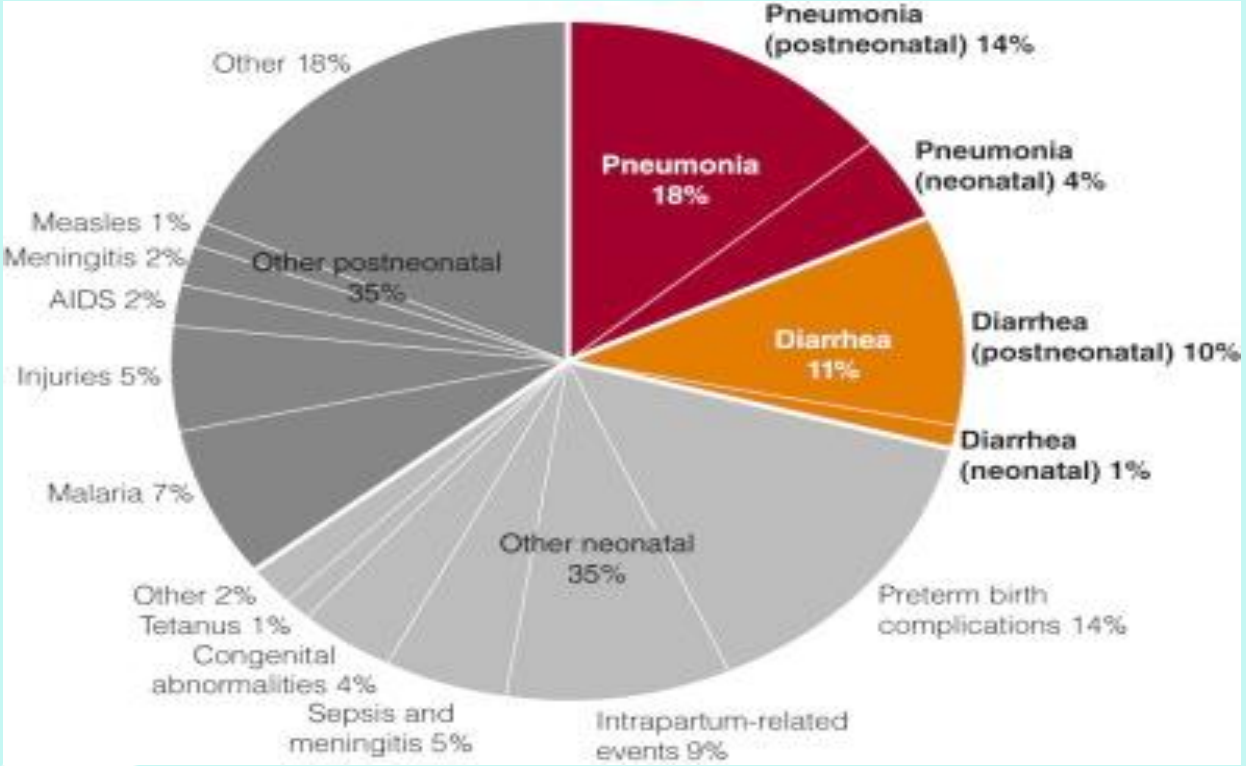
Pneumonia in children

- Uptodate online 2023
- Nelson Textbook of Pediatrics 2020
- الگوریتم علایم و بیماریهای شایع کودکان 1394

EPIDEMIOLOGY

- Inflammation of the lung parenchyma
- 156 million cases each year in children ≤ five years (WHO)
- 20 million hospital admission
- More than 2 million deaths

Pneumonia is the leading killer of children worldwide, among children ≤ 5 yr in 2015



Risk factors

- Low socioeconomic
- Respiratory viral agents
- Underlying cardiopulmonary disorders (Congenital heart disease, Cystic fibrosis, Asthma)
- Underlying medical conditions (Sickle cell disease, Neuromuscular disorders, immunodeficiency)
- Exposure to cigarette (especially mother)

Patterns of pneumonia

Bacterial:

- Lobar pneumonia
- Bronchopneumonia
- Necrotizing pneumonia
- Caseating granuloma
- Interstitial and peribronchiolar

Viral:

