

# Respiratory Medicine in the Emergency Department

Kyle Perrin





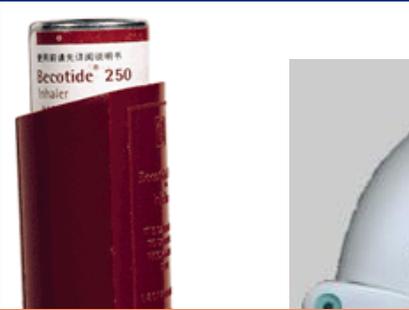
# The run down

- Asthma
- Pulmonary embolism
- Pneumothorax

# My approach to acute medicine

- Diagnosis
  - What else could this be?
  - What do I not want to miss?
- Assessment of severity

# Assessment and management of asthma in the ED



rexair



The  
**Combination Inhalers**

A collection of three white inhalers with different colored caps (grey, white, and blue) arranged in a row. The word "rexair" is written above them, and "The Combination Inhalers" is written below them.

salair



The  
**Reliever Inhaler**

A white inhaler device with a grey cap. The word "salair" is written above it, and "The Reliever Inhaler" is written below it.

meterol



The **Symptom Controller Inhaler**

A white inhaler device with a pink cap. The word "meterol" is written above it, and "The Symptom Controller Inhaler" is written below it.

floair



The  
**Preventer Inhalers**

A collection of three white inhalers with different colored caps (yellow, orange, and white) arranged in a row. The word "floair" is written above them, and "The Preventer Inhalers" is written below them.

# **Asthma and Respiratory Foundation NZ adult asthma guidelines: a quick reference guide**

Richard Beasley, Robert J Hancox, Matire Harwood, Kyle Perrin, Betty Poot, Janine Pilcher, Jim Reid, Api Talemaitoga, Darmiga Thayabaran

## **ABSTRACT**

The purpose of the Asthma and Respiratory Foundation NZ Adult Asthma Guidelines is to provide simple, practical and evidence-based recommendations for the diagnosis, assessment and management of asthma in adults (aged 16 and over) in a quick reference format. The intended users are health professionals responsible for delivering asthma care in the community and hospital Emergency Department settings, and those responsible for the training of such health professionals.

# Key principles

1. Make a diagnosis
2. Objective assessment of severity
3. Administering treatment appropriate to the degree of severity
4. Repeatedly reassessing the response to treatment
5. Assessment of the need for hospital admission

# SEVERITY ASSESSMENT

# Moderate asthma

- Worsening symptoms
- Peak flow  $>50\%$  best or predicted
- No features of acute severe asthma.

# Severe asthma

Any one of

- Peak flow 30–50% best or predicted
- Respiratory rate  $\geq 25/\text{min}$
- Heart rate  $\geq 110/\text{min}$
- Inability to complete sentences in one breath

