months after an episode of acute otitis media and is not an indication of treatment failure



Middle Ear Syndromes...

Clinical presentations:

- Otagia
- Otorrhea
- Pain
- Discharge
- Headache
- Fever
- Irritability
- Loss of appetite
- Vomiting
- Diarrhea



Note: Most national guidelines stress the importance of a tympanic membrane appearance when diagnosing acute otitis media

<https://med.uth.edu/orl/online-ear-disease-photo-book/chapter-8-middle-ear-infection/middle-ear-infection-images/>

Acute Otitis Media Severity of Symptoms Scale (AOM-SOS)

- The AOM-SOS is a validated questionnaire that can be used to interview parents and assess the severity of their child's symptoms.
- This questionnaire consists of 7 questions depicted here and includes an assessment of behavior suggestive of pain
- Each answer of 'a little' contributes 1 point to the composite score. An answer of 'a lot' contributes 2 points

Note: A score of >8 suggests severe pain. It is commonly used in children with AOM.

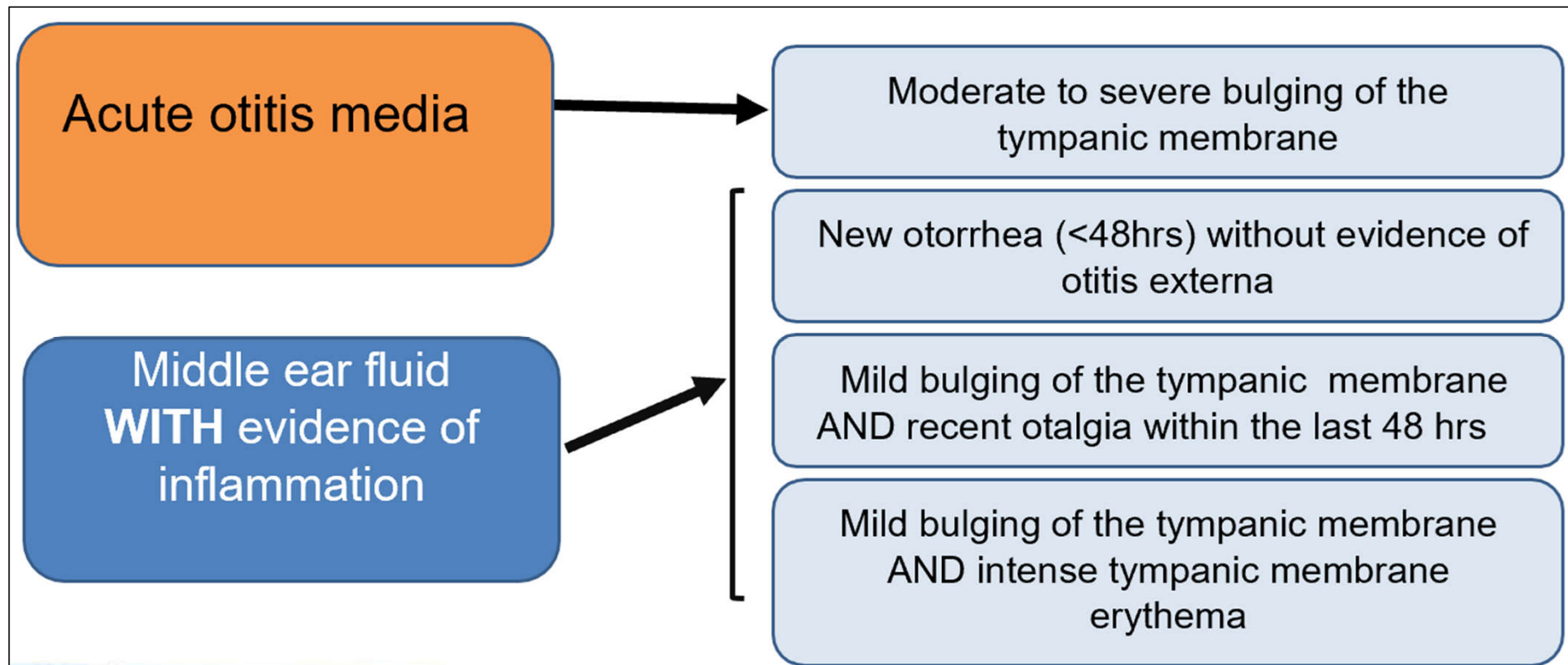


Acute Otitis Media Severity of Symptoms Scale (AOM-SOS)...

