

Interpretation of Pulmonary Function Tests

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Interpretation

Interpretation (v):

the action of explaining the
meaning of something

Interpretation of Pulmonary Function Test

Classifying which disease pattern best explains the results of a test.

Determining the degree to which function has been impaired.

What is Important?

Respiratory Pump

- Normal Muscle Function
- Normal Chest Wall and Lung compliance
- Low Resistance Pathway

Gas Exchange

- Normal alveolar surface area
- Normal diffusion “resistance”
- Normal blood supply

Sequential Approach To Interpretation

- Assess test quality /read technical comment
- Compare with predicted values and LLN
- Compare with known disease or physiologic patterns
- Review serial data
- Draw conclusions

Previous CRFS Workshops

2007 Interpretation of Airway Function Tests

Jeff Pretto

2008 Interpretation of Tests of Parenchymal Function

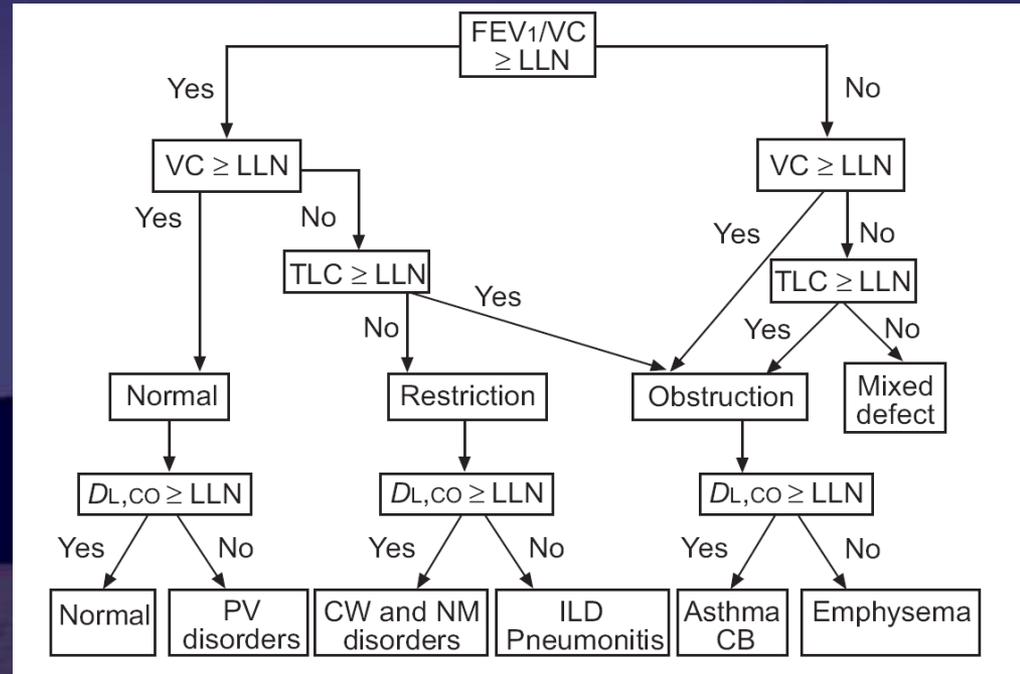
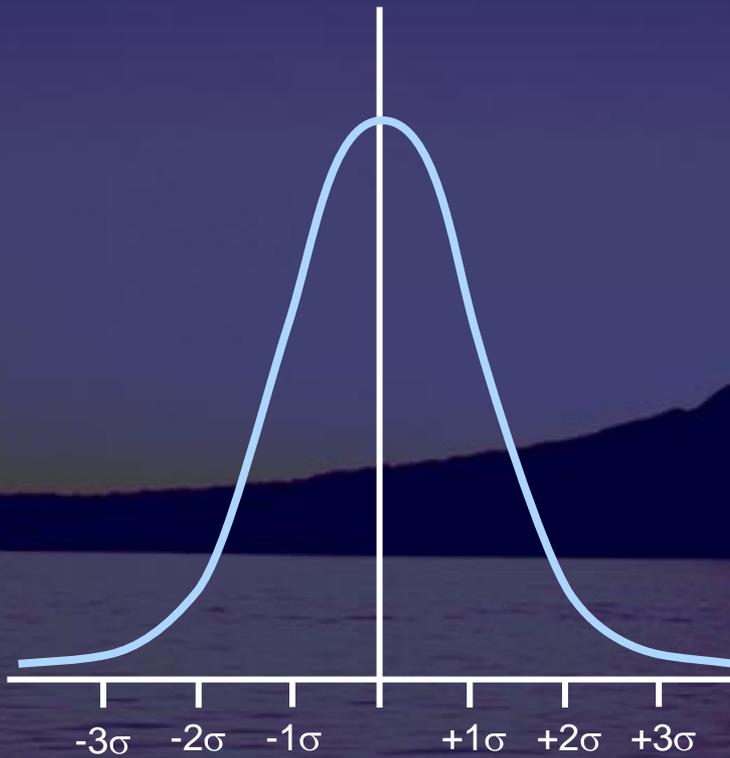
Sonya Johnston

2013 Normal Values in Respiratory Function Tests

Josh Stanton

Spirometry Interpretation Algorithm

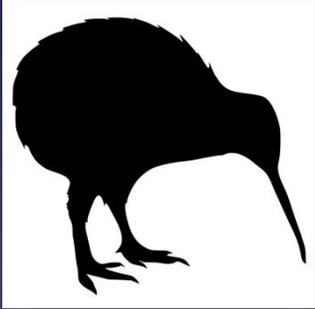
Normal Distribution



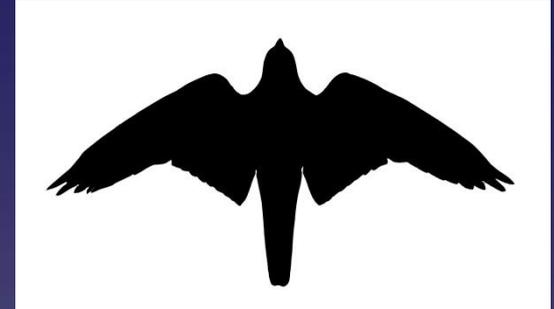
ATS/ERS 2005: interpretation

Below 5th centile < Normal < 95th
OR 1.65 SDs

Pattern Recognition



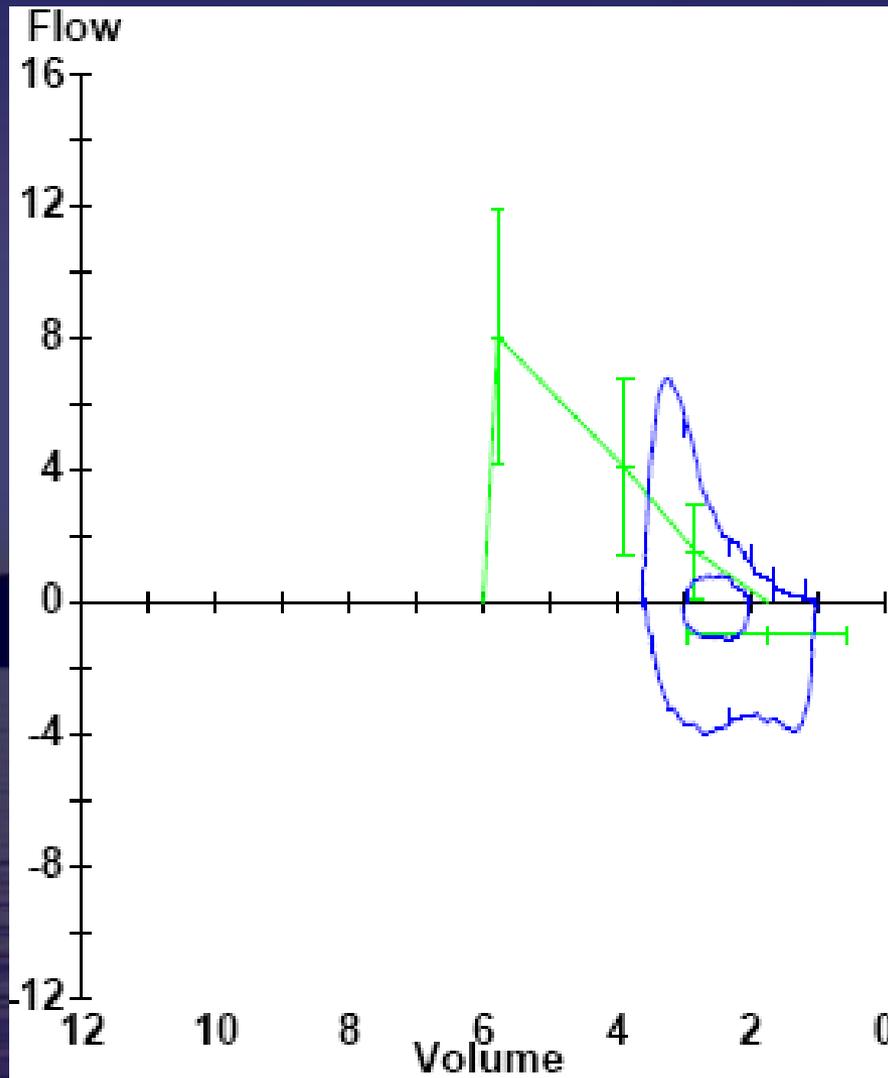
“JIZZ”
(GISS)