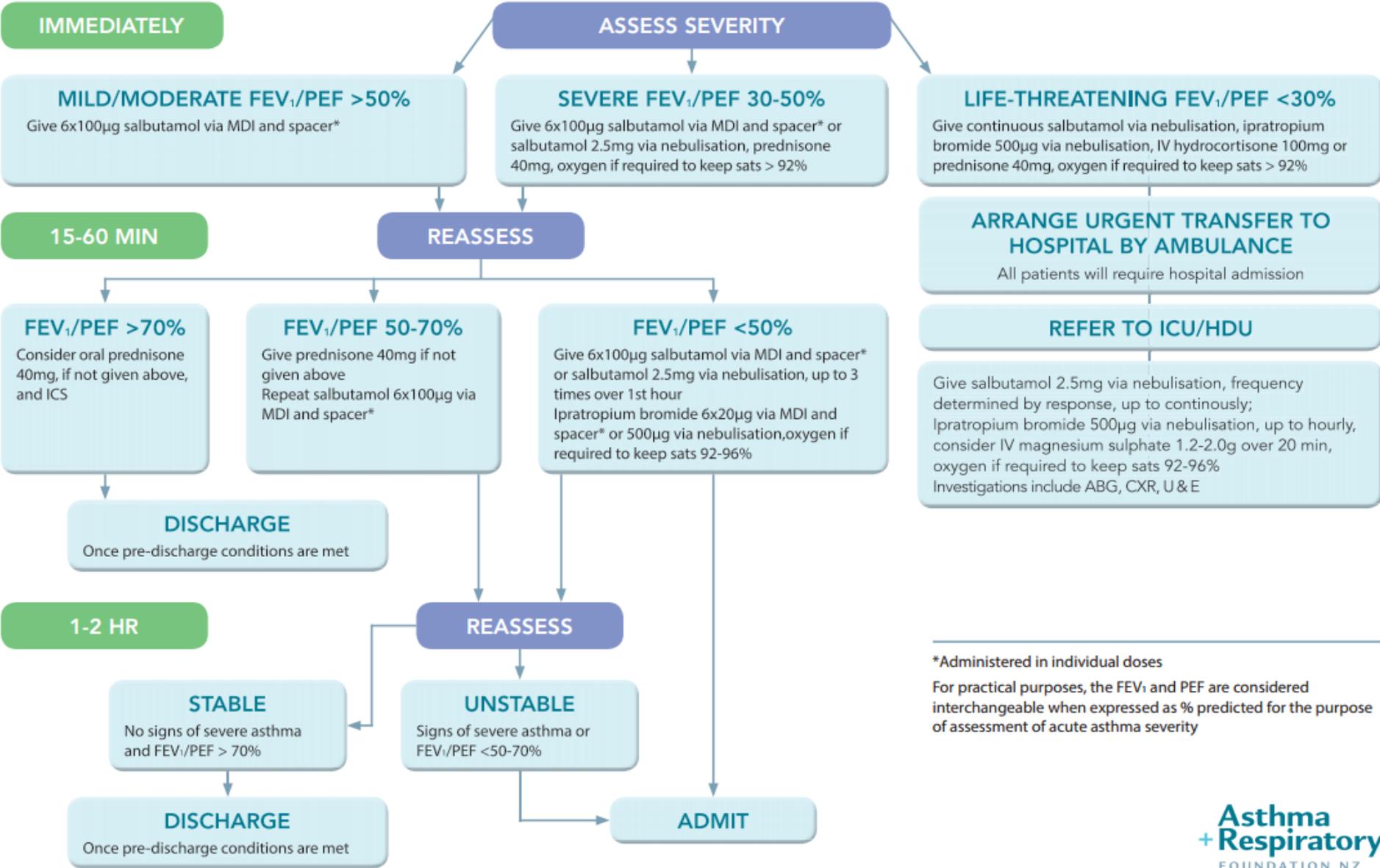
# Life threatening asthma

Any one of

- Peak flow  $< 30\%$  best or predicted
- SpO<sub>2</sub>  $< 92\%$
- PaCO<sub>2</sub>  $\geq 45$ mmHg
- Other:
  - Silent chest
  - Cyanosis
  - Drowsy/exhaustion
  - Hypotension or bradyca

**TREATMENT**

# ALGORITHM FOR MANAGEMENT OF SEVERE ASTHMA



\*Administered in individual doses  
For practical purposes, the FEV<sub>1</sub> and PEF are considered interchangeable when expressed as % predicted for the purpose of assessment of acute asthma severity

# PRACTICE POINTS

For most patients, initial treatment with bronchodilator via a spacer and oral steroids is likely to be sufficient.

Magnesium is the preferred  
IV bronchodilator to be  
administered in life-threatening asthma

There is no role for IV salbutamol unless  
inhaled treatment cannot be given.

There is no role for intravenous  
aminophylline

There is no role for adrenaline unless asthma is accompanied by anaphylaxis or angioedema

There is insufficient evidence to support the use of non-invasive ventilation (NIV) in acute asthma, outside an ICU setting.