Over the past 12 hours, has your child been:	No	A little	A lot
Tugging, rubbing, or holding the ear(s) more than usual?			
Crying more than usual?			
More irritable or fussy than usual?			
Having more difficulty sleeping than usual?			
Less playful or active than usual?			
Eating less than usual?			
Having fever or feeling warm to touch?			



Diagnosis



Management of Acute Otitis Media

- The management of acute otitis media is complicated since antibiotics most often provide little benefit
- Most cases resolve without any intervention and without complications
- Use of antibiotics increases the risk of developing an adverse event such as diarrhea, vomiting or rash
- Many guidelines promote withholding antibiotics in some cases of non-severe acute otitis media



Management of Acute Otitis Media...

Use of antimicrobials depends on the following scenarios:

Antibiotics	No antibiotics
Severe AOM	Non-severe unilateral AOM in children 6-24 months of age
Non-severe bilateral AOM in children < 24 months of age	Non-severe unilateral or bilateral AOM in children > 24 months of age



Management of Acute Otitis Media...

Antimicrobials are recommended in the following scenarios:

Antibiotics

Tympanic membrane perforation or otorrhea

Children < 24 months of age with one of the following:

- Bilateral AOM
- Bulging tympanic membrane
- Acute Otitis Media Severity of Symptom Scale (AOM-SOS) Score of >8



Case Scenario 1

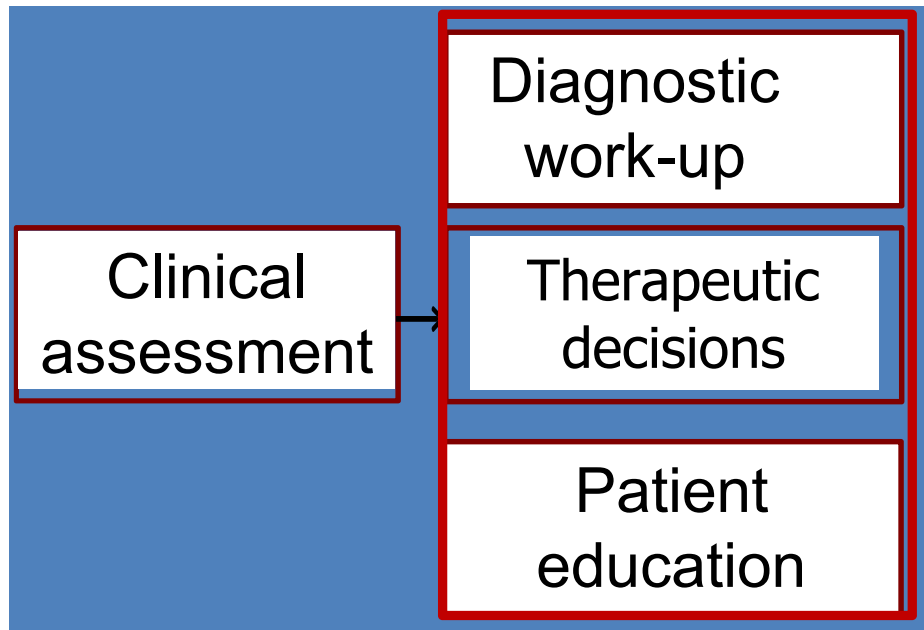
Imagine you are in a clinic and are evaluating an 18-month-old girl with 3 days of fever and frequent awakening at night. Her mother reports she's been pulling at her left ear for the last 48 hours and crying. Her mother reports the child has been alert, has not had any vomiting or diarrhea and also reports frequent wet diapers and good oral intake. Several family members are ill at home with nasal congestion and the baby had rhinorrhea for 3 to 4 days prior to the onset of fever. She has received her immunizations on time, including vaccination against *Pneumococcus*. Of note, her father smokes in the home. On physical examination she is febrile to 39 degrees Celsius and all other vital signs are normal. She is alert and appears uncomfortable but is non-toxic in appearance. Pneumatic otoscopic examination reveals fluid in her middle ear. In addition, her left tympanic membrane is red, opaque, bulging and immobile. How would you manage this patient?