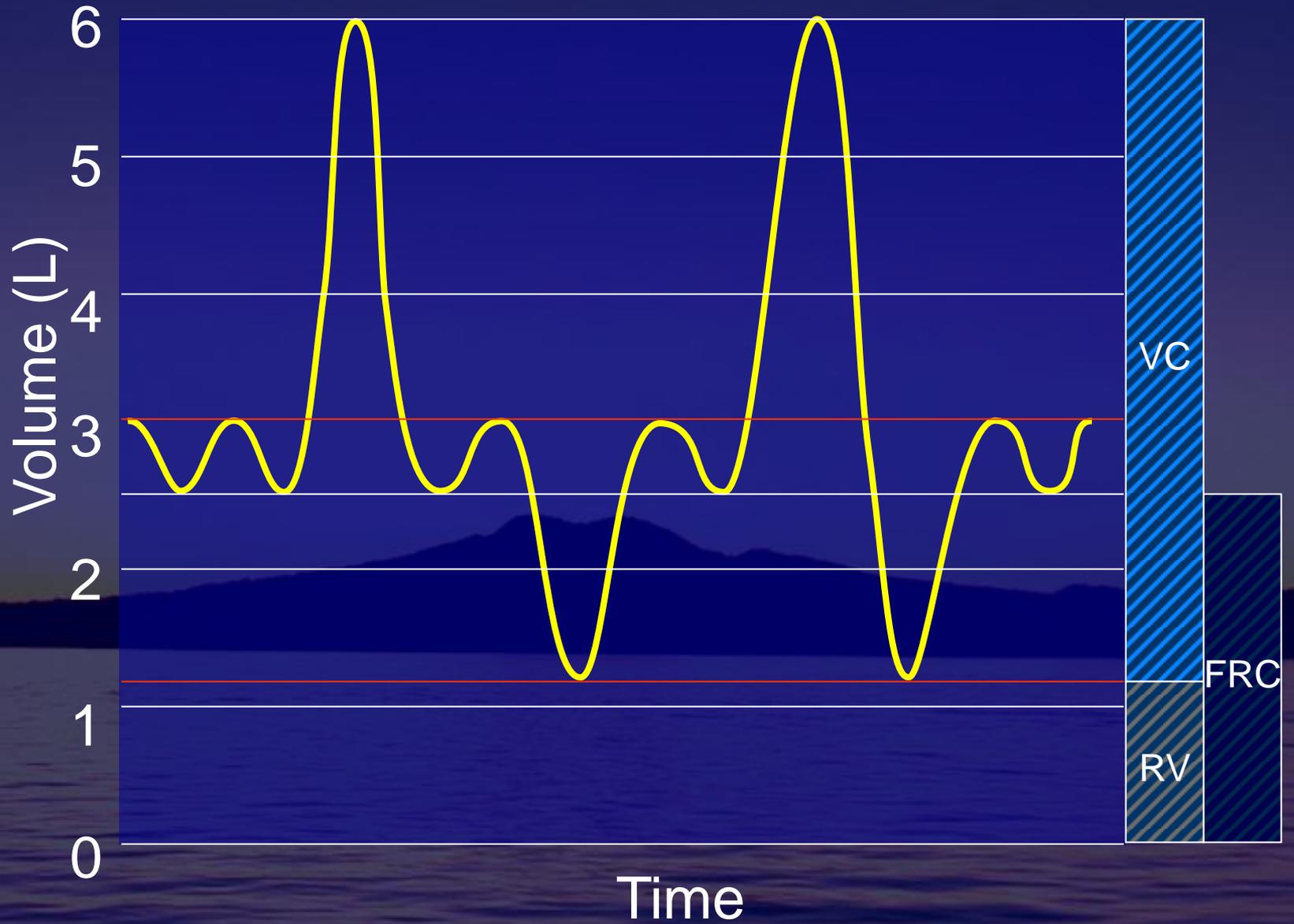
General Impression of Size and Shape



Recognising Disease Patterns

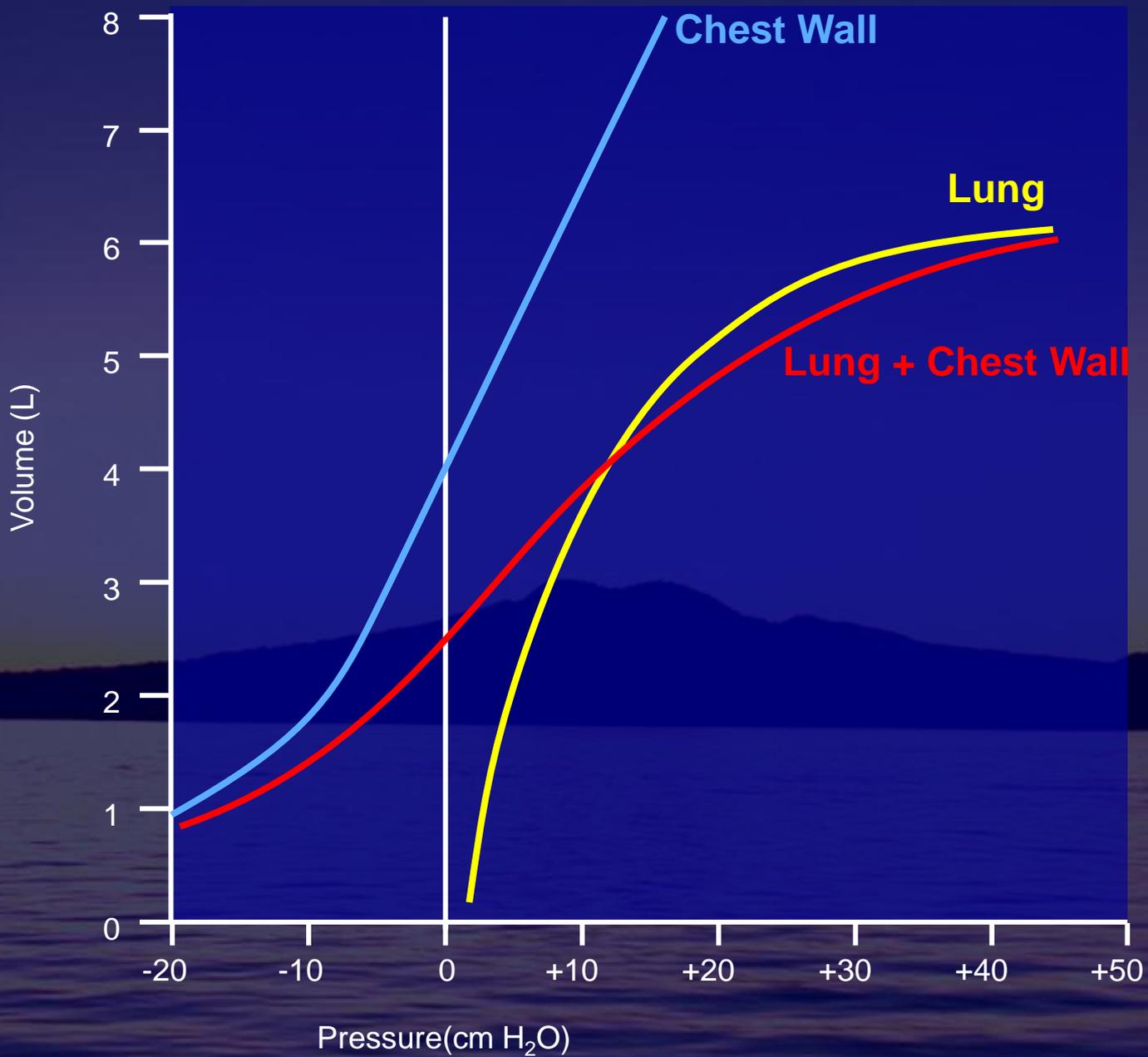


Static Volumes



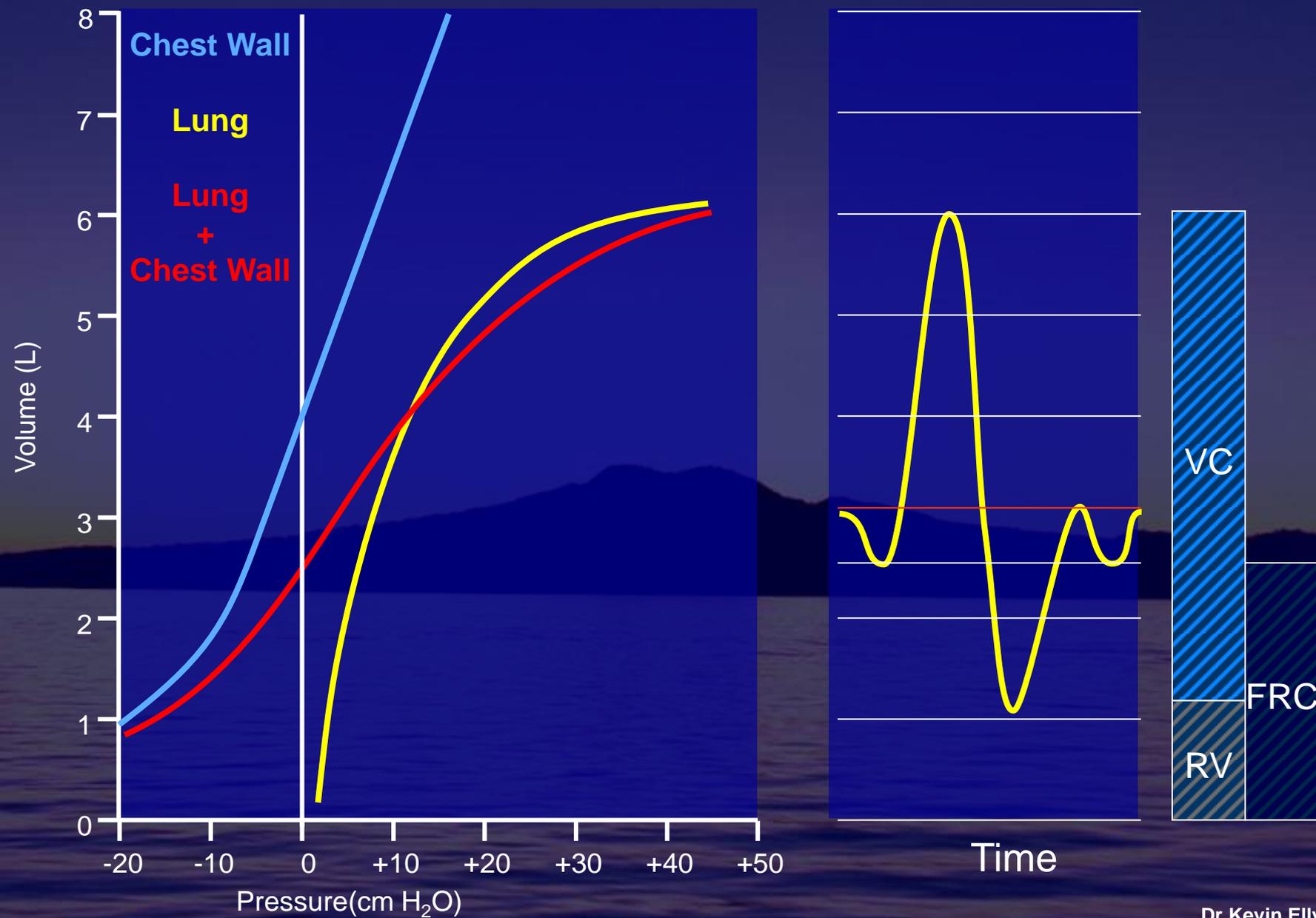
Static Pressure Volume Relationship Between Chest Wall and the Lungs

NORMAL



Static Pressure Volume Relationship Between Chest Wall and the Lungs

NORMAL



Causes Of Abnormal Static Volume Relationships

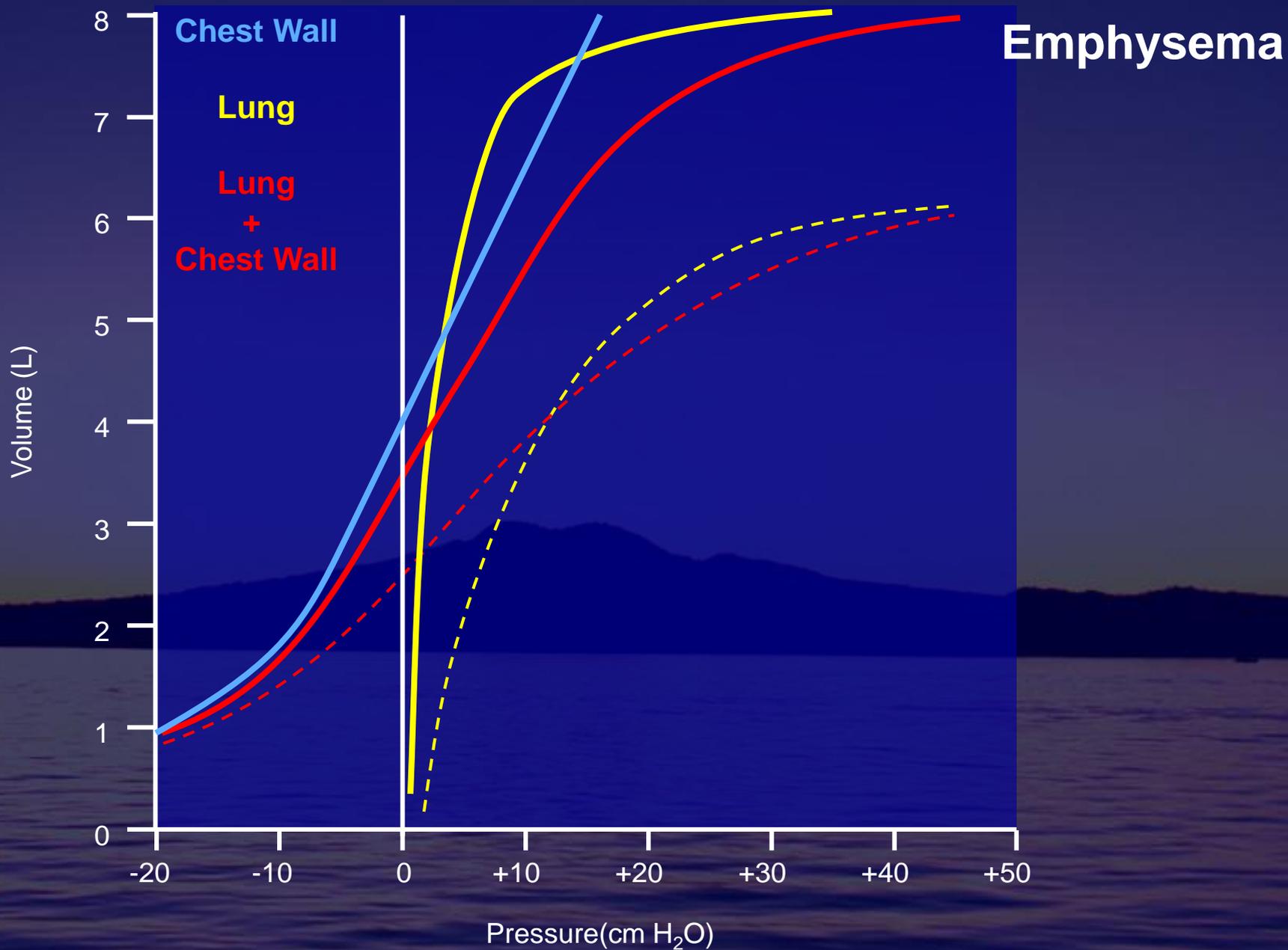
Changes In chest wall compliance

- Obesity
- Kyphoscoliosis
- Fibrothorax
- Pectus excavatum
- Chest wall tumor
- Scleroderma

Changes In Lung compliance

- Emphysema
- Pulmonary edema
- Pulmonary fibrosis
- Acute respiratory distress syndrome
- Hypersensitivity pneumonitis
- Connective tissue disorders
- Cryptogenic organizing pneumonitis

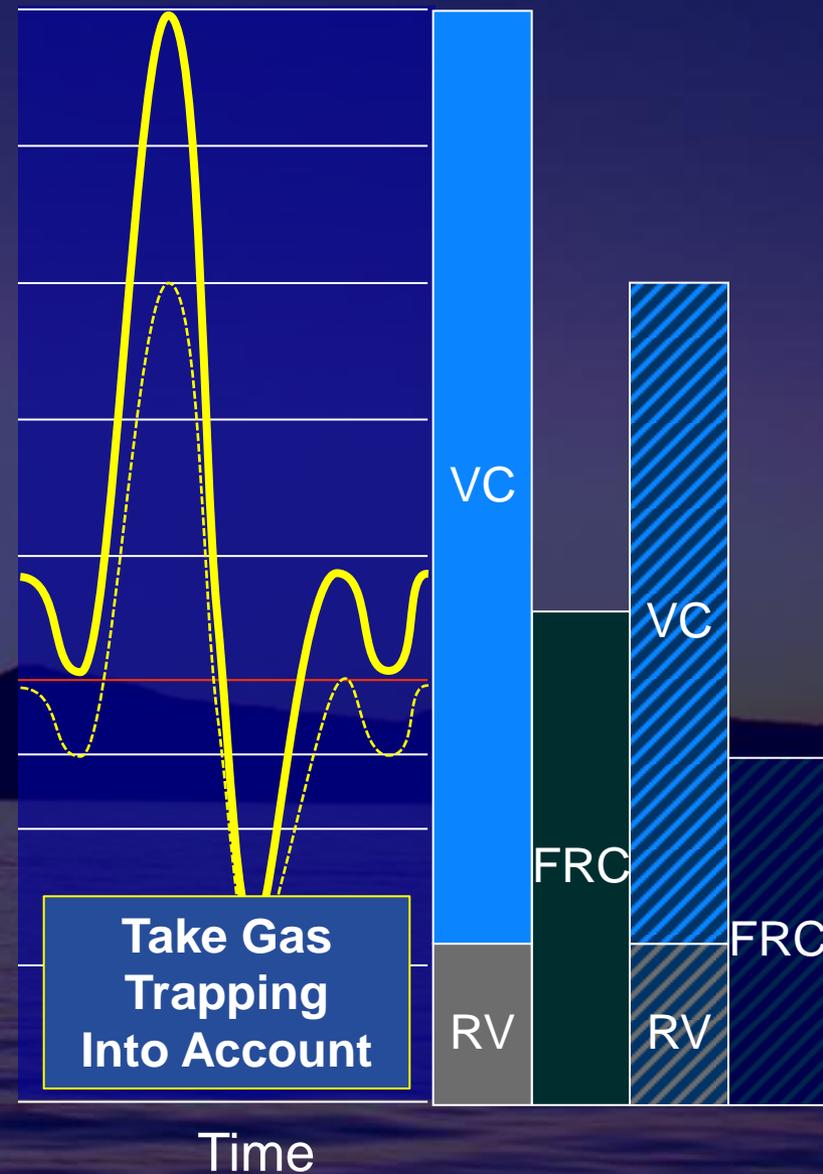
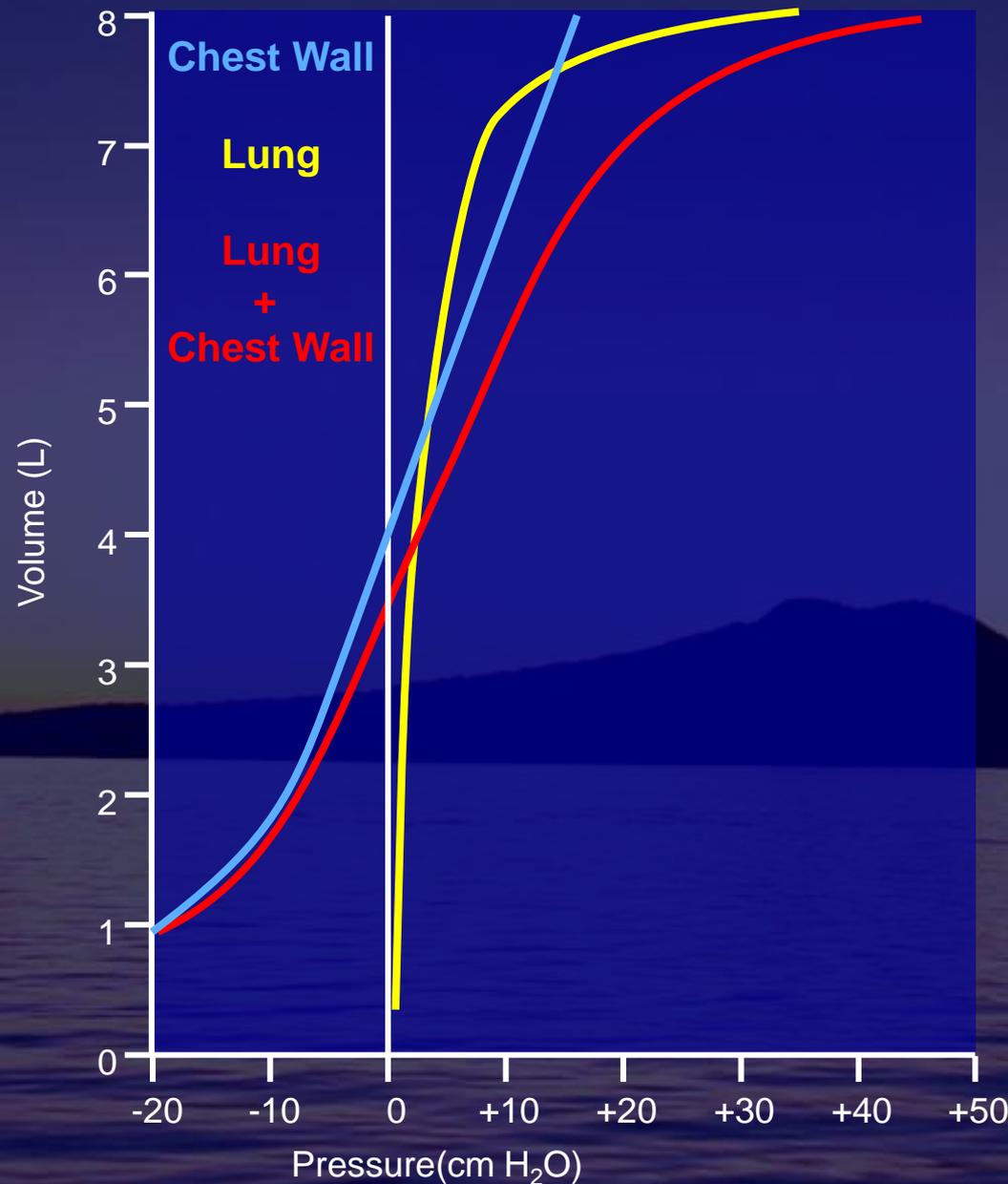
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Static Pressure Volume Relationship Between Chest Wall and the Lungs

