

# Risk factors, pathophysiology and causative agents of acute otitis media

*This teaching presentation for the ISOM website has been prepared by*

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# Acknowledgement

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- ▶ This presentation is aimed for teaching purposes of students, residents and other allied healthcare workers
- ▶ Please visit the International Society for Otitis Media website for more resources, [www.otitismediasociety.org](http://www.otitismediasociety.org)



# **Risk factors, pathophysiology and causative agents of acute otitis media**

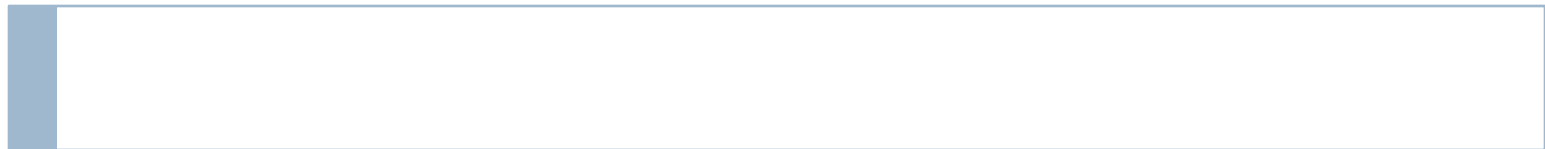


# What Are the Risk Factors for OM?

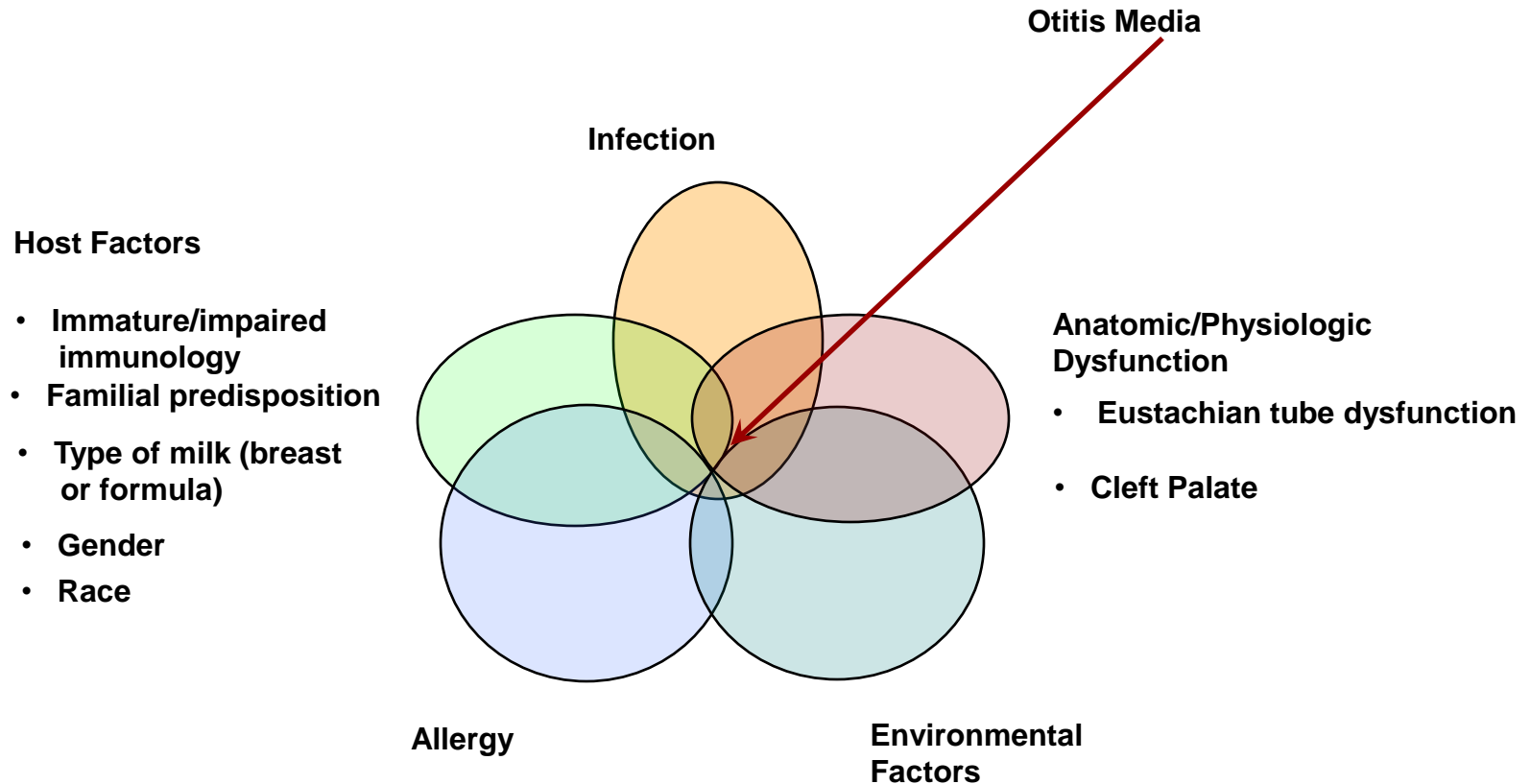


Risk factor	Comment
Age	Highest incidence between 6 and 11 months
Sex	Slightly higher preponderance among males
Ethnicity	Aboriginal children are at increased risk of earlier and more severe disease and there is a higher prevalence of OM in some refugee and migrant groups
Premature birth	Increased risk
Allergy	Link noted, but pathways unclear
Immunosuppression	Subtle immune deficiencies often noted in recurrent acute otitis media
Genetic predisposition	Familial clustering noted
Craniofacial abnormalities	Increased incidence in children with cleft palate, Down syndrome and craniofacial anomalies
Adenoids	Infected adenoids or tissue increases risk more than size of adenoids
Gastro-oesophageal reflux	Link noted, but further study required
Intense contact with multiple children	Higher incidence with day-care attendance and in overcrowded homes
Siblings	Increased risk with older siblings
Upper respiratory tract infection	Pathogens predispose to otitis media
Seasonality	Increased incidence in winter months
Cigarette smoke exposure	Increased risk