- Interstitial pneumonitis
- Parenchymal infection

ETIOLOGIC AGENTS

AGE GROUP	FREQUENT PATHOGENS
Neonates (<3 wk)	Group B streptococcus, Escherichia coli , other Gram-negative bacilli, Streptococcus pneumoniae, Haemophilus influenzae (type b, nontypeable)
3 wk-3 mo	Respiratory syncytial virus, other respiratory viruses (rhinoviruses, parainfluenza viruses, influenza viruses, adenovirus), *S. pneumoniae* , *H. influenzae* (type b,nontypeable); *Chlamydia trachomatis*

AGE GROUP	FREQUENT PATHOGENS
4 mo-4 yr	Respiratory syncytial virus, other respiratory viruses (rhinoviruses, parainfluenza viruses, influenza viruses, adenovirus), *S. pneumoniae, H. influenzae* (type b,nontypeable), *S. aureus,* group A streptococcus
≥5 yr	*M. pneumoniae, S. pneumoniae, Chlamydophila pneumoniae, H. influenzae* (type b,nontypeable), influenza viruses, adenovirus, other respiratory viruses, *Legionella pneumophila*

- Atypical pneumonia: extrapulmonary manifestations, low-grade fever, patchy diffuse infiltrates, poor response to β-lactam antibiotics, negative sputum Gram stain
- Tachypnea:
- ≤ two months: >60 breaths/min
- Two to 12 months: >50 breaths/min
- One to 5 years: >40 breaths/min
- 5 to 12 years: >30 breaths/min
- ≥12 years: >20 breaths/min

رویکرد تشخیصی

- پنومونی حاد: ≥ 3 هفته
- علایم غیر اختصاصی: تب، لرز، سردرد، میالژی، بی حالی
- علایم عفونت: تاکی پنه، درد قفسه سینه
- علایم بالینی: رتراکشن، کاهش صدای تنفسی، رال، ویز
- علایم افیوژن: درد، Friction rub
- علایم خارج ریوی: راش، آرتریت، اوتیت

سرفه

- post viral cough
- سینوزیت
- میکروآسپیراسیون
- GERD
- HRAD
- passive smoking
- Tic
- pertussis like
- جسم خارجی
- برونشیت یا برونشکتازی

شدت پنومونی

- رتراکشن یا درد قفسه سینه
- تاکی پنه
- T≤36 ، T≥38.5
- آپنه یا سیانوز
- استفراغ مکرر، دهیدراتاسیون
- شوک، الیگوری
- درگیری دوطرفه، مولتی لوبار

- افزایش consolidation ≤ 50% طی 48 ساعت
- Hb≤9
- PO2/FIO2≤250
- PO2< 60 mmHg , PCO2> 50 mmHg
- نیاز به اکسیژن

Hospitalization

- Age <6 mo
- Sickle cell anemia with acute chest syndrome
- Multiple lobe involvement
- Immunocompromised state
- Toxic appearance
- Moderate to severe respiratory distress
- Requirement for supplemental oxygen
- Complicated pneumonia
- Dehydration
- Vomiting
- No response to oral antibiotic
- Social factors

DDx

- شروع بیماری
- تب
- شدت بیماری
- اِئوزینوفیلی، لنفادنوپاتی، عوارض
- درگیری دستگاه تنفس فوقانی
- یافته های CXR
- آزمایشگاه
- علایم خارج ریوی

Severity

mild pneumonia	severe pneumonia
Temperature≤40	Temperature≥40
Mild or absent respiratory distress: •Increased RR, but less than the age-specific RR that defines moderate to severe respiratory distress •Mild or absent retractions •No grunting •No nasal flaring •No apnea •Mild shortness of breath	Moderate to severe respiratory distress: •RR >70 breaths/minute for infants; RR >50 breaths/minute for older children •Moderate/severe suprasternal, intercostal, or subcostal retractions (<12 months) •Severe difficulty breathing (≥12 months) •Grunting •Nasal flaring •Apnea •Significant shortness of breath

Severity

mild pneumonia	severe pneumonia
Normal color	Cyanosis
Normal mental status	Altered mental status
Normoxemia (oxygen saturation ≥92 percent in room air)	Hypoxemia (sustained oxygen saturation <90 percent in room air at sea level)
Normal feeding (infants); no vomiting	Not feeding (infants) or signs of dehydration (older children)
Normal heart rate	Tachycardia
Capillary refill <2 seconds	Capillary refill ≥2 seconds