Emphysema

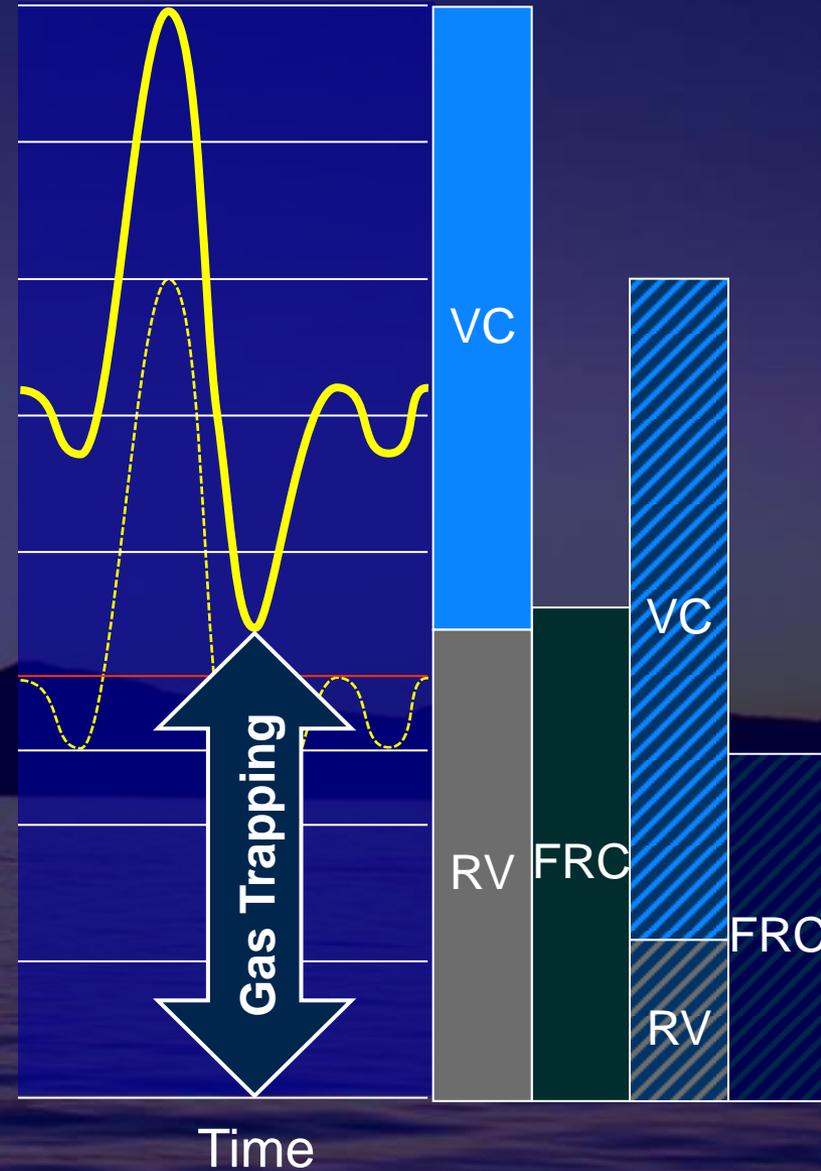
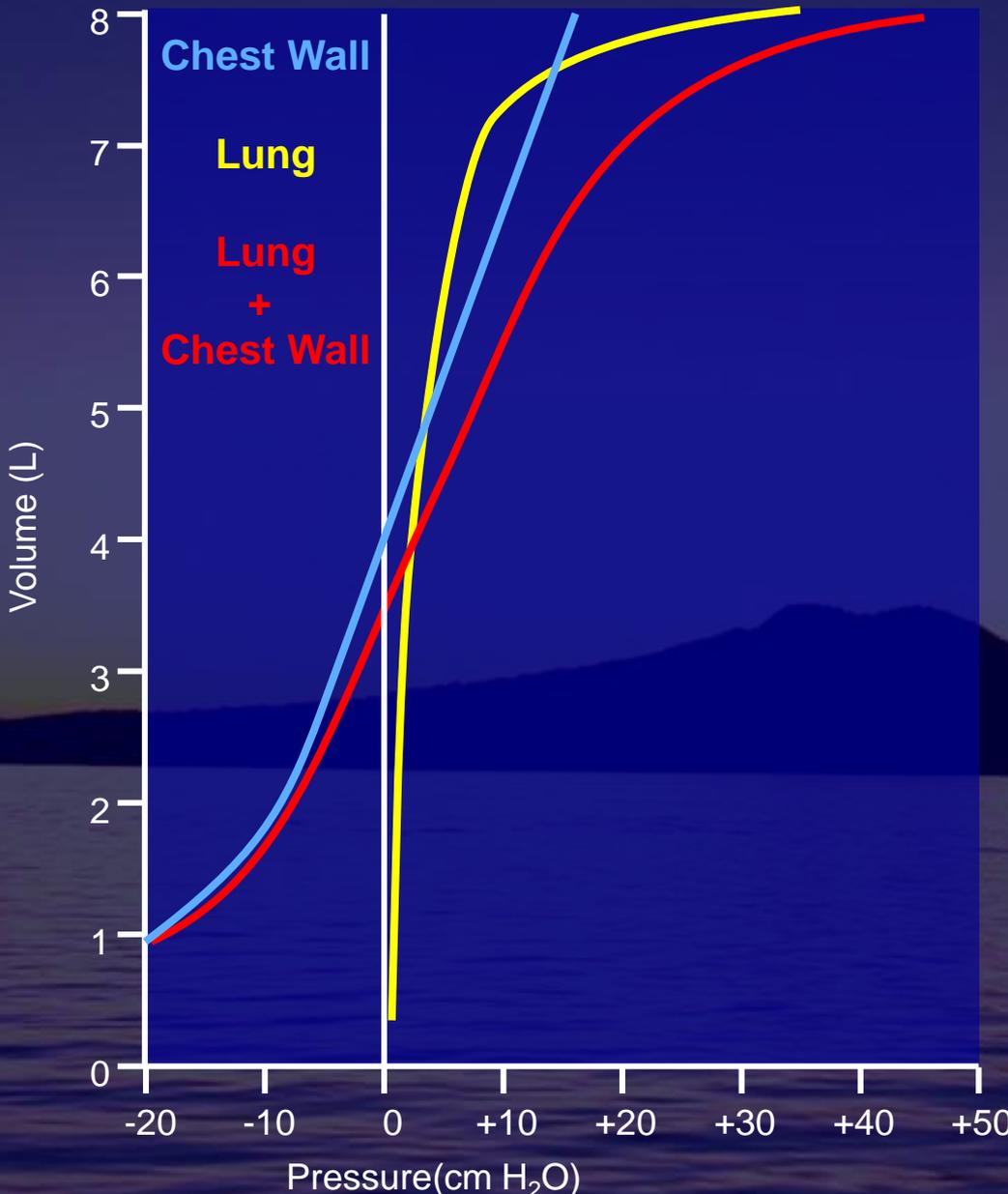
Abnormal Normal



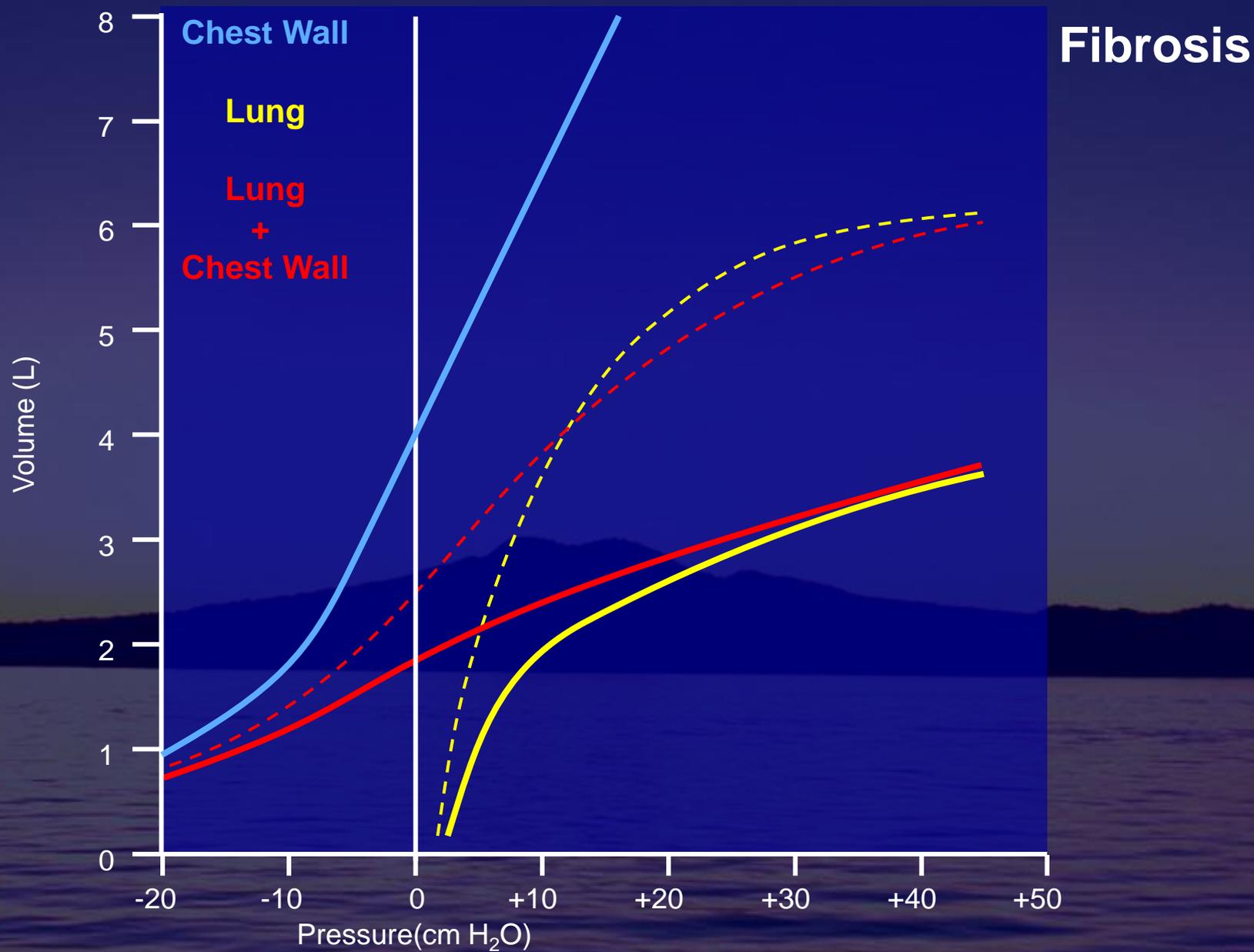
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Emphysema