# Assessment and treatment of pulmonary embolism

# Principles

- Suspect PE
- Make the diagnosis
- Assess severity
- Treat according to severity

# Kate

- Age 26, previously fit and well
- Sudden onset breathlessness yesterday morning, worse today so flat-mate drives her to ED
- On the OCP
- Mum has had two previous DVTs

# Kate

- Comfortable at rest
- Observations
  - Afebrile
  - BP 126/64
  - HR 90/min
  - RR 18/min
  - Oxygen saturation 96%

# Kate

- Physical examination normal
- CXR clear
- Bloods all normal except D-dimer >5000

What now?

# Treatment of low risk PE

- Low molecular weight heparin
- Anticoagulation
  - Warfarin
  - Dabigatran
  - Rivaroxaban

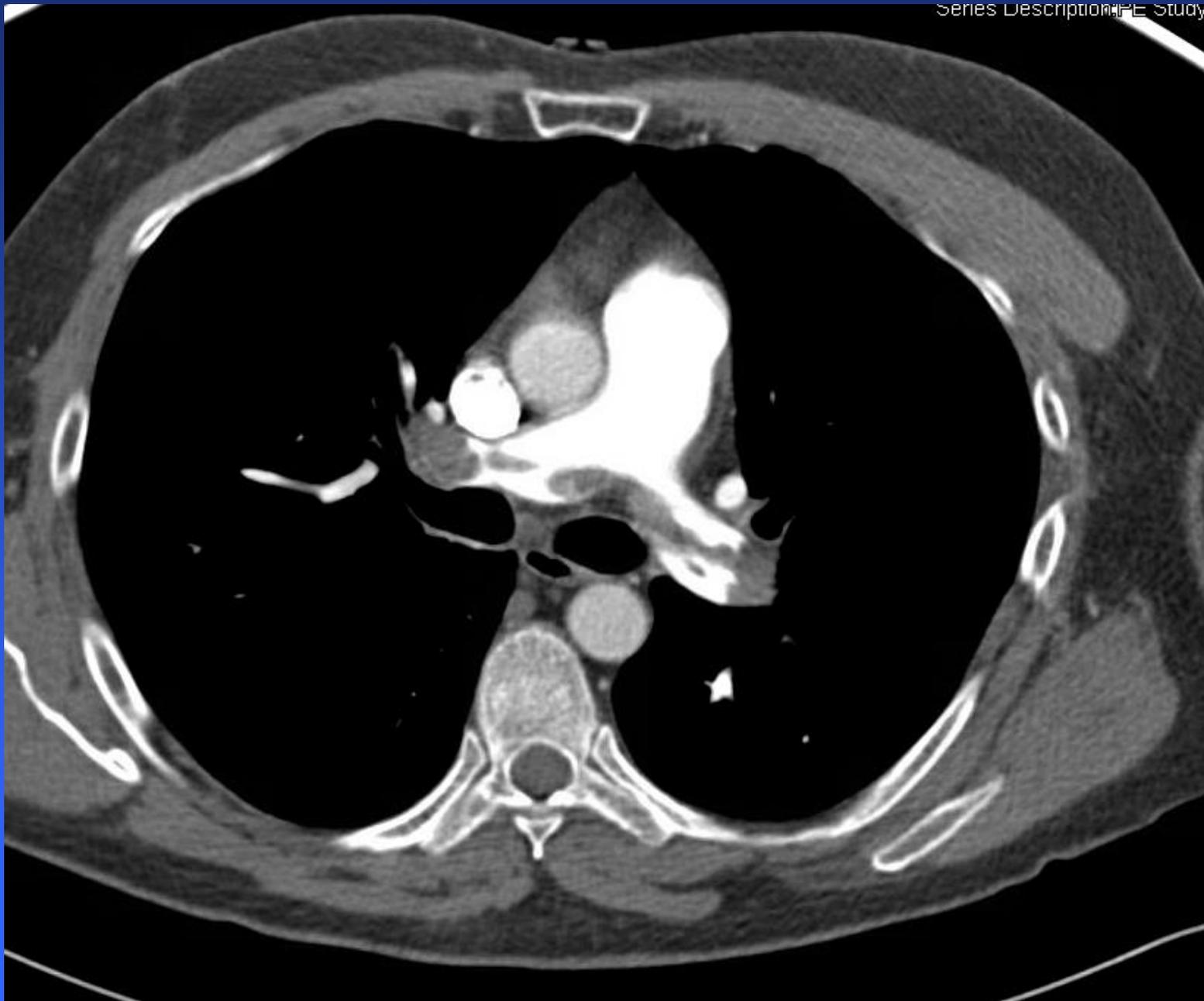
Why do you die from a PE?