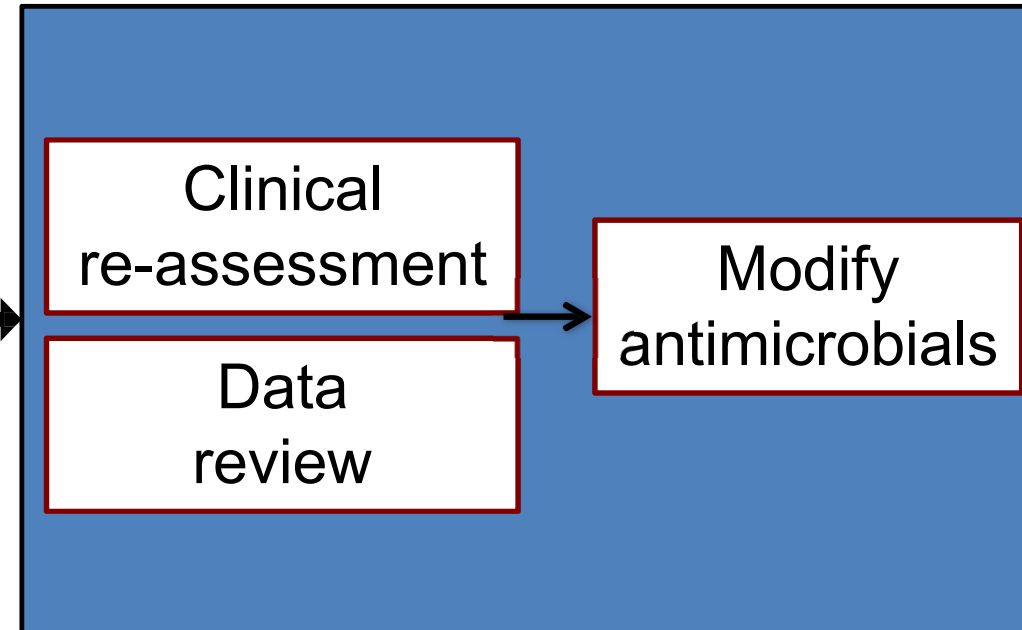
The Clinician-Patient Encounter

Let's return to the case

Initial evaluation

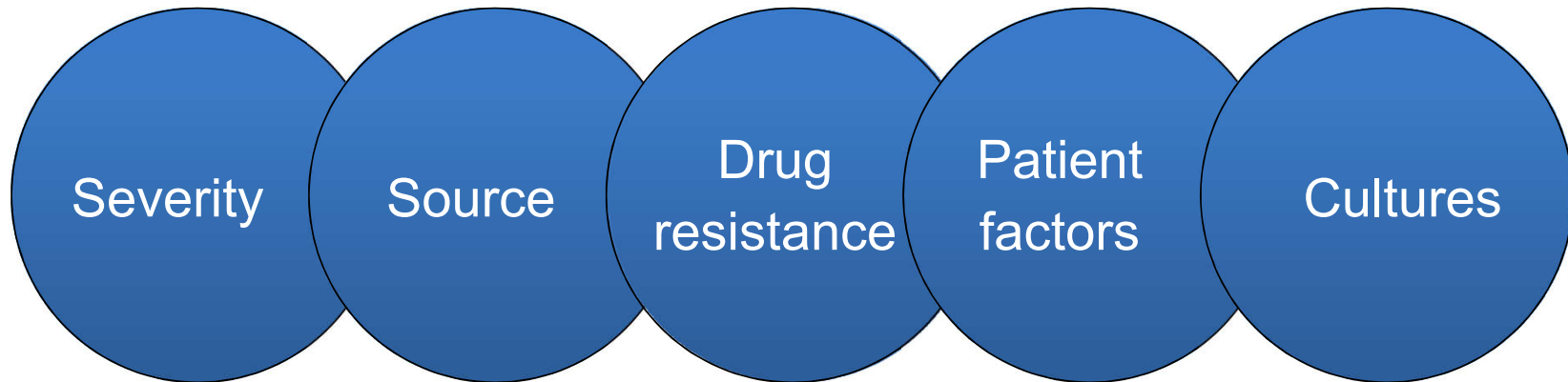


Subsequent evaluation



Making An Informed Choice

Consider the patient and epidemiologic factors for optimal antibiotic therapy (Principles of empiric antibiotic use)