Abnormal Normal



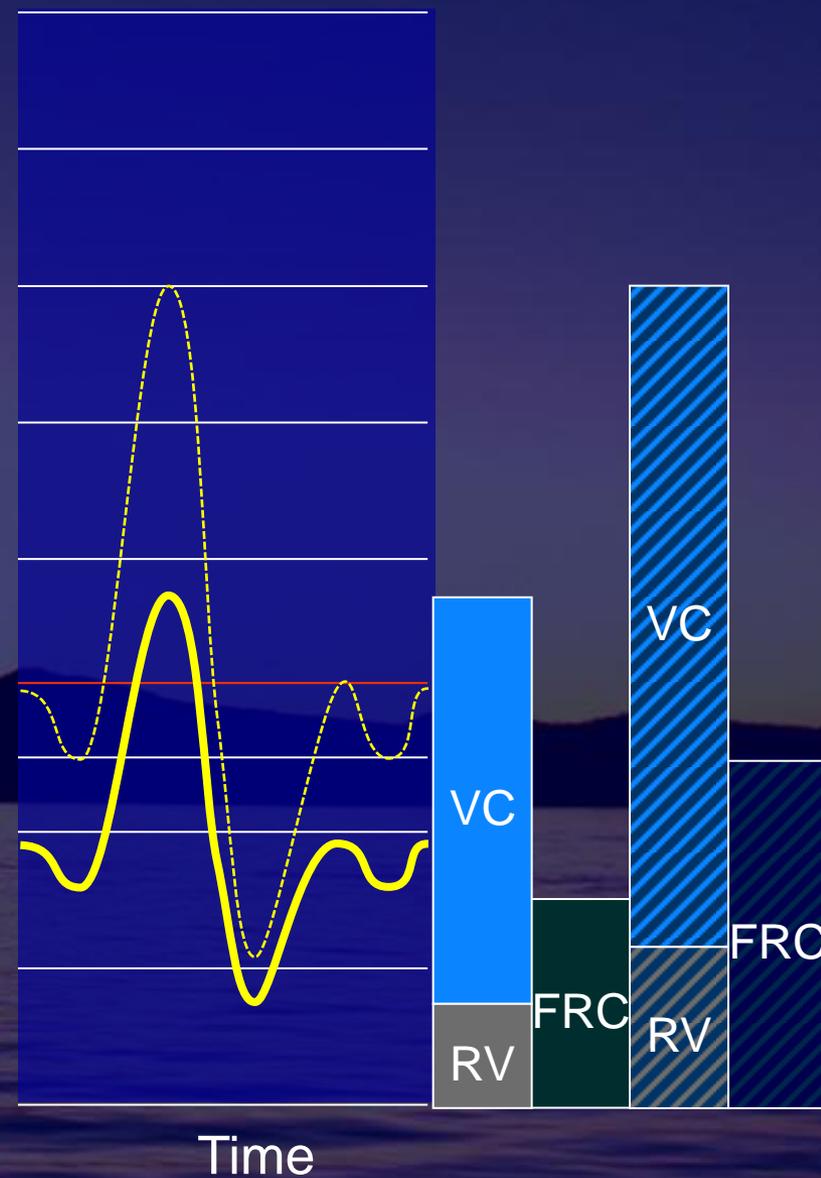
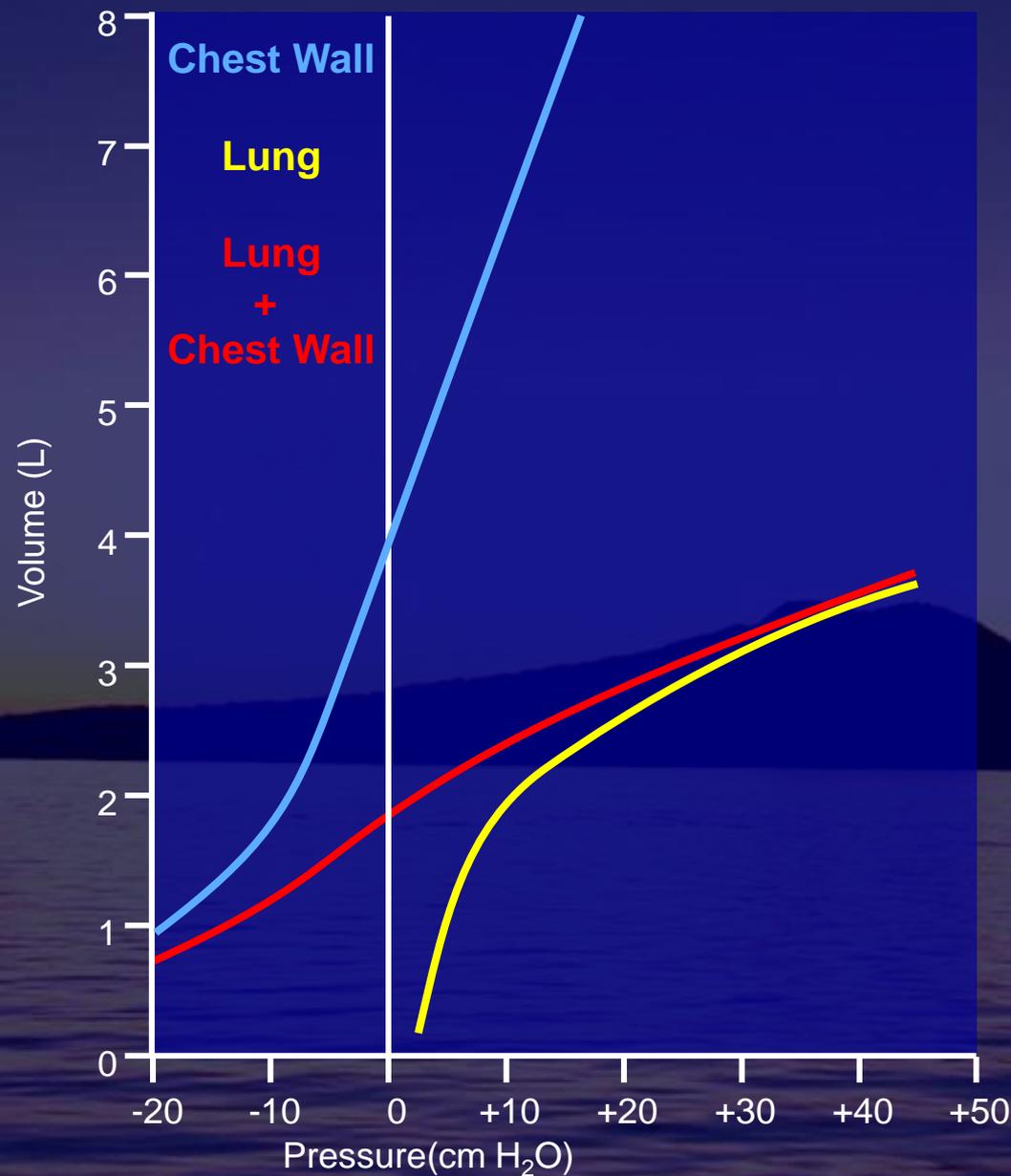
Static Pressure Volume Relationship Between Chest Wall and the Lungs



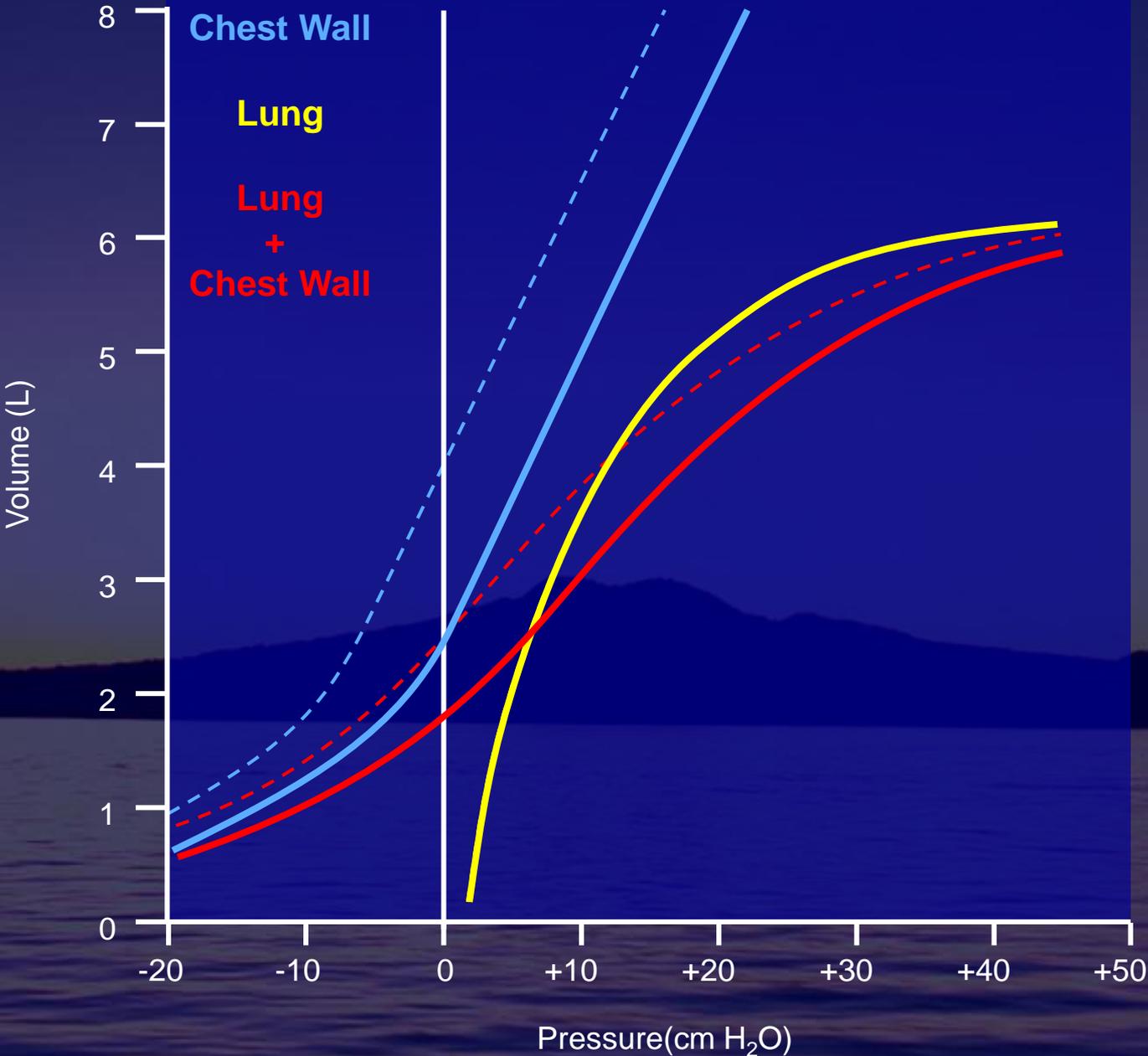
Static Pressure Volume Relationship Between Chest Wall and the Lungs

Fibrosis

Abnormal Normal



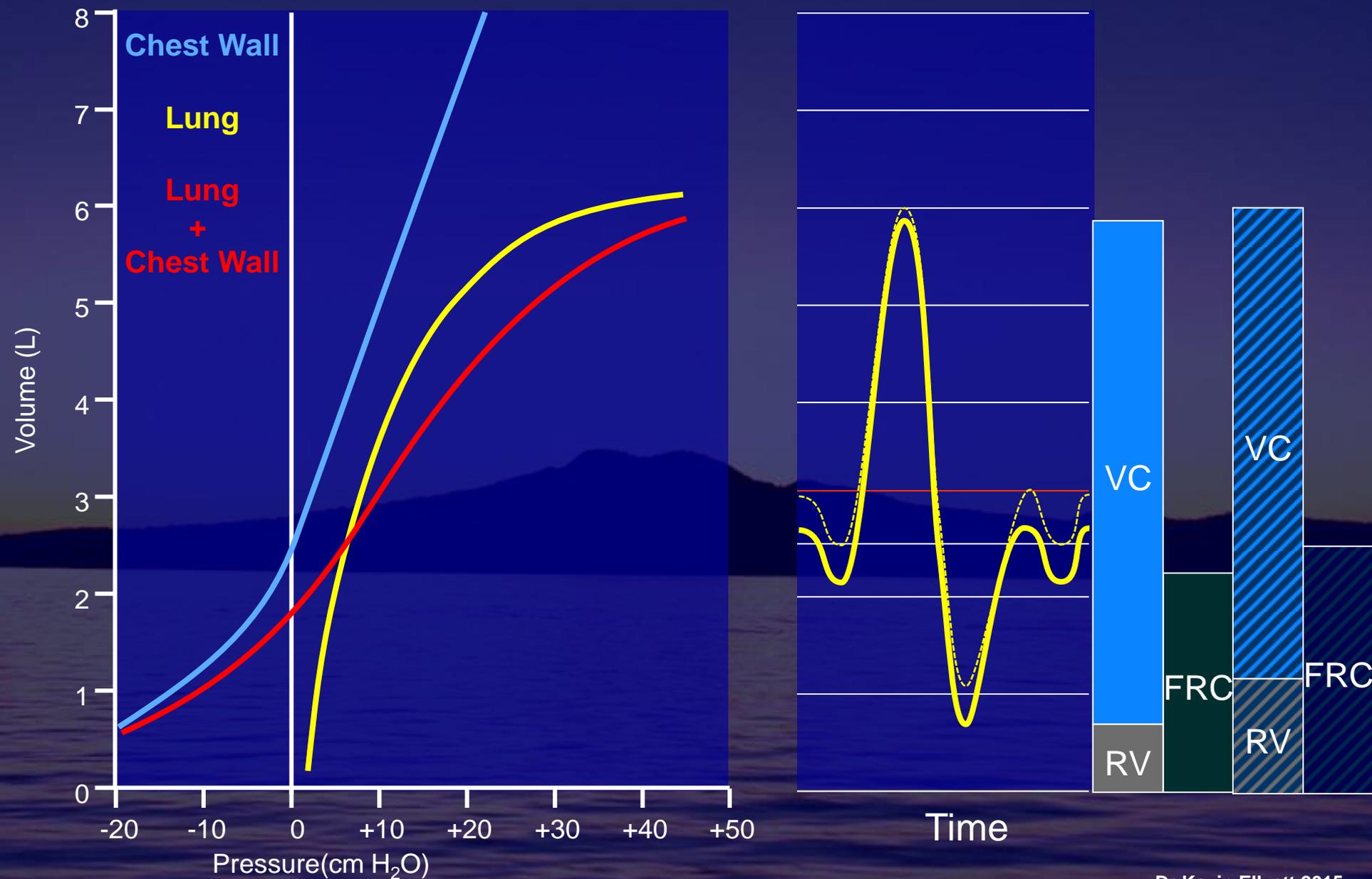
Static Pressure Volume Relationship Between Chest Wall and the Lungs