# Severity assessment: high risk PE

- Systolic BP < 90 mmHg
- Drop of systolic BP by 40 mmHg and
  - cold extremities
  - low urinary output (< 30 mL/h)
  - confusion

# Management of high risk PE

- Urgent CTPA
- Systemic thrombolysis with tPA



# Management of pneumothorax



# Varieties of pneumothorax

- Primary spontaneous
- Secondary spontaneous
- Iatrogenic
- Traumatic
- Tension

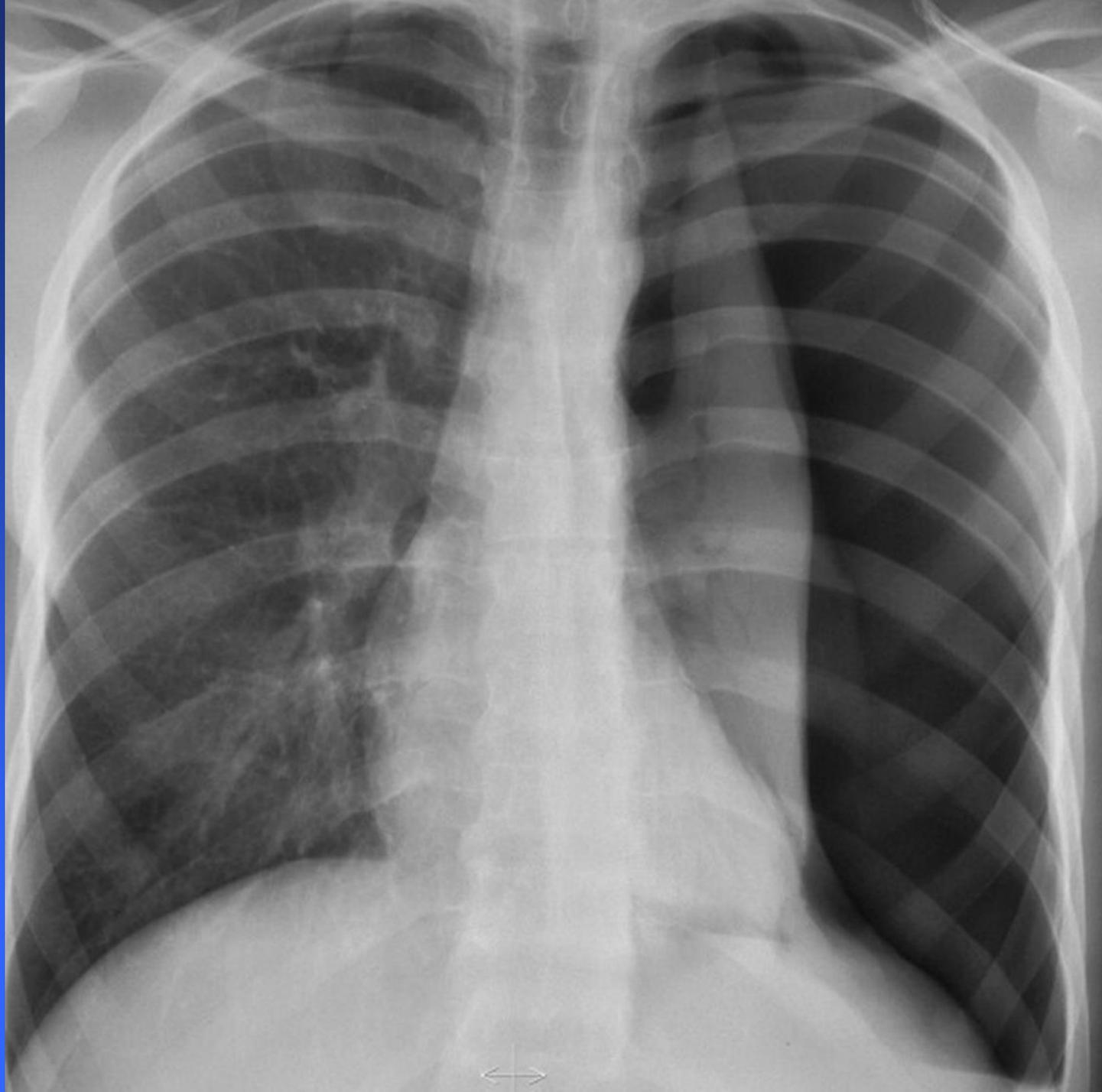
**A CASE**

# Simon

- Age 24
- Works in IT
- Normally fit and well
- Smoked in his teens but gave up 4 years ago

# Simon

- Yesterday sudden onset left sided chest pain and dyspnoea while sitting at his desk
- Today pain improved but moderately breathless at the gym so saw his GP
- Referred to medical registrar with possible PE



Initial management?

# Initial management

- 12 Fr intercostal tube inserted by ED SHO
- Significant chest pain during and after insertion

# Progress – day 1

- Connected to underwater seal drain
- Admitted to medical ward
- Required sevredol for pain

# Progress – day 2

- Drain still bubbling

# Progress – day 3

- Got up to use the toilet, stood on drain and pulled it out of his chest
- Drain re-inserted

# Progress – day 4

- Drain still bubbling
- Simon fed up
  - Not sleeping
  - Can't have a shower

# Progress – day 5

- Drain still bubbling
- Repeat chest x-ray showed lung only 50% expanded
- Persistent air leak
- Discussed with cardiothoracic registrar

