

PNEUMONIA

Learners Guide

Author **Ellis Collins & Michelle Alisio**

(Edits by the DFTB Team)

fellows@dontforgetthebubbles.com

PRE-READING FOR LEARNERS

Khan Academy: [What is pneumonia?](#) (9 mins) OR

Khan Academy: [Classification of lung diseases.](#) (restrictive, obstructive, ventilation and perfusion lung problems 11mins)

[GPPaedstips](#): Diagnosing a lower respiratory tract infection (LRTI)

[LITFL](#): Pneumonia in the ED

[Paediatric clinical examinations- The respiratory system](#) (7mins)

[DFTB](#): Respiratory infections

[RCH](#): Community Acquired Pneumonia

[DFTB](#): The Mire of Mycoplasma

[DFTB](#): POCUS and Pneumonia

[ALiEM](#): Lung Ultrasound for diagnosing pneumonia

[Substituting POCUS for CXR Podcast on using lung USS](#) (11 mins)

CASE SCENARIO 1

Mary is 3yrs old and was referred to hospital from the GP with a 2 day history of coryzal symptoms, cough, fever and saturations of 91%. She is not eating but still drinking fluids well. On assessment in triage she is crying; her respiratory rate is 45, saturations are 96% and temperature is 37.8°. The play therapist distracts her while you examine her chest on mum's lap. You don't see any use of accessory muscles or intercostal recessions at rest; you think you heard crackles but it could also be transmitted sounds.

What is the probability that Mary has pneumonia?

Should you do a Chest X-ray?

Mary's mother says the GP frightened her by referring her to hospital. She asks you whether Mary needs antibiotics. Should you prescribe antibiotics?

CASE SCENARIO 2

Martin is an 8year old fit and healthy young boy who was brought in by his dad with three days of fever, a dry cough, abdominal pain and shortness of breath, initially seen by the GP and started on amoxicillin. Today he was sent home from school because of breathing difficulties. On assessment Martin is lying in bed, alert with a tracheal tug, use of accessory muscles, a respiratory rate of 37, and oxygen saturations of 89% in room air. You also note that Martin has a rash on their lower legs.

Why is Martin not improving on appropriate antibiotics?

How should Martin be investigated and managed?

ADVANCED CASE SCENARIO 1

Mimi is well known to the department. She has Trisomy 21 and had her VSD repaired at 3 months of age. She is now 10 months old and is brought in with a 2 day history of coryzal symptoms, cough and fever. Today her parents have noticed fast breathing, she is much more lethargic and off food. She is normally a very bright bubbly child. On examination Mimi is tiring, she is cyanosed with oxygen saturations of 82%.

**Which patients are at increased risk of a severe pneumonia?
Should we CPAP 'trial' or immediately intubate?**

ADVANCED CASE SCENARIO 2

A 4yr child, Hannah was diagnosed with pneumonia and admitted to the children wards on oxygen and commenced on IV antibiotics. After 48hr of initial therapy her oxygen requirements have increased, and she is still spiking fevers. You have been called to review Hannah as the nursing staff are concerned that she is febrile again despite paracetamol. Her initial CXR showed a dense left lower lobe consolidation.

**Would you repeat a Chest xray? Or are there alternative investigations?
Hannah has developed an empyema. Discuss your approach to inserting a chest drain.**

SIMULATION (30-60 MINS)

[Thames Valley Simulation PDF](#) – Paediatric sepsis

This simulation focuses on management of sepsis so would follow on from recognising complications or deteriorations in children with LRTI, recognising shock and when to escalate care.

QUIZ QUESTIONS (10-15 MINS)

A 5yr is brought in with 3day history of fever, lethargy and complaints of left sided abdominal pain. Normally fit and well, immunisations are up to date and they attend school. In triage he is noted to have subcostal and intercostal recession, with SpO₂ of 90% in air, the triage nurse moves him to a bay and asks for your urgent review.

Question 1.

What on examination/initial investigation would make the diagnosis of pneumonia more likely?

- A - Fever and cough
- B - Low sats and fever
- C - Focal crackles on chest auscultation
- D - Hypoxaemia and increased work of breathing
- E - Coryzal and increased work of breathing

Question 2.

On examination the child has consistently reduced air entry at the right, persistently low sats of 91%. CXR shows a right lower lobe pneumonia.

What is the most likely causative pathogen?

- A - Streptococcus Pneumoniae
- B - Staphylococcus aureus
- C - Haemophilus influenza (type B)
- D - Mycoplasma pneumonia
- E - Respiratory Syncytial Virus (RSV)

Question 3.

You insert an IV cannula and take bloods. Results show a white cell count of $24.3 \times 10^9/L$ (with neutrophils 92%), a CRP 283 mg/L and a sodium (Na) 126 mmol/L. The rest of his full blood count and renal function are normal.

Which of the following is the most likely cause for his hyponatraemia?

- A - Low sodium intake
- B - Increased renal excretion
- C - Hyponatraemic dehydration
- D - Increased sodium dilution
- E - High sweat sodium concentrations

Take home tips

- 1** Pneumonia can present in a number of ways but abnormal signs of breathing, fever and low saturation would make a pneumonia more likely
- 2** There are no absolute rules about when to do a Chest X-ray – consider doing it in infants, those with complex medical backgrounds and those with chronic symptoms.
- 3** A clinical examination cannot distinguish between a viral or bacterial pneumonia, neither can a CXR. Use a severity assessment to direct your treatment.
- 4** Consider using POCUS over CXR if the resource and technicians are available- it can give a more sensitive result without Xray exposure
- 5** If there is no response to antibiotics after 48hours consider development of an effusion or empyema. If continued deterioration then a trial of CPAP/PICU may be required

REFERENCES

<https://jamanetwork.com/journals/jama/article-abstract/2646723>

[BTS guidelines for community acquired pneumonia in children](#)

[Point of care ultrasound in diagnosing pneumonia](#)

<http://www.emdocs.net/pediatric-pneumonia/>

<https://www.who.int/news-room/fact-sheets/detail/pneumonia>

<https://www.blf.org.uk/support-for-you/pneumonia-in-children/treatment>

https://apps.who.int/iris/bitstream/handle/10665/137319/9789241507813_eng.pdf;jsessionid=CEC9F8E3036037394A86ADF7B7B44B43?sequence=1

<https://litfl.com/pediatric-pneumonia-in-the-ed/>

<https://dontforgetthebubbles.com/the-mire-of-mycoplasma/>

<https://dontforgetthebubbles.com/adcdftbjournalclub-jan19-pocus-vs-pneumonia/>

<https://www.ncbi.nlm.nih.gov/books/NBK536940/>

<https://emedicine.medscape.com/article/967822-overview>

<https://emedicine.medscape.com/article/1926980-overview#a3>

<https://www.nice.org.uk/guidance/ng138/chapter/Recommendations>

 fellows@dontforgetthebubbles.com