Severity of the Patient's Condition

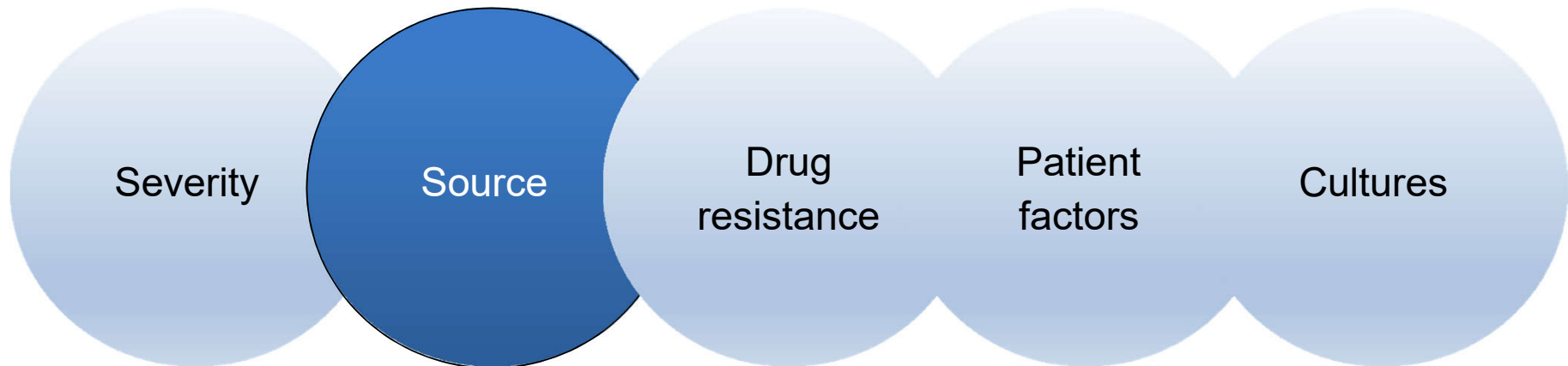
Not severe. This baby who is alert and tolerating oral feeds does not require hospitalization



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Source of Infection

Diagnosis of acute otitis media. Her physical examination is notable for classic findings of relatively severe acute otitis media. She has evidence of a middle ear effusion and middle ear inflammation with bulging, erythematous and immobile tympanic membrane.



Source of Infection...

The most common bacterial pathogens associated with acute otitis media include *Streptococcus pneumoniae*, non-typeable *Haemophilus influenzae* and *Moraxella catarrhalis*. Vaccination rates, including pneumococcal vaccination, impact the relative prevalence of these organisms. However, studies have also isolated many different respiratory viral pathogens. Co-infection with viral and bacterial pathogens is also common. The most resistant pathogen is typically: *Moraxella catarrhalis*, due to its near-universal production of β -lactamase, which renders many penicillins ineffective.



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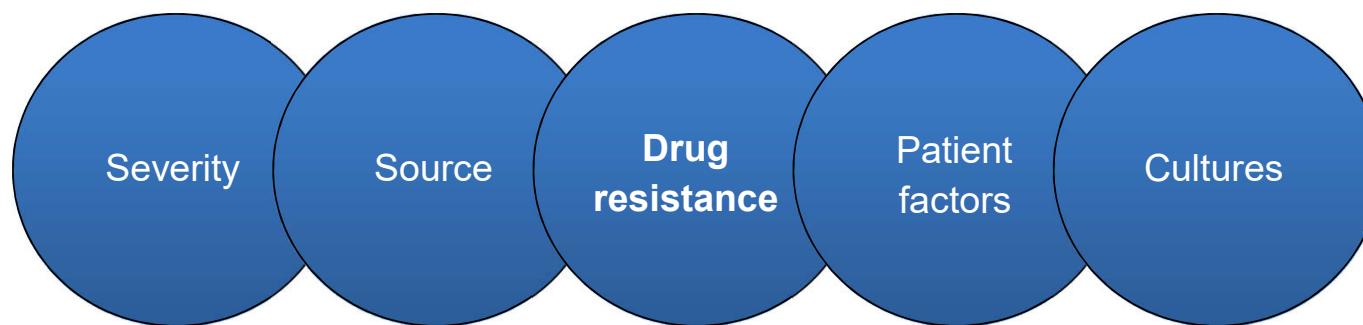
Resistance to Antimicrobials

Although the prevalence of drug resistance among *Streptococcus pneumoniae* is growing worldwide, this has not impacted the prevalence or severity of acute otitis media. Most guidelines recommend high dose amoxicillin as the first-line therapy in patients who have not received antibiotics within the last 30 days, who do not have concomitant purulent conjunctivitis and who have no history of recurrent acute otitis media.