# Progress – day 6

- Transferred to cardiothoracic ward
- VATS pleurodesis
- Eventually discharged 2 days later

# **HISTORY OF PNEUMOTHORAX**

# Early case series

- DuBose (NEJM 1953)
  - 34 patients treated by bed rest
  - Average time to expansion: 15 days
- Lefemine (JAMA 1956)
  - 15 patients treated by bed rest
  - Average time to expansion: 12 days

# Early case series

- Vail (Chest 1960)
  - 29 patients treated by bed rest
  - Average time to expansion: 29 days
- Hyde (Chest 1963)
  - 171 patients treated by bed rest
  - Average time to expansion: 27 days

# Diseases treated with prolonged bed rest in the 20<sup>th</sup> century

Myocardial infarction

Hypertension

Peptic ulcer

Pneumonia

Rheumatic fever

# Ruckley (Thorax 1966)

- Thoracic surgical unit
- 242 cases of pneumothorax over 10 years
- High rate of active intervention (97%)

# Ruckley (Thorax 1966)

“The combination of loss of earnings and the cost of the hospital bed occupancy makes quite clear the economic importance of active treatment in most cases”.

Stradling and Poole (Thorax 1966)

“Conservative management of  
pneumothorax”

# Stradling and Poole, Thorax 1966

- 68 PSP patients discharged immediately without intervention, majority were told to remain at work
- 78% had re-expanded by 4 weeks
- 97% had re-expanded by 8 weeks

# Stradling and Poole, Thorax 1966

“Our experiences with simple pneumothorax is encouraging. It is a benign condition and only occasionally gives cause for anxiety”.