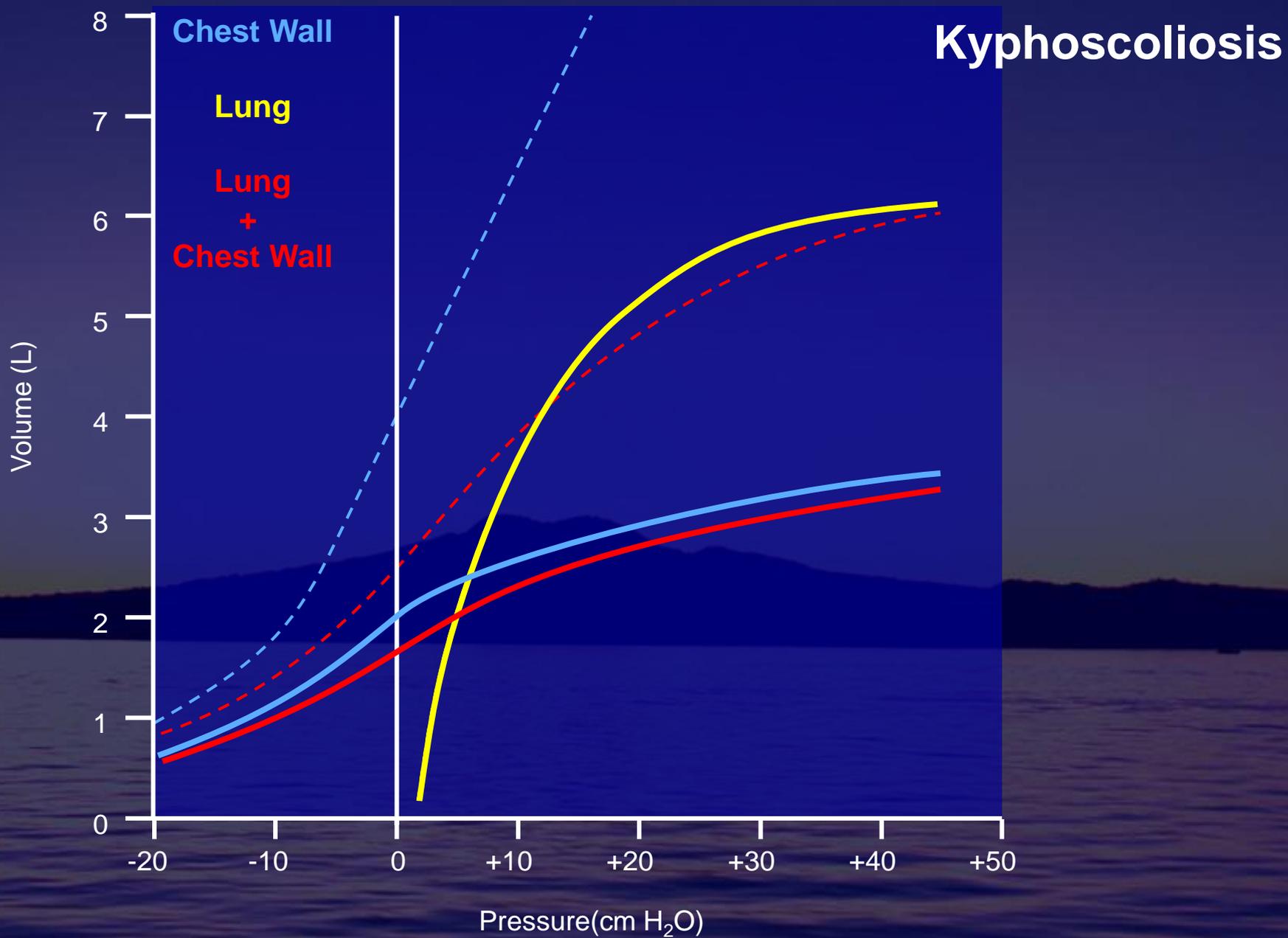
Obesity

Static Pressure Volume Relationship Between Chest Wall and the Lungs

Obesity



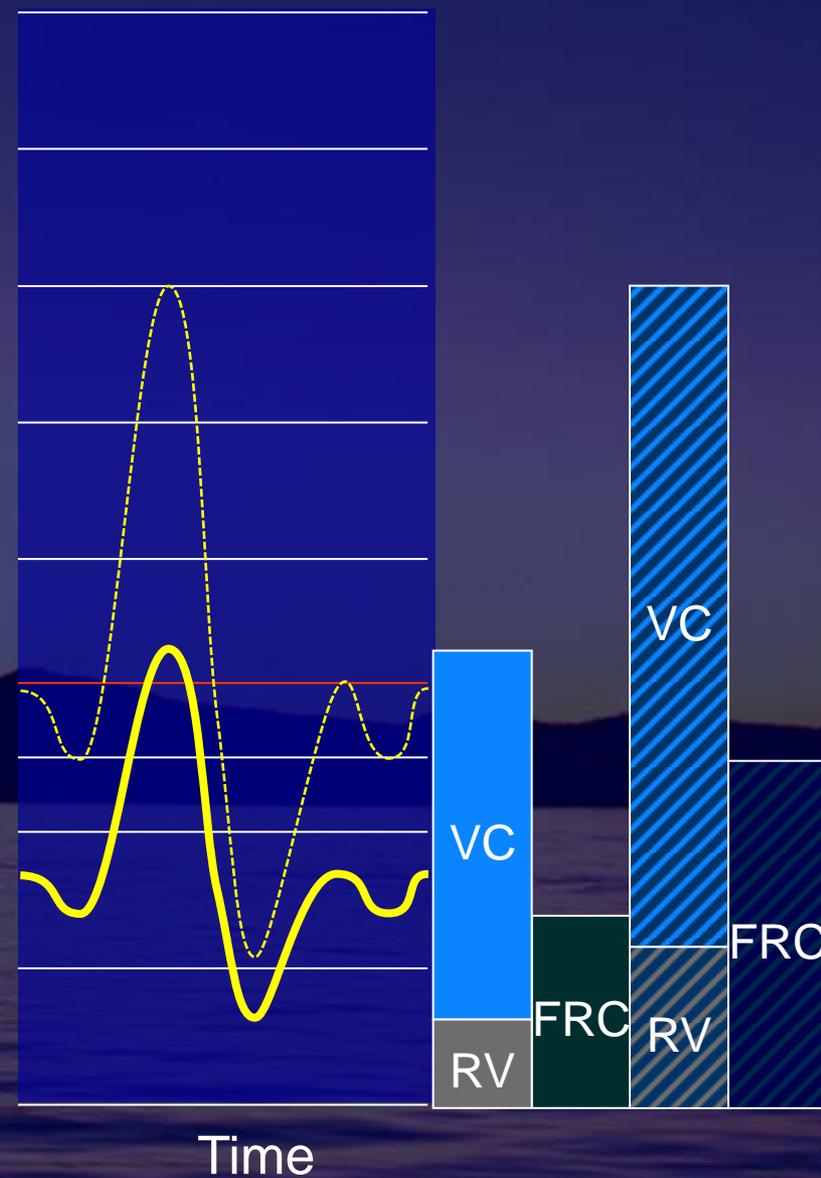
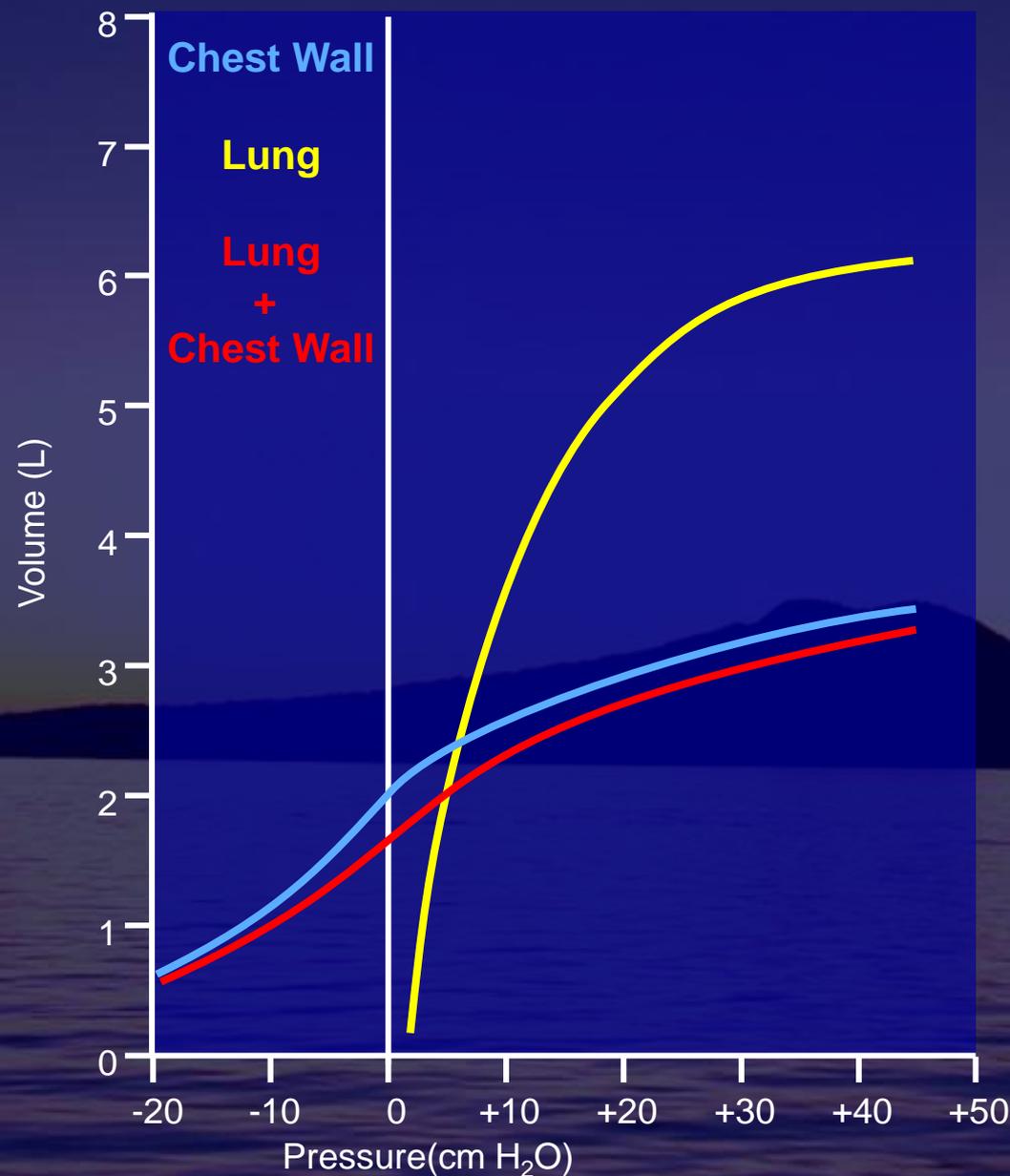
Static Pressure Volume Relationship Between Chest Wall and the Lungs



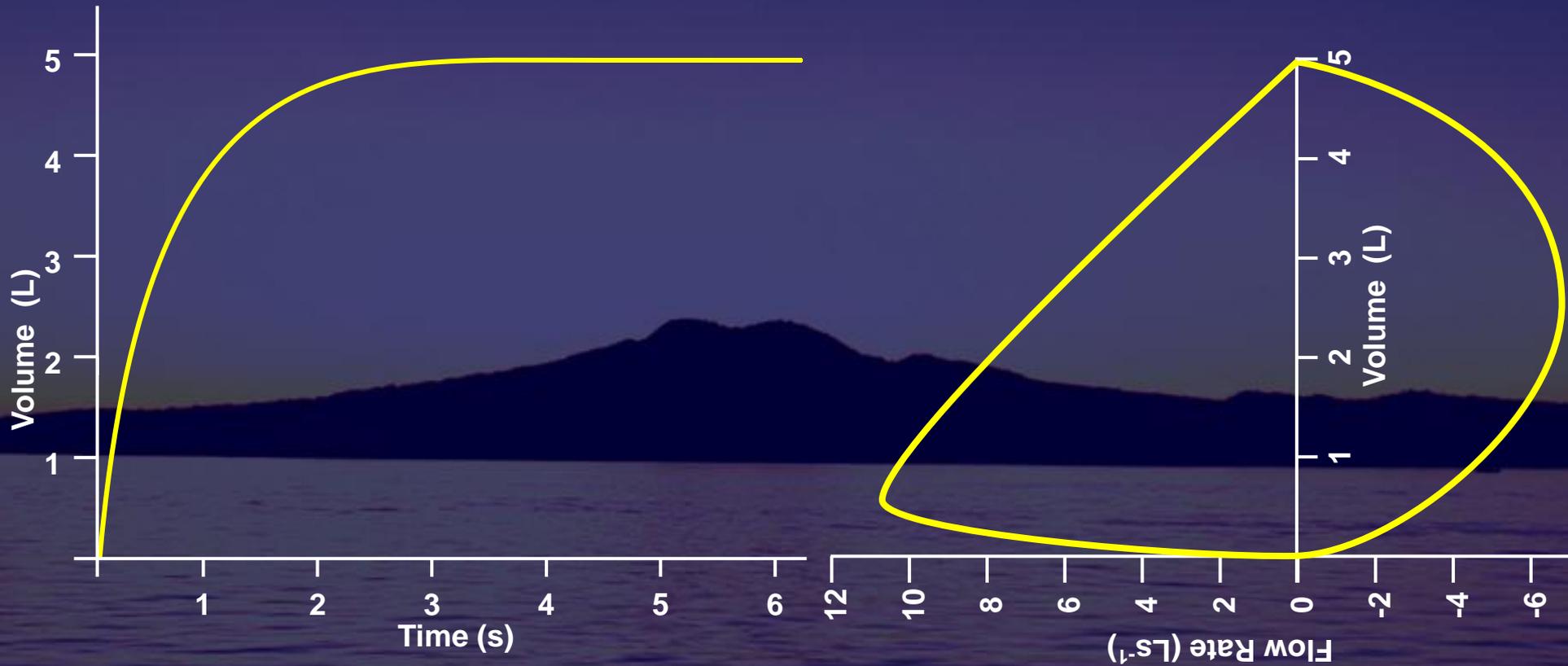
Static Pressure Volume Relationship Between Chest Wall and the Lungs

Kyphoscoliosis

Abnormal Normal

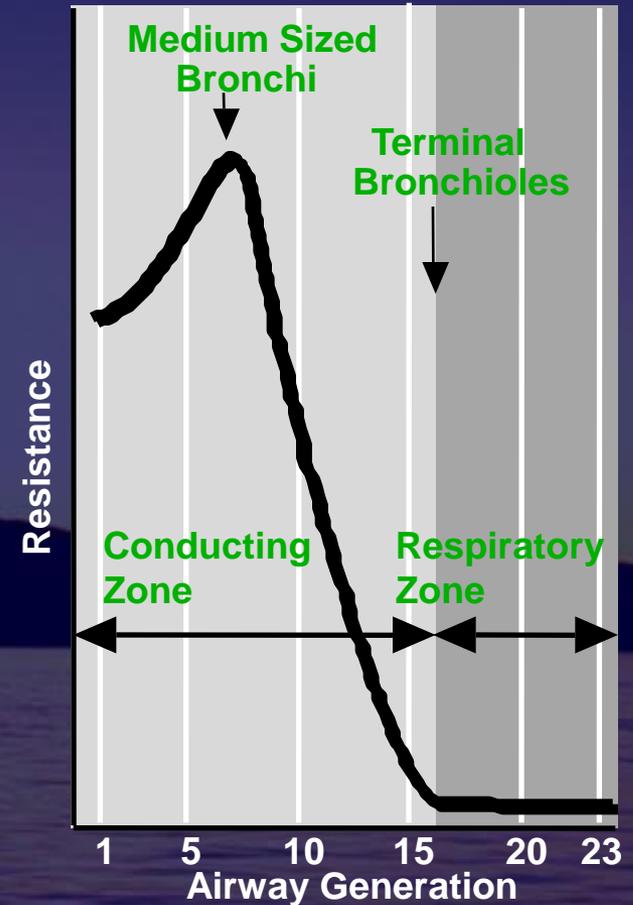


Dynamic Volumes



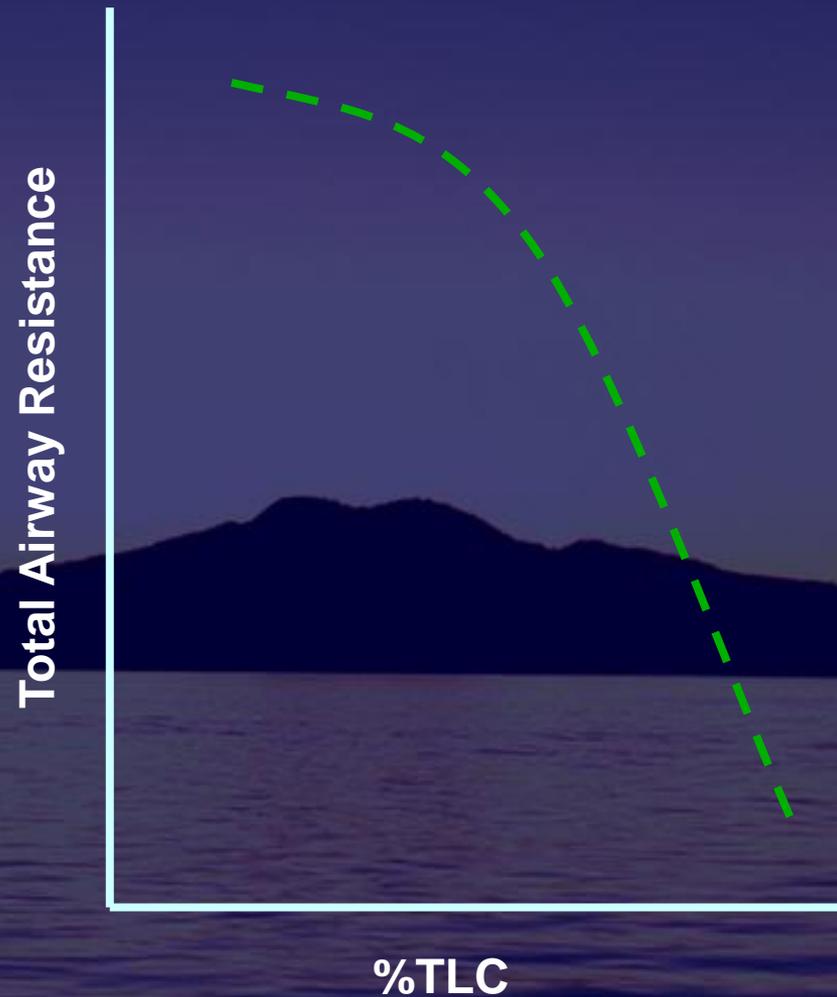
Airway Resistance

	Name of branches	Number of tubes in branch
Conducting zone	Trachea	1
	Bronchi	2
		4
		8
	Bronchioles	16
		32
Terminal bronchioles	6×10^4	
Respiratory zone	Respiratory bronchioles	5×10^5
	Alveolar ducts	
	Alveolar sacs	8×10^6