Therapeutic Choices

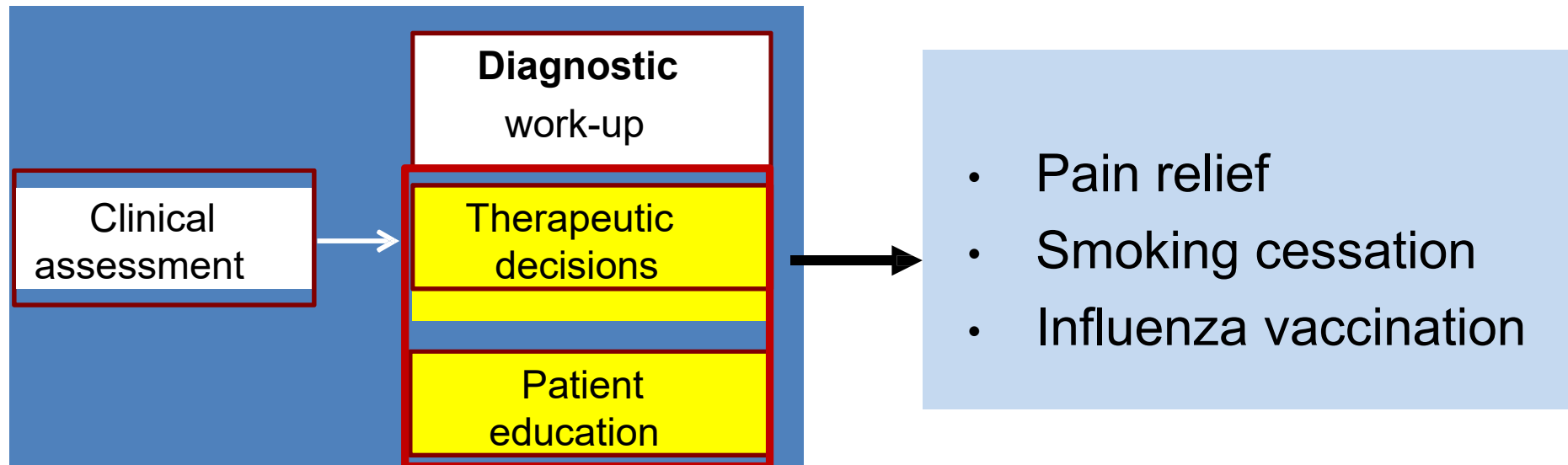
Refer to relevant national guidelines and prescribe amoxicillin at a dose of 90 milligrams per kilogram divided into 2 doses with a maximum of 3 grams administered per day for 10 days.



Patient Factors

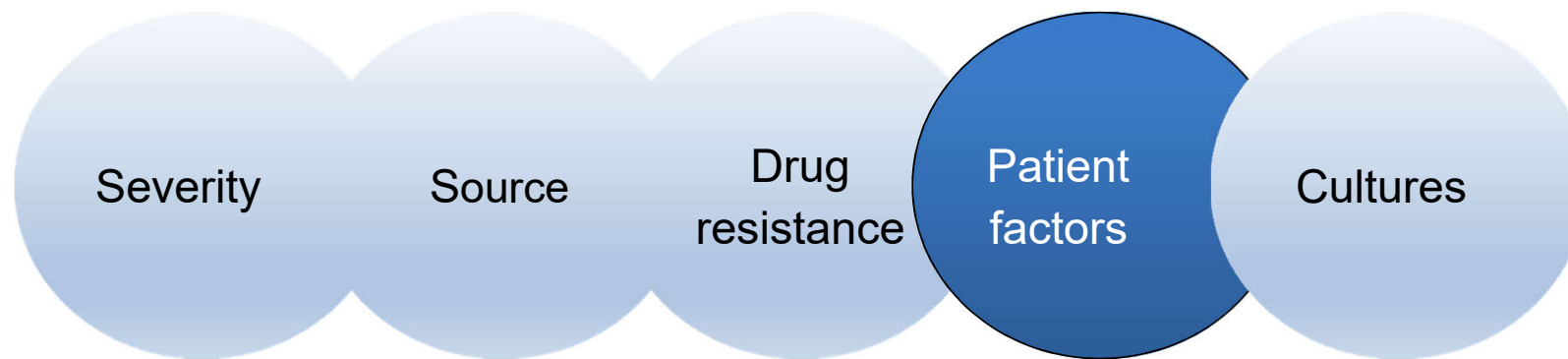
Provide pain relief – a key recommendation from most national guidelines. Counsel the patients regarding the risk of secondhand smoke and urge them to quit smoking. Encourage the entire family to get their yearly influenza vaccinations if this is in line with your current guidelines.