درمان

	باکتریال	آتی پیک	ویرال
خفیف	آموکسی سیلین خوراکی با دوز بالا	ماکرولید	عدم درمان آنتی بیوتیکی
متوسط	سفالوسپورین نسل 3 تزریقی	ماکرولید ± سفالوسپورین نسل 3 تزریقی	تحت نظر گرفتن
شدید	سفالوسپورین نسل 3 + سفالوسپورین نسل 1	ماکرولید + سفالوسپورین نسل 3	شبیه باکتریال
خیلی شدید	سفالوسپورین نسل 3 + وانکومایسین	ماکرولید + سفالوسپورین نسل 3 + وانکومایسین	شبیه باکتریال ± اسلتامیویر

Groups at higher risk for influenza complications

Children <5 years, but especially <2 years
Adults ≥65 years of age
People who are pregnant or up to 2 weeks postpartum
Residents of nursing homes and long-term care facilities
People with medical conditions: Asthma, Neurologic and neurodevelopmental, Chronic lung disease, Heart diseas, Blood disorders, Endocrine disorders, Kidney&Liver diseases, Metabolic disorders ,
Weakened immune system (HIV, cancer, chemotherapy…)
Children <19 years of age who are receiving long-term aspirin therapy
People with Class III obesity (body mass index [BMI] ≥40)