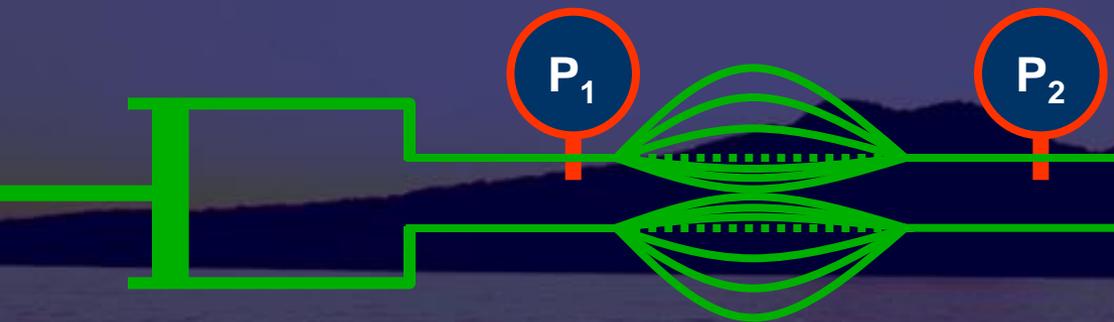
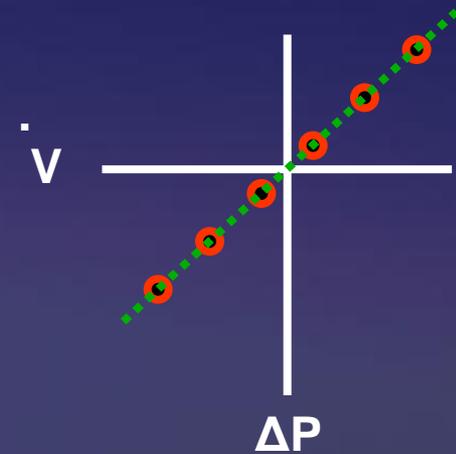
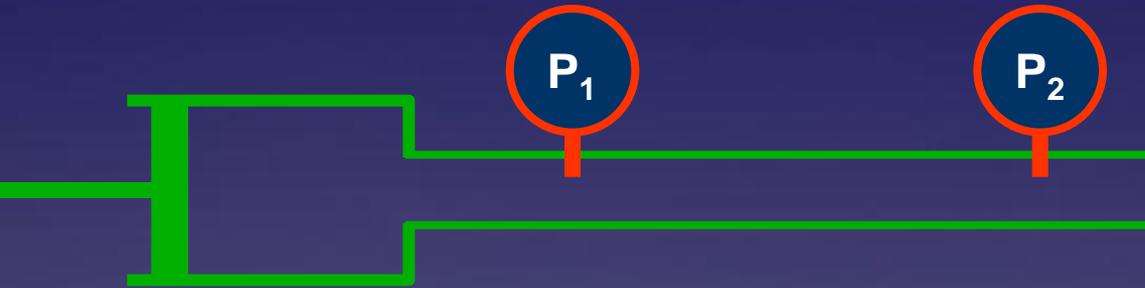


Determinants of Maximal Flows

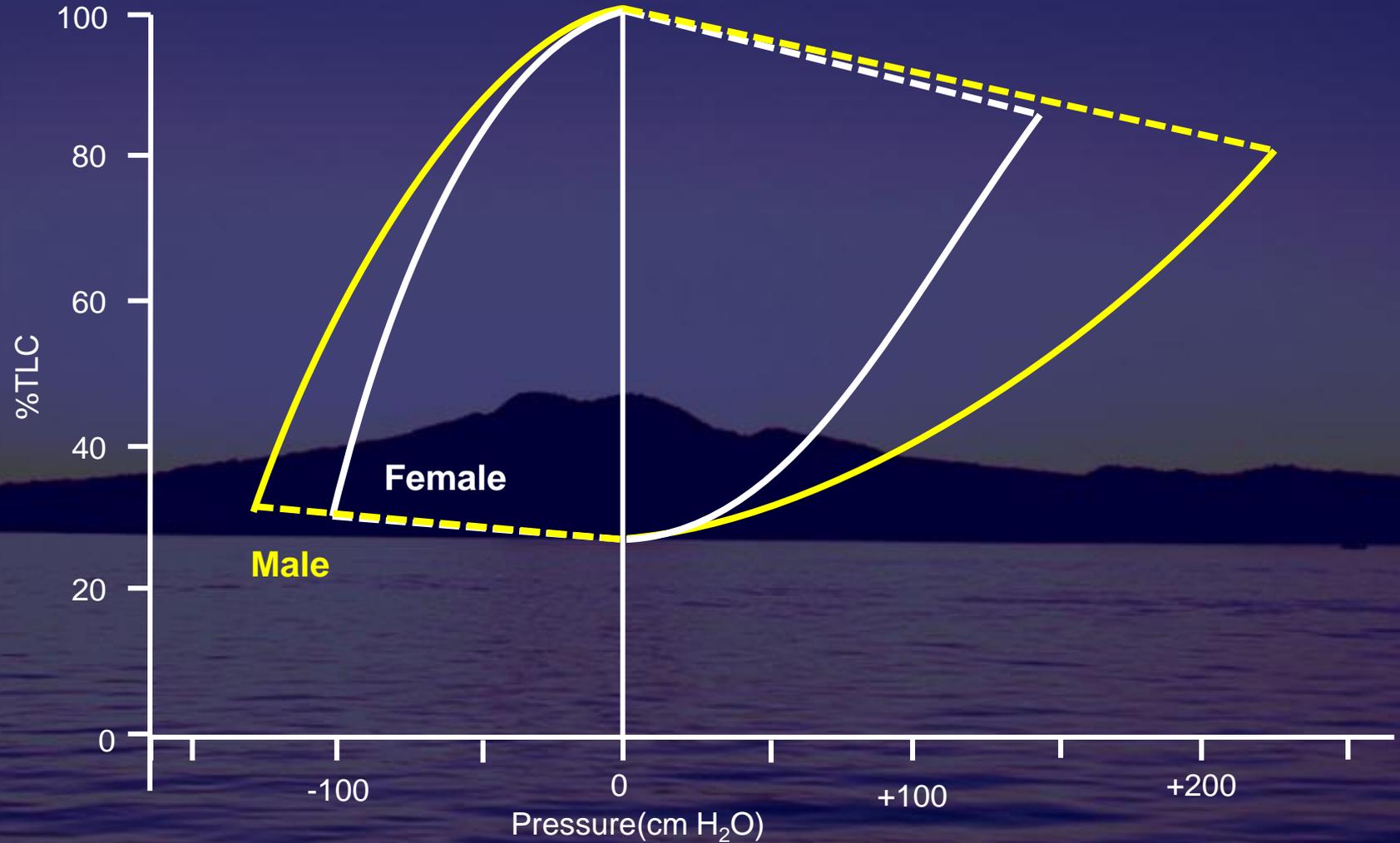
Airway Resistance



Starling Resistors

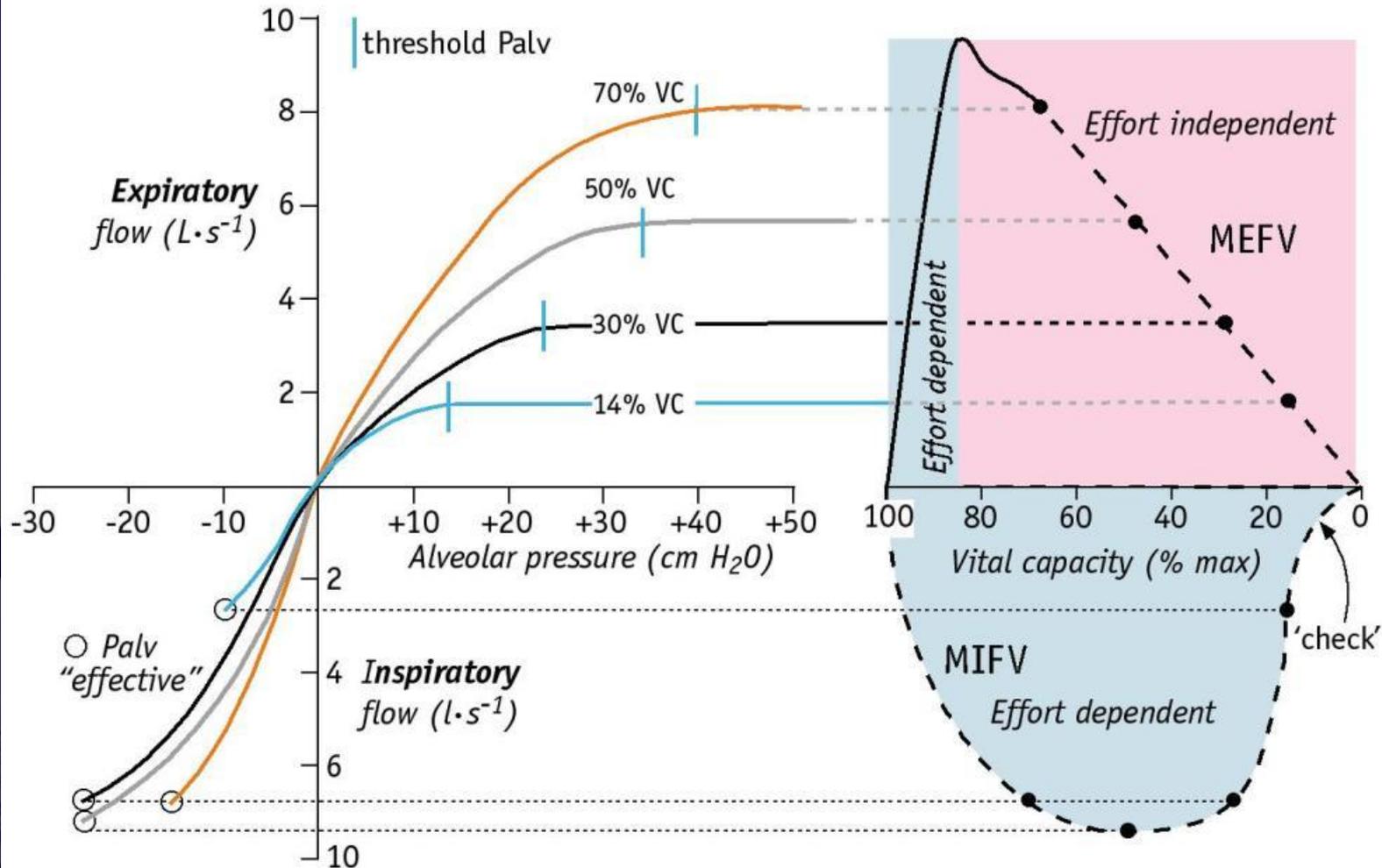


Determinants of Maximal Flows Driving Pressure

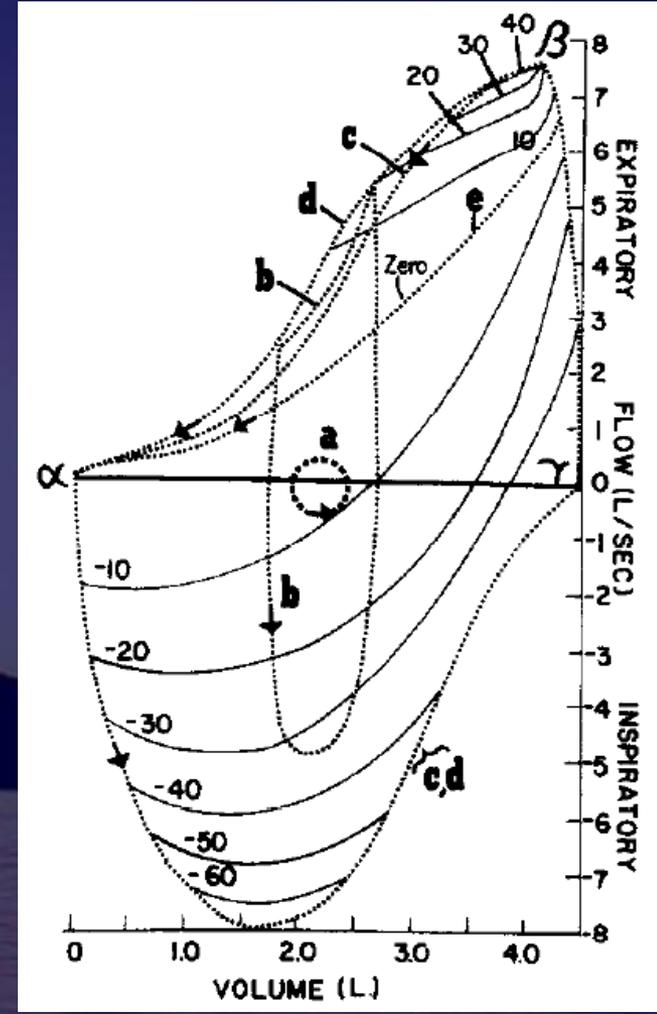
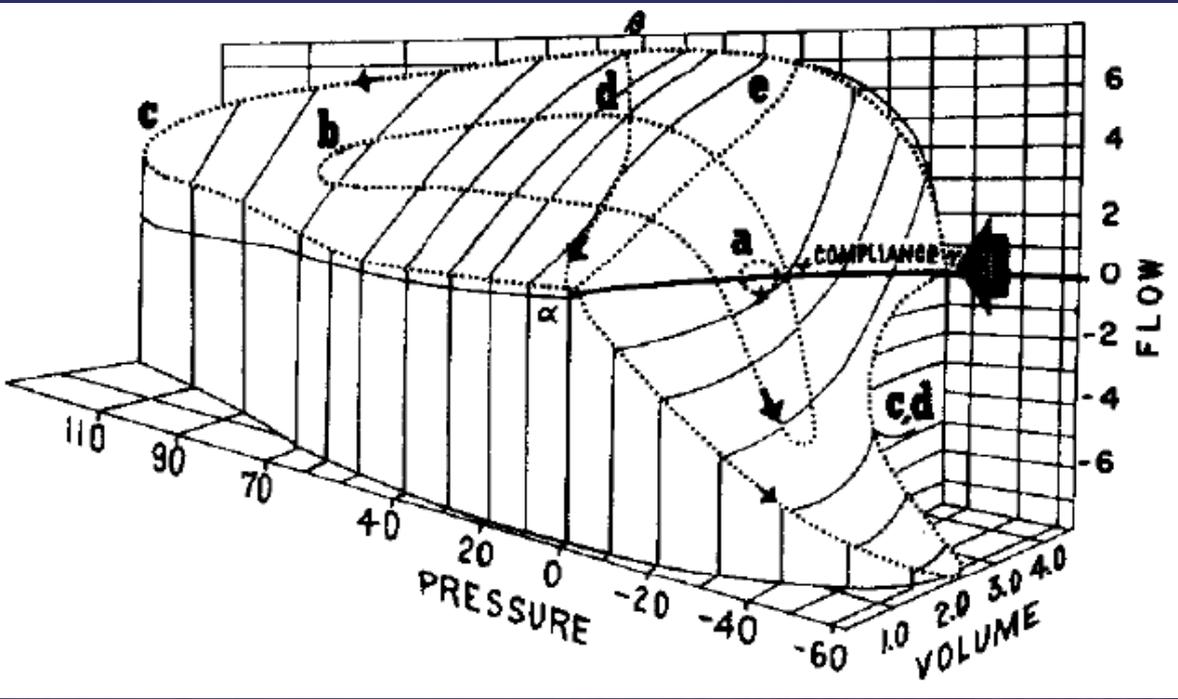