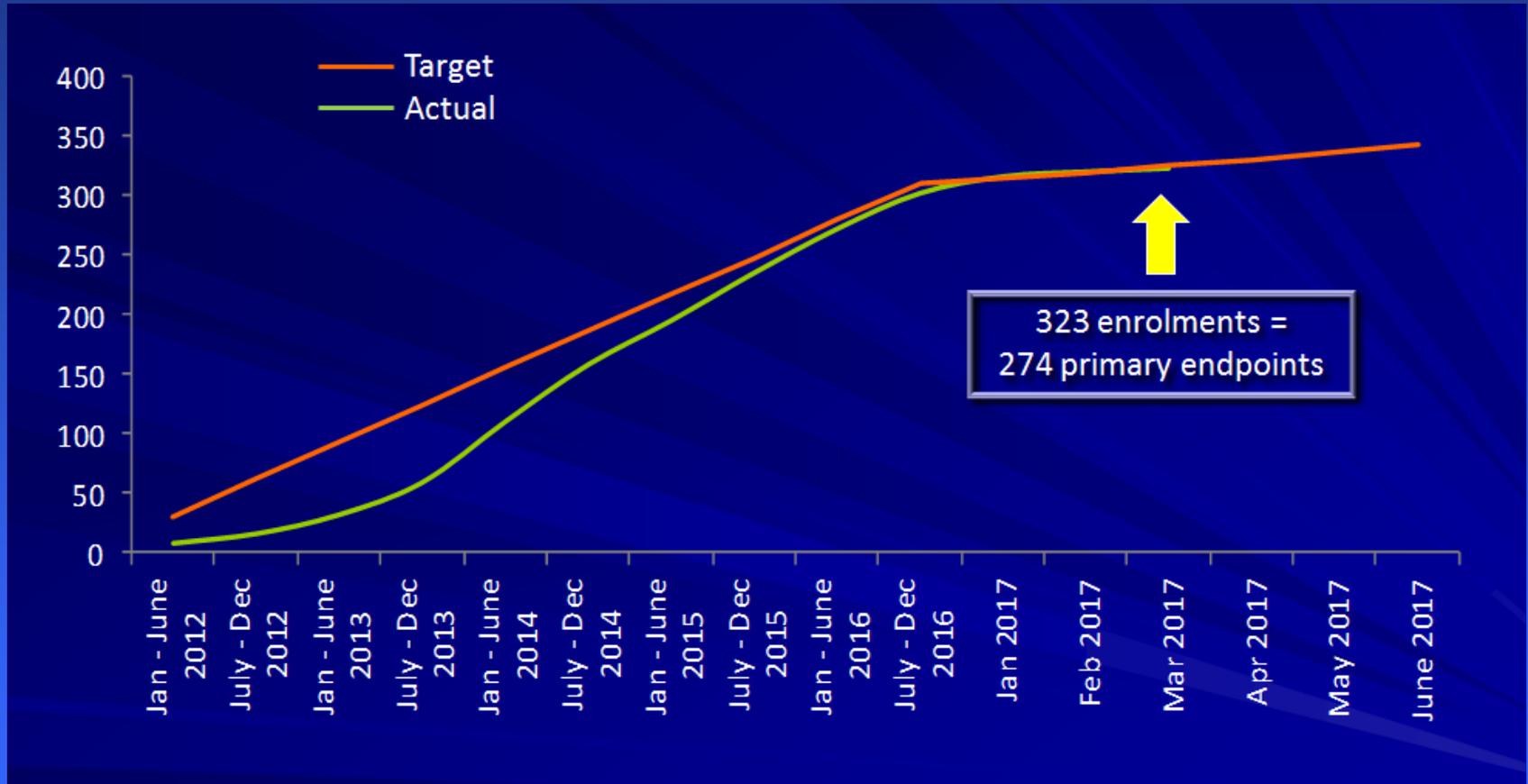
What happened next...

A randomised-controlled trial of  
conservative vs invasive  
management of primary spontaneous  
pneumothorax

# Hypotheses

1. That large PSPs resolve within 8 weeks in  $\geq 90\%$  of cases with conservative management alone
2. That a conservative approach results in comparable or higher patient satisfaction and fewer health resources
3. That conservative management is safe.

# Recruitment



# Future of pneumothorax management

- The majority of patients are observed and discharged without intervention
- Significant reduction in hospital costs and complications of tube insertion and surgery
- Possible reduction in recurrence rates and reduction in disease burden