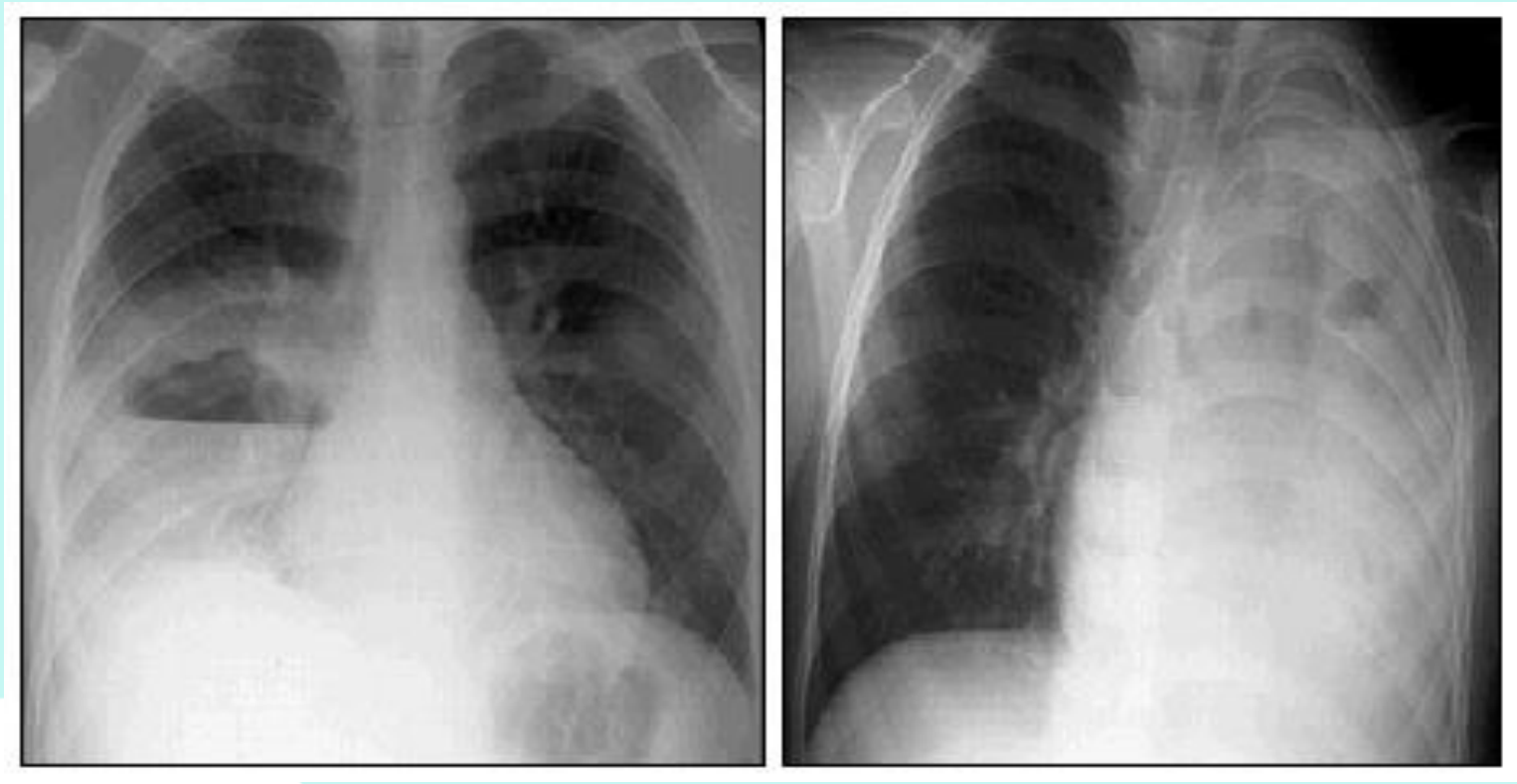
Duration

- Outpatient treatment: 7 to 10 days (azithromycin is five days)
- Inpatient treatment:
- Parenteral therapy: afebrile for 24 to 48 hours, no emesis
- 10 days or at least one week beyond resolution of fever
- Complicated: four weeks or two weeks after afebrile