Initial evaluation



Other Considerations

The most important issue in administering medications to children is to accurately dose by weight and ensure that parents know what to do if a patient vomits or spits up a dose.

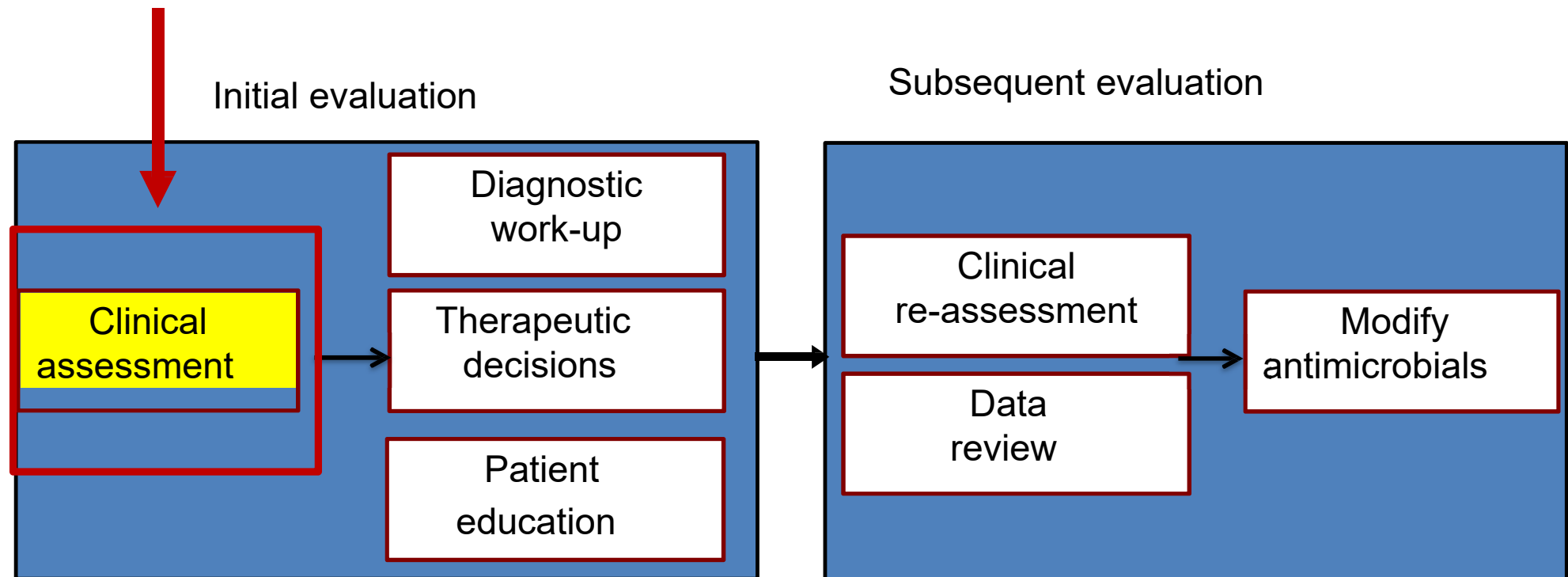


Case Scenario 2

Imagine now you were in a clinic and evaluating a 2.5-year old boy with 2 days of pulling at his left ear. His mother reports he has been alert, has not been crying, denies any vomiting or diarrhea and reports frequent wet diapers and good oral intake. Several family members are ill at home with nasal congestion and the baby had rhinorrhea for 3 to 4 days before he started pulling at his ear. He has received his immunizations on time, including vaccination against pneumococcus. Of note - his father smokes in the home. On physical examination he is afebrile, alert and all other vital signs are normal. Upon pneumatic otoscopic examination, his left tympanic membrane is light pink, semi-opaque and immobile. It is mildly bulging. How would you manage this patient?