Determinants of Maximal Flows

ISOVOLUME PRESSURE FLOW AND MAXIMUM FLOW VOLUME CURVES

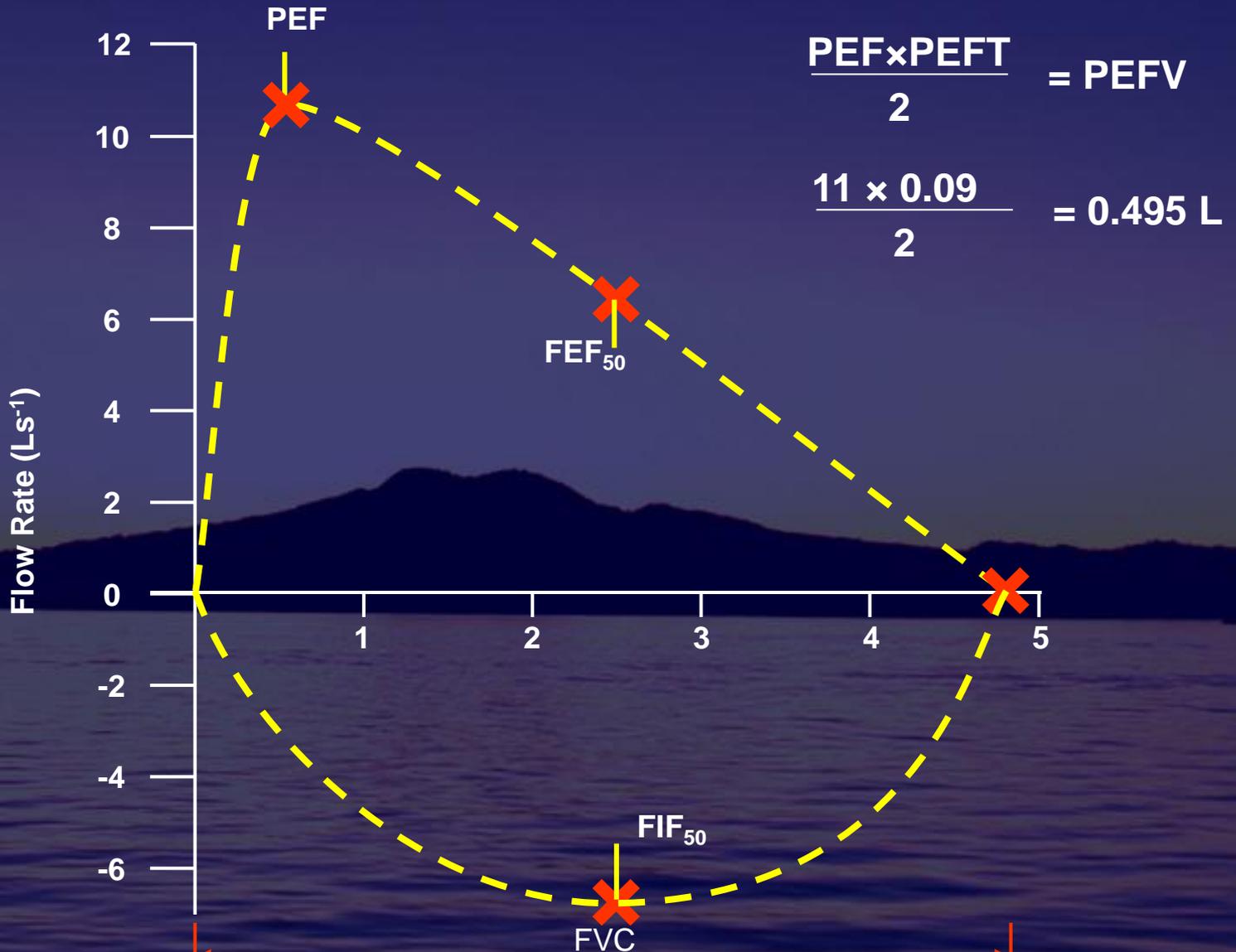


Flow Limitation

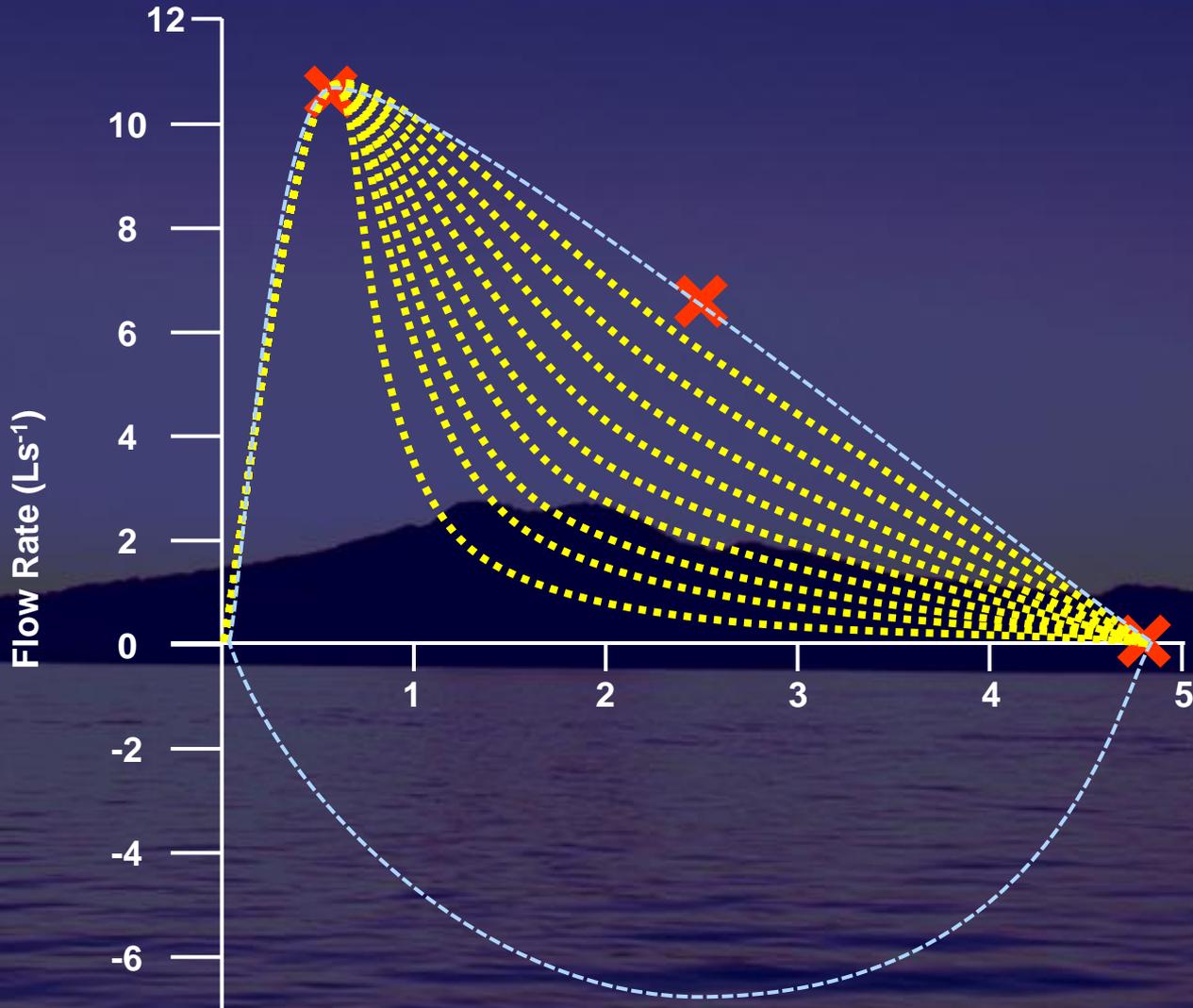


Fry & Hyatt 1960

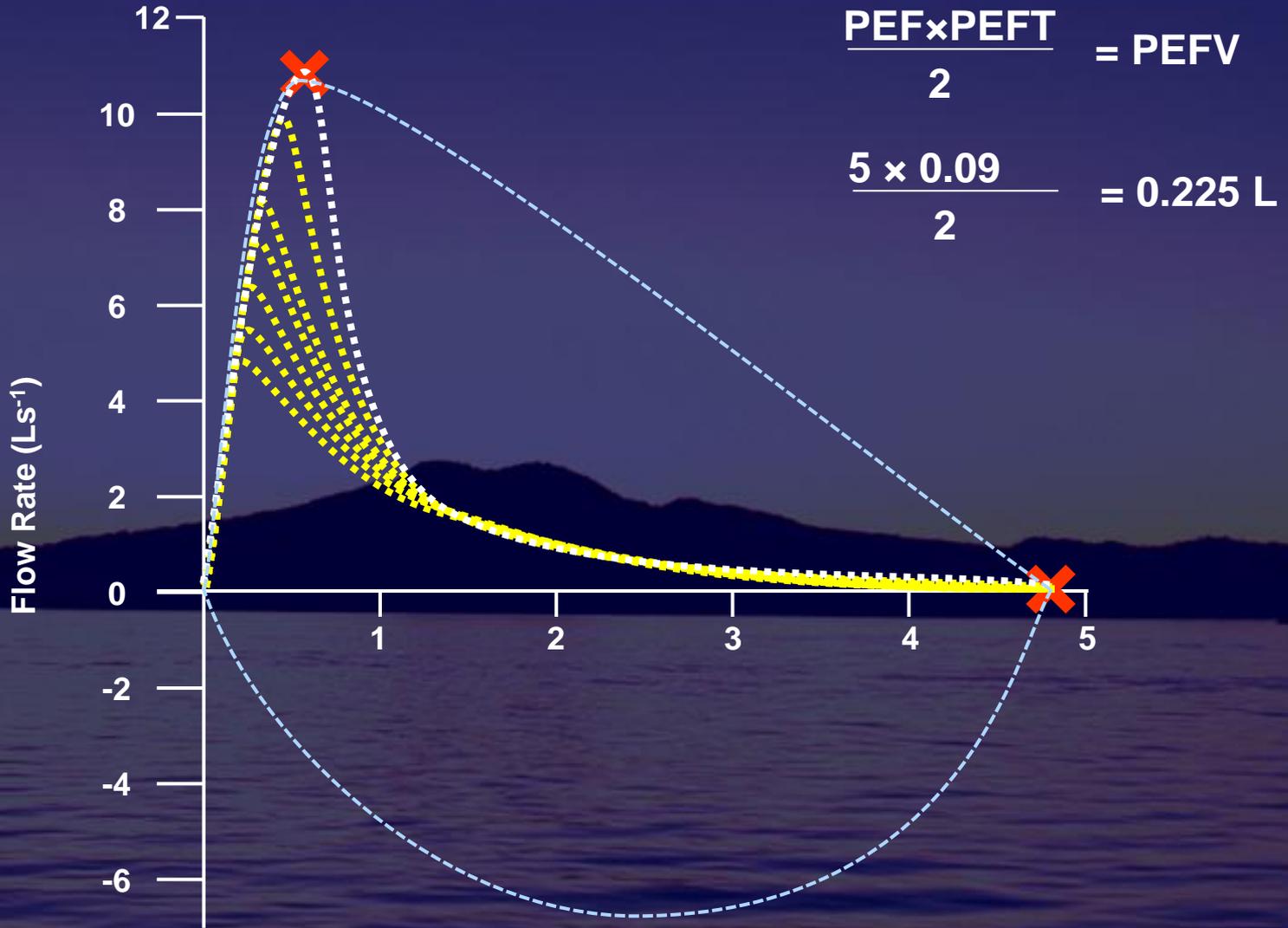
Thinking About The Flow Volume Curve



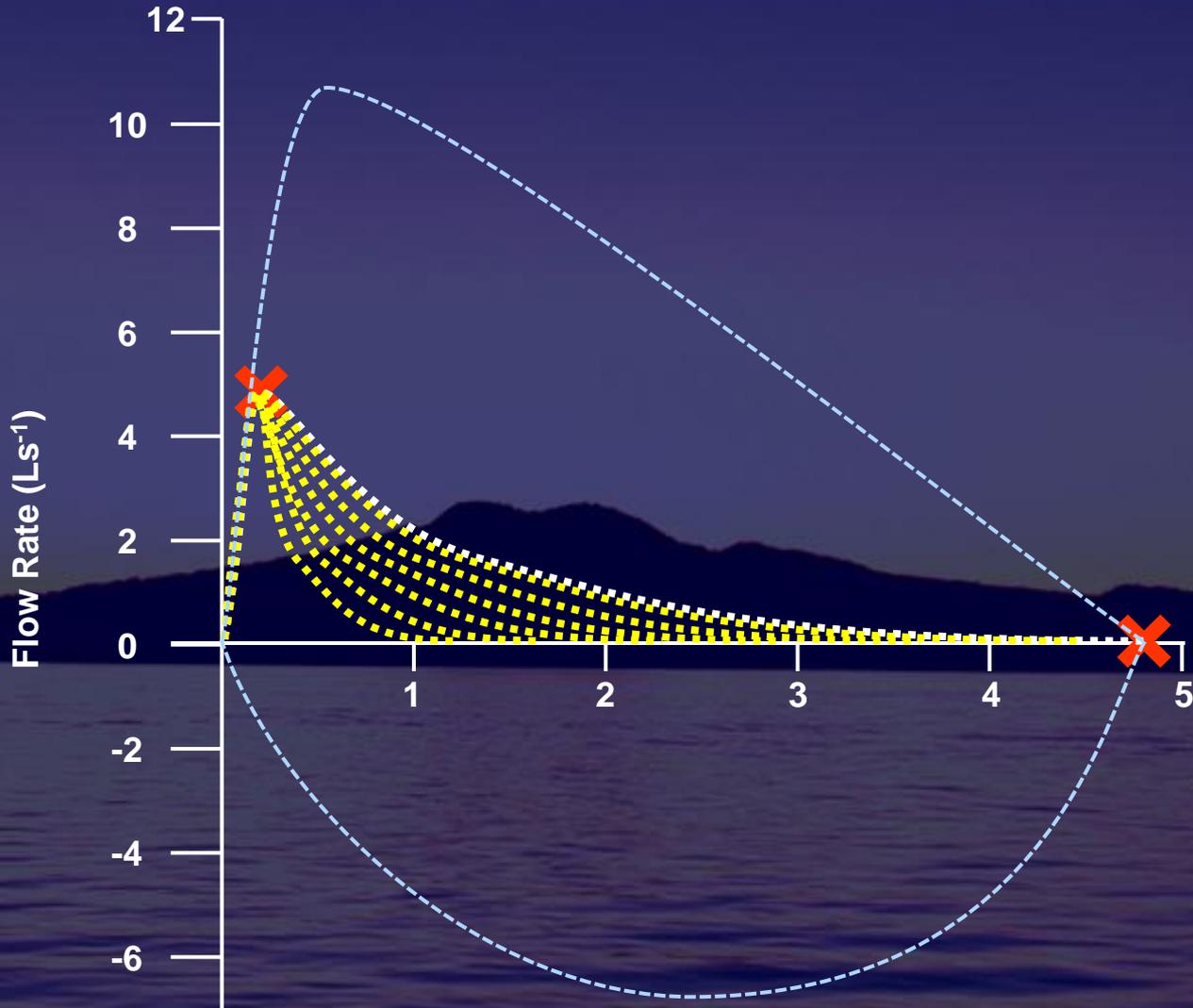
Obstructive



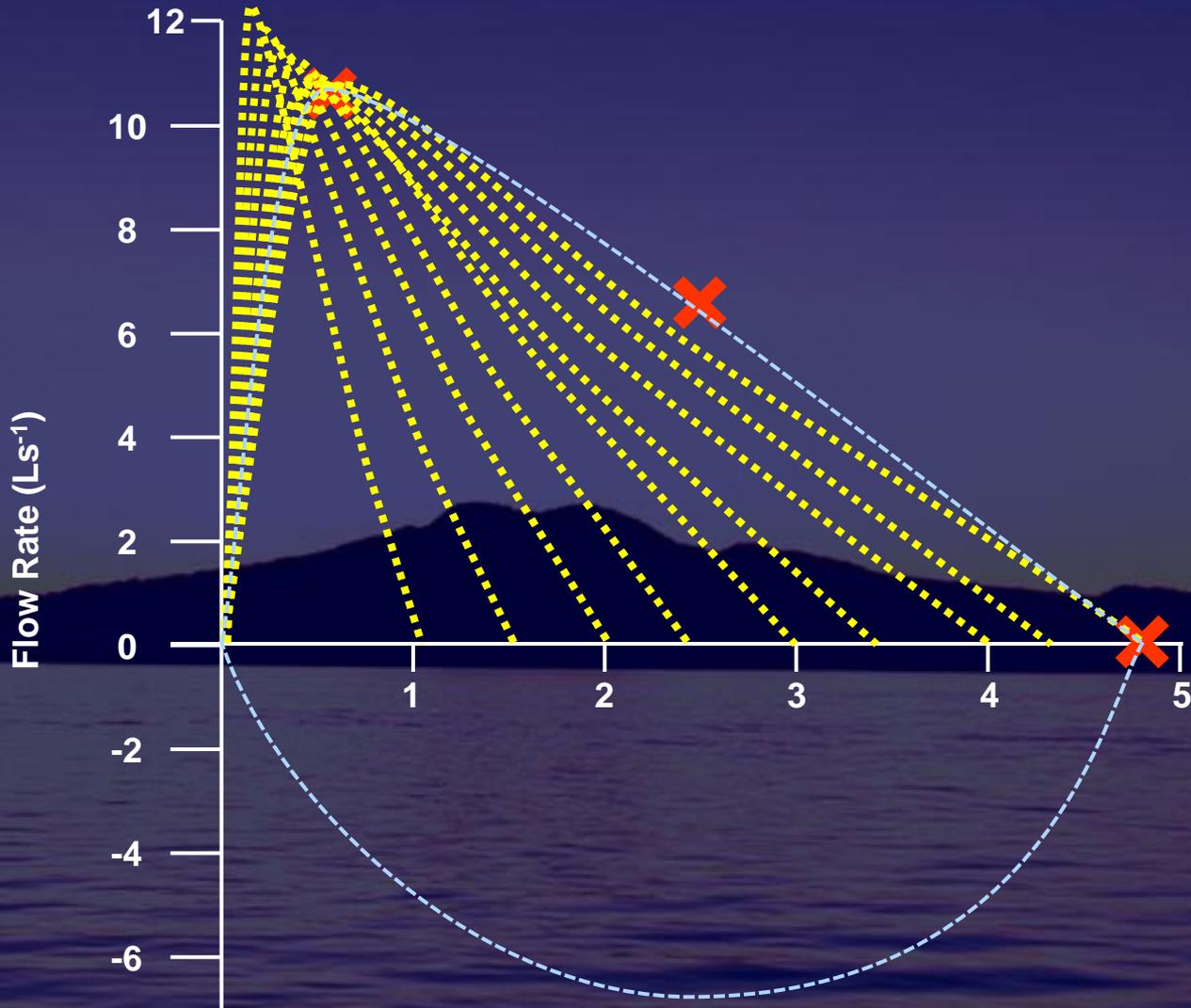