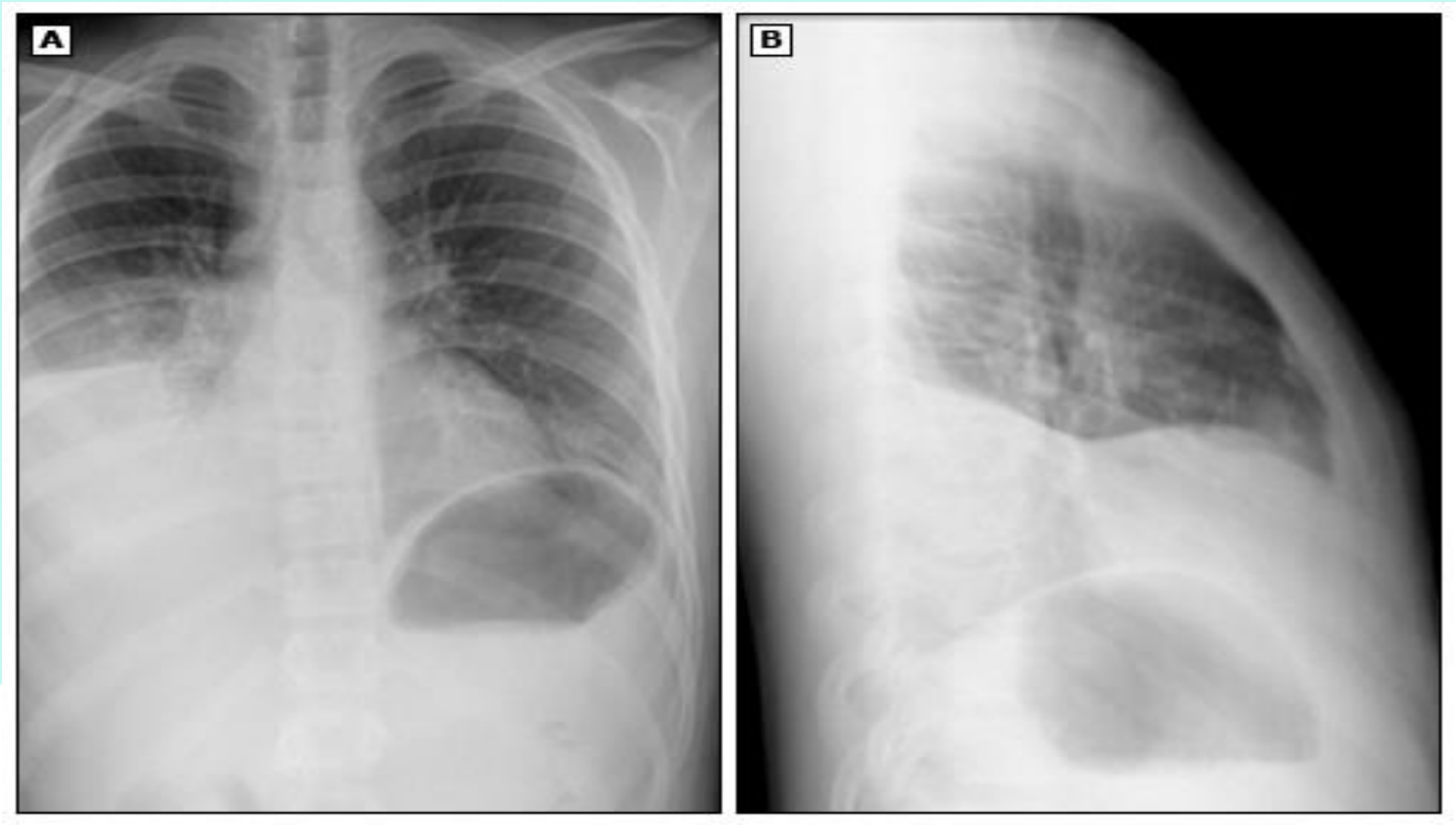
Follow-up radiographs

- Not necessary in asymptomatic and uncomplicated
- Complicated CAP
- Recurrent pneumonia, persistent symptoms, severe atelectasis, unusually located infiltrates, round pneumonia (pulmonary spherical consolidation)

Lung abscess with an air-fluid level in the right lung (Streptococcus pneumoniae)