Case Scenario 2



Watchful Waiting

Clinical evidence indicates that many patients with otitis media do well without antibiotics and evidence-based guidelines are available to help clinicians make management decisions, thus acute otitis media provides an excellent opportunity for clinicians to incorporate stewardship strategies in their daily practice.



Management of Acute Otitis Media

Antibiotics	No antibiotics
Severe AOM	Non-severe unilateral AOM in children 6-24 months of age
Non-severe bilateral AOM in children < 24 months of age	Non-severe unilateral or bilateral AOM in children > 24 months of age

AAP 2013



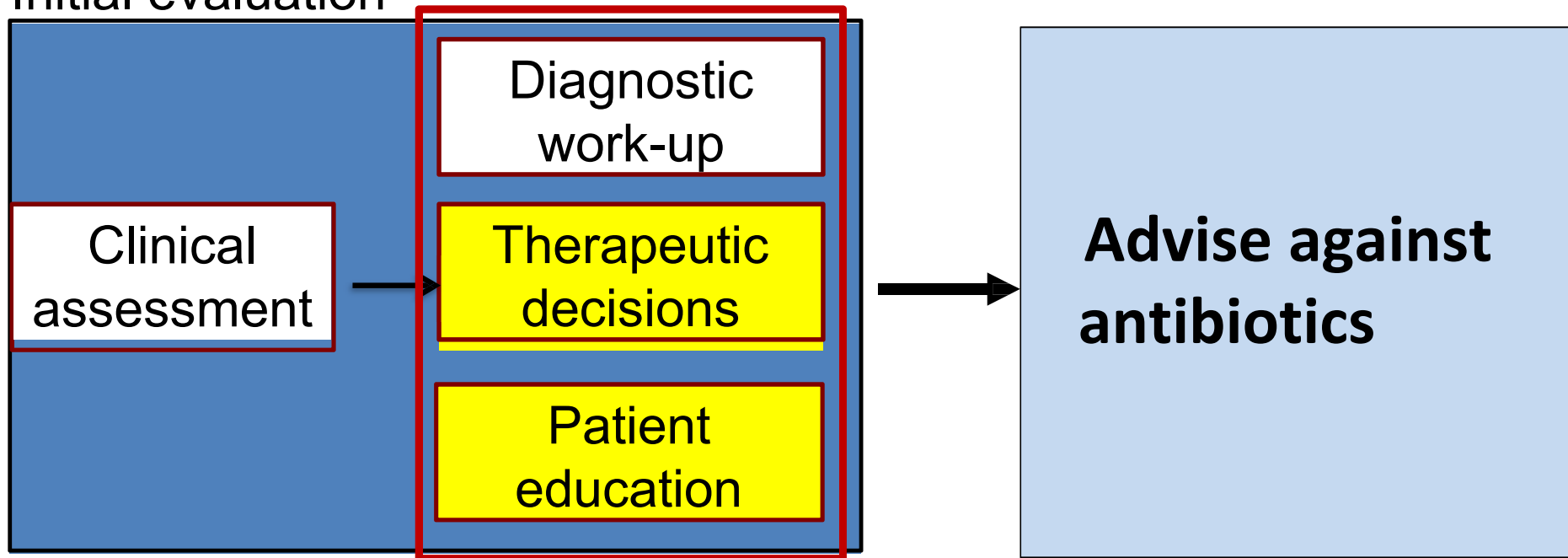
The “Observation Option”



- Deferring antibacterial therapy for 48 – 72 hours while providing symptomatic relief
- Follow-up plan

Therapeutic Decision

Initial evaluation



Key Points

- 1. Accurate diagnosis is essential** – Differentiating AOM from OME is critical, as only AOM with infection signs typically requires antibiotics
- 2. Most AOM cases are self-limiting** – Many episodes resolve without antibiotics; inappropriate use increases resistance risk
- 3. Use evidence-based guidelines** – Clinical decisions should follow national protocols for when to prescribe and appropriate dosing
- 4. Non-antibiotic management is important** – Pain relief, education, watchful waiting, and prevention strategies are crucial
- 5. Apply stewardship principles** – Right antibiotic, dose, duration, considering patient-specific factors



The End



You have come to the end of this module. Kindly attempt module 13 quiz before proceeding to download your completion Certificate