Socioeconomic status	Variable but generally increased risk with lower status
Dummy (pacifier) use	Increased risk in children over age 11 months

# What is the Pathophysiology of OM?



# Pathophysiology of AOM



Bluestone CD. *Pediatr Infect Dis J.* 1996;15:281-291)



# Pathophysiology of AOM

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- ▶ Eustachian tube (ET) functions include ventilation, protection and clearance of secretions
  - ▶ Impairment ET function → OME
  - ▶ Upper Respiratory Infection → inflammation of nasopharynx (NP) and ET
  - ▶ Inflammation → ET dysfunction → negative middle ear pressure
  - ▶ Organisms colonizing NP aspirated into middle ear resulting in AOM
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# What Bacterial and Viral Agents are Responsible for OM?

# Bacterial Etiology

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- ▶ *Streptococcus pneumoniae*
  1. Incidence: 38%
  2. Beta Lactamase producing: 15-25%
  3. Causes more severe cases with otalgia and fever.
  
- ▶ Nontypeable *Haemophilus influenzae*
  1. Incidence: 27%
  2. Beta Lactamase producing: 35%
  3. More often associated with eye redness and discharge.
  
- ▶ *Moraxella catarrhalis*
  1. Incidence: 10%
  2. Beta Lactamase producing: 85-100%

NOTE: THE NUMBERS HAVE CHANGED WORLDWIDE SINCE THE INTRODUCTION OF THE PNEUMOCOCCAL CONJUGATE VACCINES

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# Viral Etiology

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- ▶ 57% of respiratory syncytial virus (RSV)
- ▶ 35% of influenza A
- ▶ 33% of parainfluenza type 3
- ▶ 30% of adenovirus
- ▶ 28% of parainfluenza type 1
- ▶ 18% of influenza B
- ▶ 10% of parainfluenza type 2 virus infections

OTHER VIRUSES: HUMAN METAPNEUMOVIRUSES, HUMAN BOCAVIRUS, ENTERVIRUSES, RHINOVIRUS, ETC.