Right-sided pneumonia with pleural effusion



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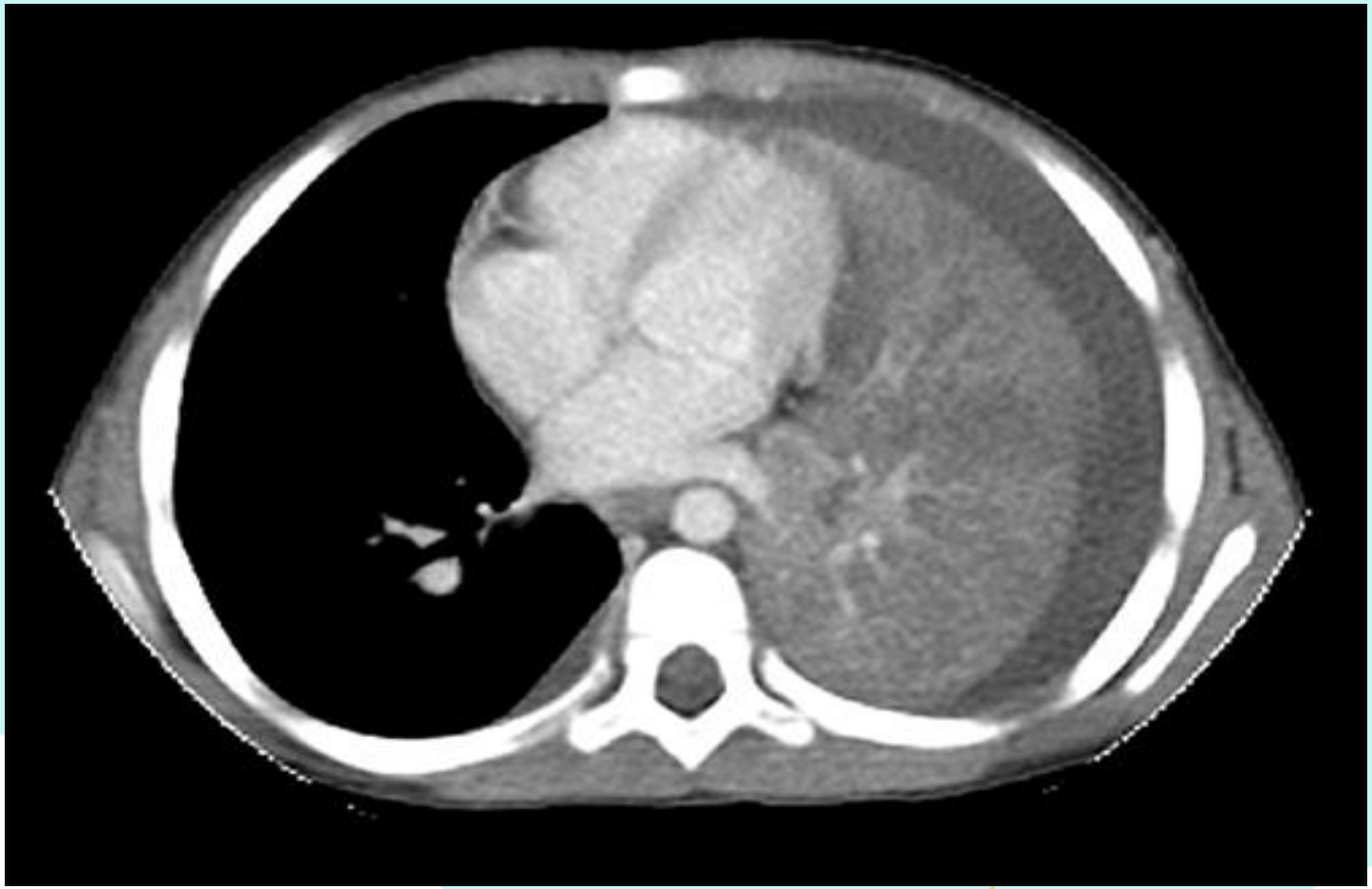
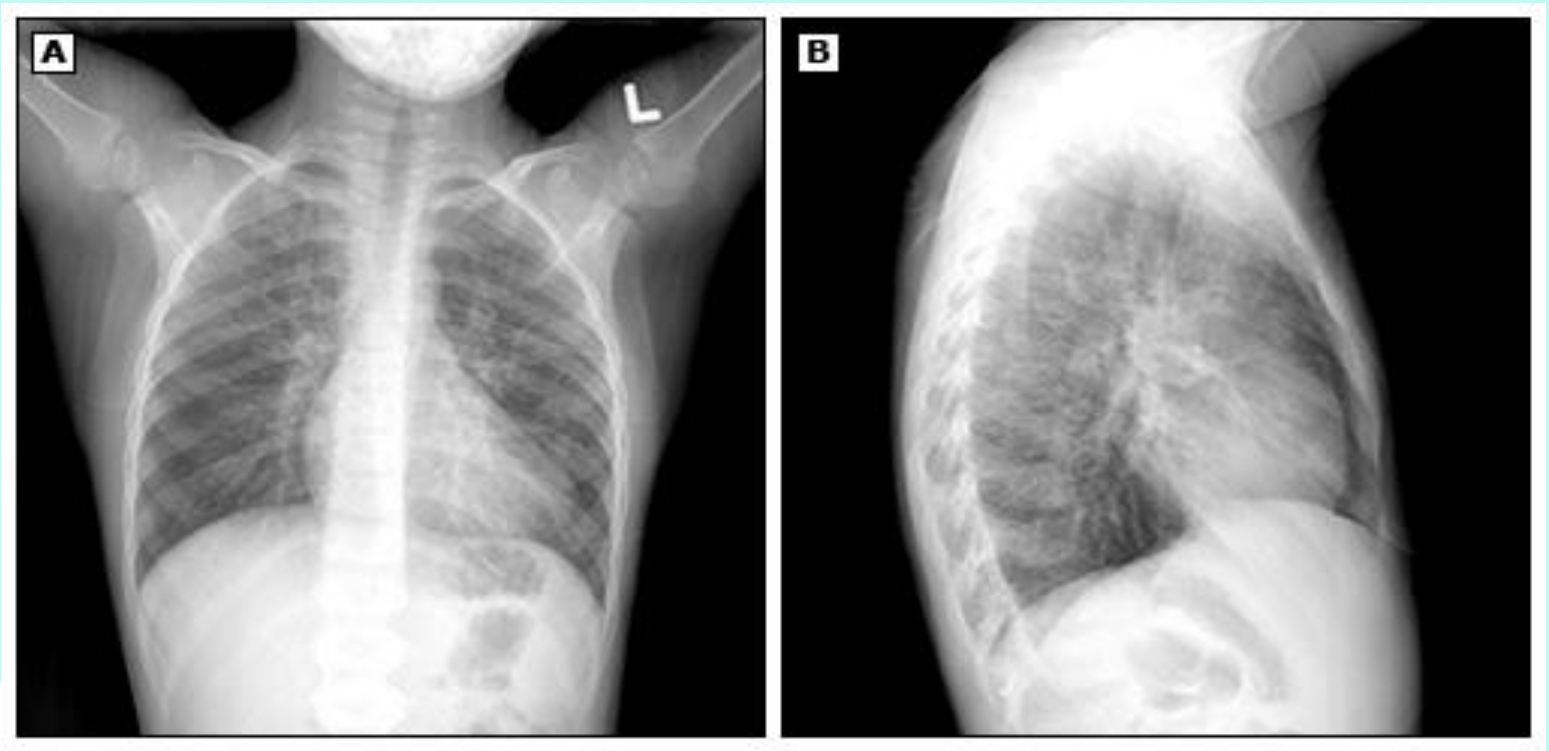
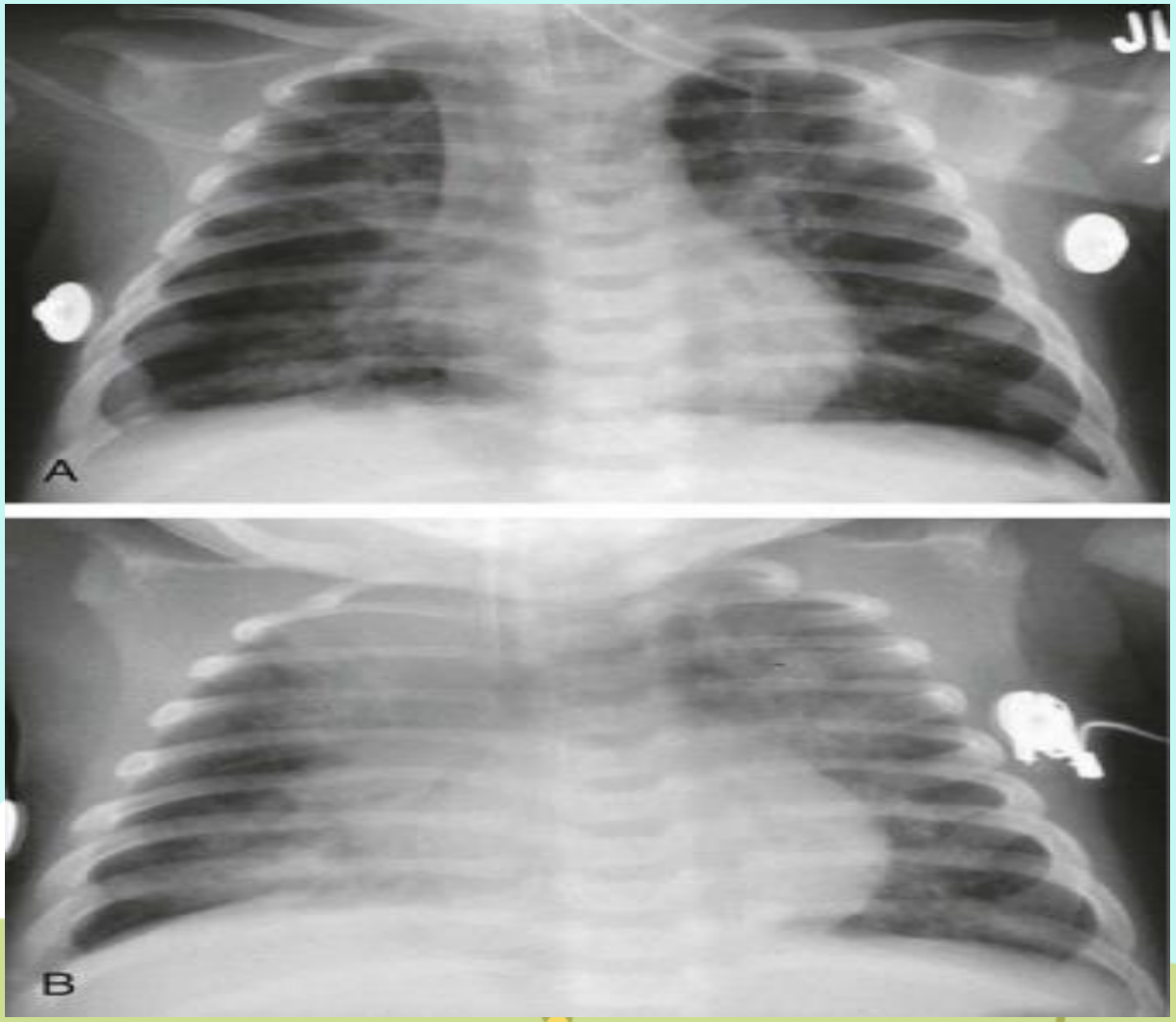