Obstructive



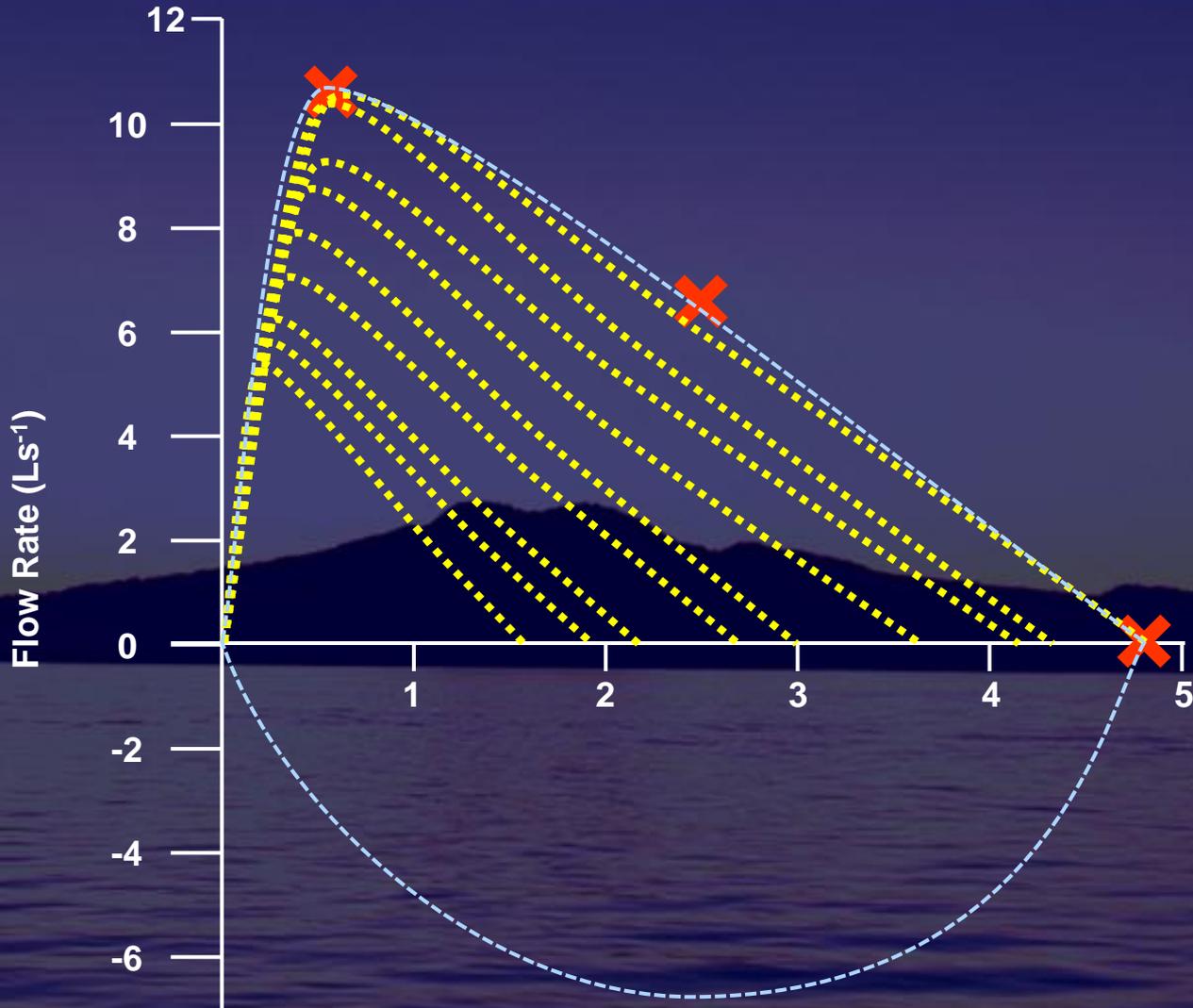
Obstructive With Gas Trapping



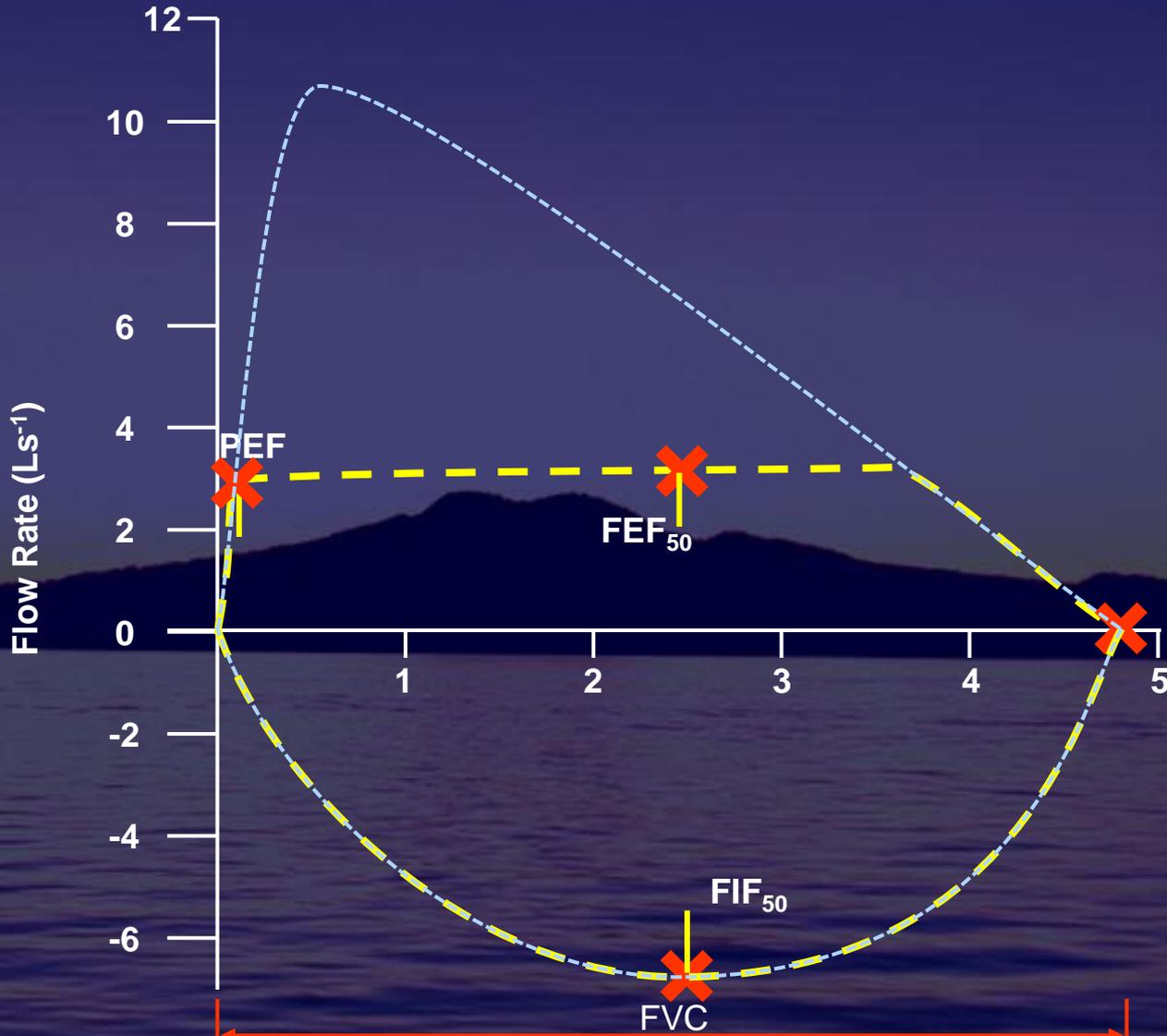
Restrictive Pattern – Fibrotic



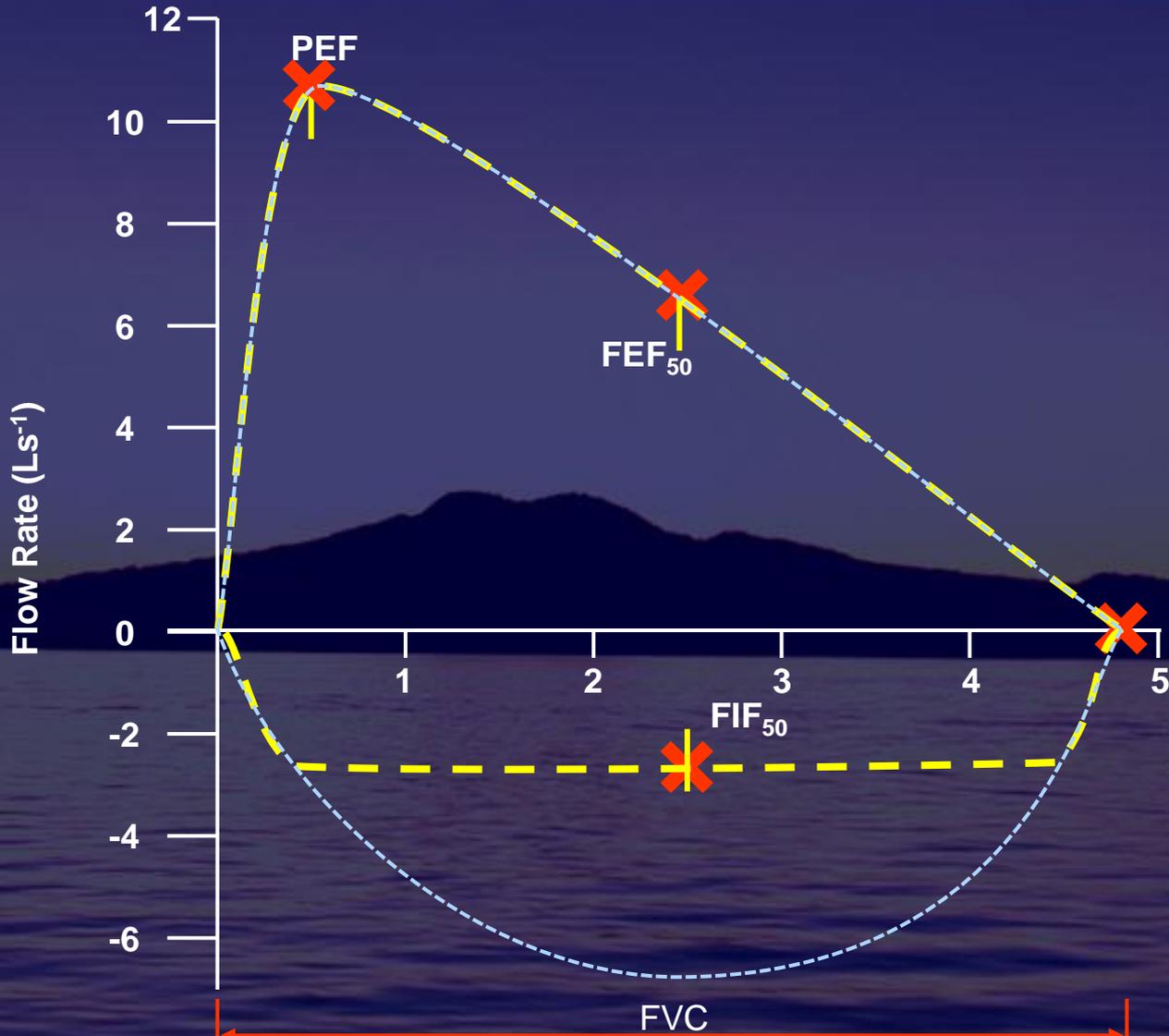
Restrictive Pattern – Non Fibrotic



Variable Intrathoracic Large Airway Obstruction



Variable Extrathoracic Large Airway Obstruction



Fixed Large Airway Obstruction