Left-sided Streptococcus pneumoniae necrotizing pneumonia

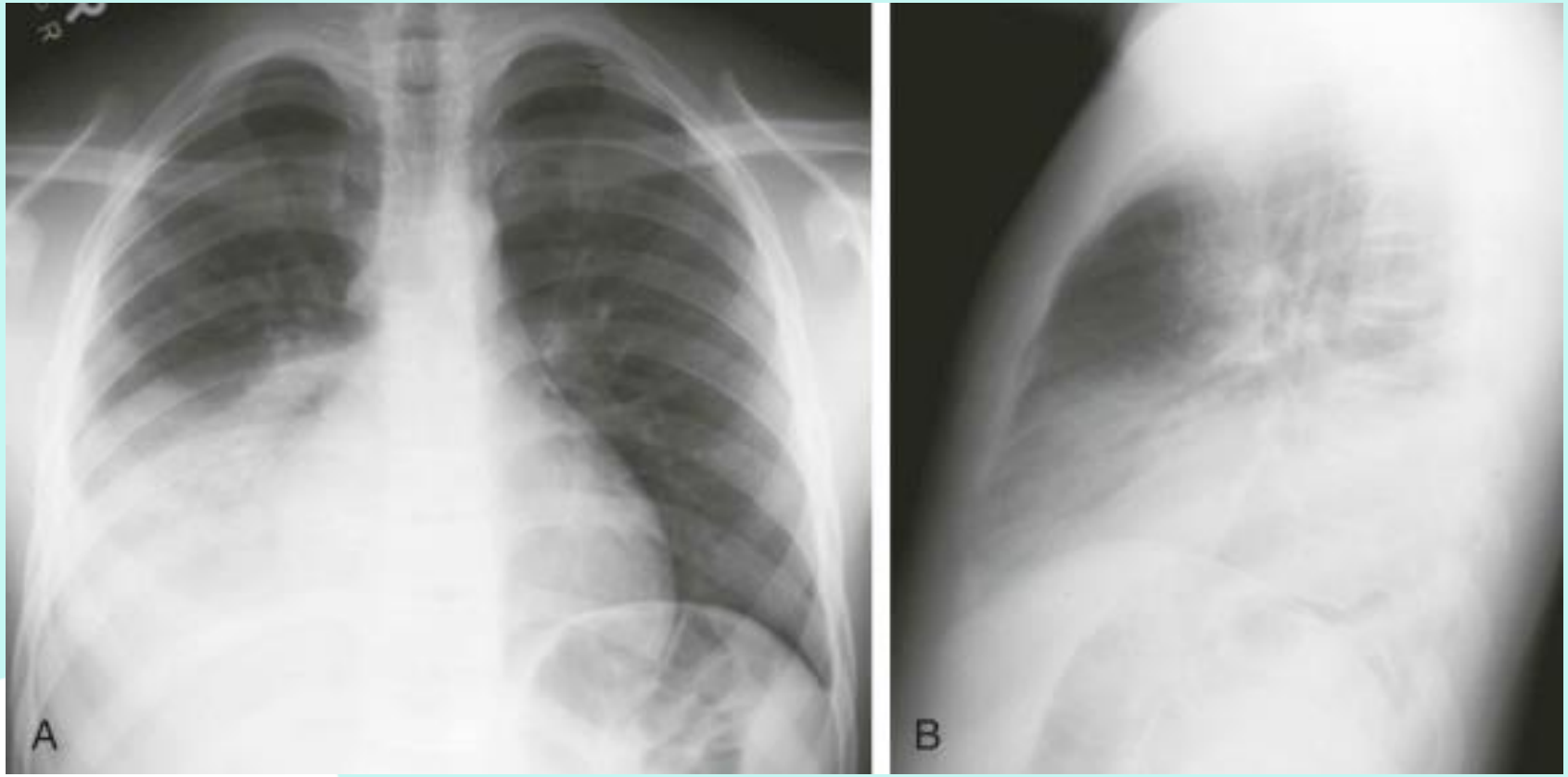
Mycoplasma pneumoniae pneumonia



respiratory syncytial virus pneumonia in a 6 mo old



consolidation in the right lower lobe(pneumococ)



Pneumococcal empyema