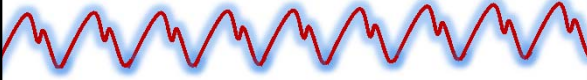


HEMODYNAMIC MONITORING
For the Respiratory Therapist



Cardiopulmonary System

Main Purpose	Oxygen Delivery
Main Function	Adequate Perfusion (deliver adequate oxygen and nutrients; remove metabolic waste)
Main Goal	Tissue Oxygenation

Respiratory Therapist's Job

USED TO BE:
Get O₂ into lungs and hope Cardiovascular System picks it up and delivers

NOW:
Ensure that O₂ not only gets to the lungs, but is effectively delivered to the tissue

Monitoring !

Pulmonary:
Monitor O₂ from air to circulation

Cardiovascular:
Monitor O₂ from circulation to tissue
(Psst . . . This is Hemodynamic Monitoring!)

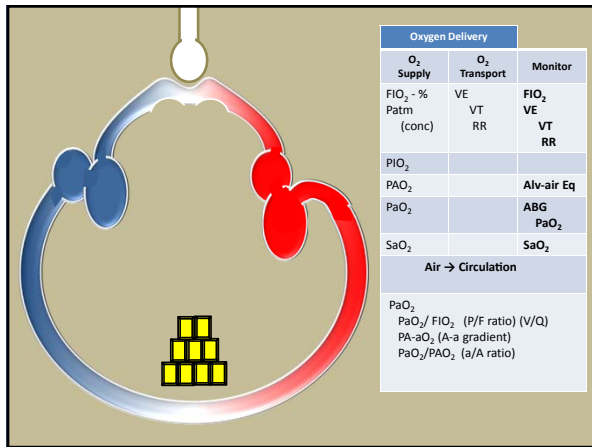
Hemodynamics
The *study*
of blood flow to the body

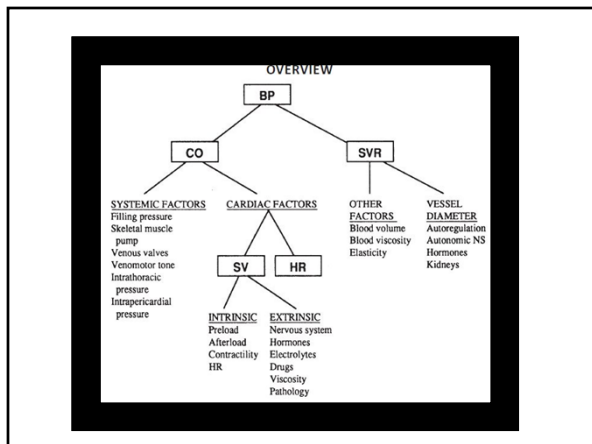
Hemodynamic Monitoring
The *monitoring*
of the blood flow to the body

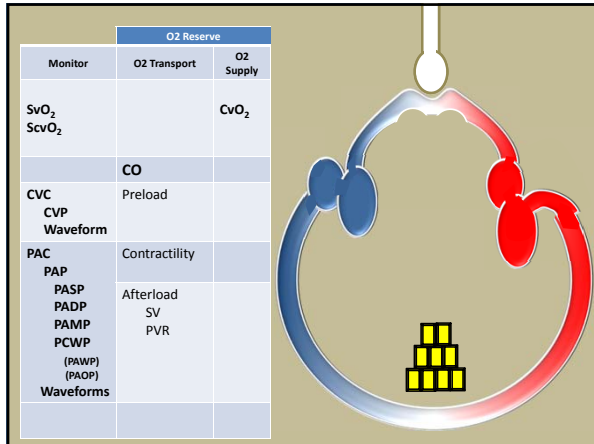
Hemo Monitoring: Purpose

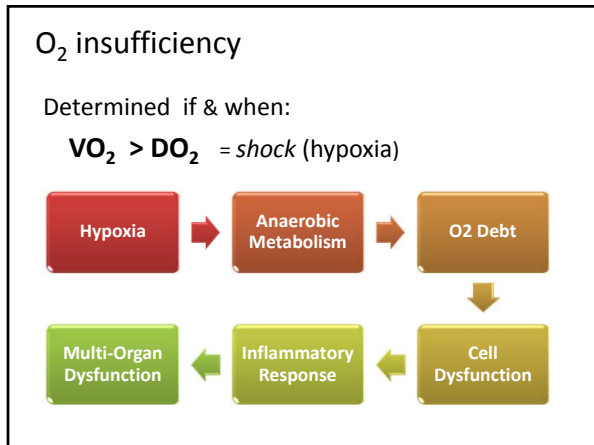
- 1. Assess blood flow –**
Ensure adequacy of tissue perfusion/oxygenation
- 2. Early detection –**
of life threatening derangements of vital functions
- 3. Titrate therapy –**
Ensure adequacy of tissue perfusion/oxygenation
and correct derangements

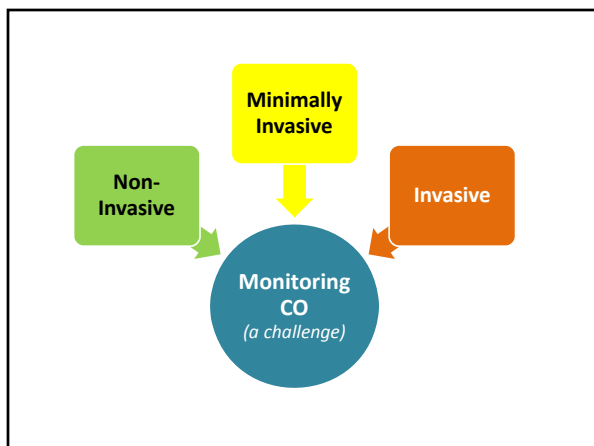
- What do all people die from?
Hypoxia !
- #1 cause of death in ICU ? -
Multi-System Organ Dysfunction
(due to hypoxia)
RTs can be and should be the first to detect hypoxia











Non-Invasive Signs of CO

Sign	↓ tissue perfusion/oxygenation
BP	<div style="font-size: 2em;">}</div> <div style="font-size: 2em;">↓ = ↓ CO</div>
HR (maybe ↑)	
Pulse Strength	
Capillary Refill	
Skin Temperature	
Urinary Output (UO)	
Mental Status	
Skin Color	Pale = ↓ CO
Lactate	↑ = ↓ CO
Less Specific: RR, ECG	

Pulmonary Artery Catheter (Swan-Ganz)

Measured or Derived Parameters

(mostly left heart values)

CO	RAP	CvO ₂	RVSW	DO ₂
CI	(RVEDP)	LV	RVSWI	MDO ₂
CVP	SvO ₂	(function, curve)	SV	MVO ₂
HR	SvO ₂	LVS	SVI	O ₂ ER
PADP	PvCO ₂	LVS	SW	QS/QT
PASP	PvCO ₂	LVS	SWI	SVR
PAWP	PvO ₂	PAMP	a-vDO ₂	SVRI
(LAP, LVEDP)	PvO ₂	PVR	Ca-vO ₂	VO ₂
	pHv	PVRI		CPP

SvO₂

Reflects metabolism

$SaO_2 - SvO_2 = O_2$ metabolism

Norm = 75% (range 60 - 80%)

< 50% = anaerobic metabolism and global hypoxia

Goal = 70%

Mechanical Ventilation may ↓ CO

1. ↓ venous return (no spontaneous ventilation)
 Spontaneous ventilation = ↑ venous return

2. Blockage of pulmonary blood flow
 ↑ lung vol (>FRC), ↑ PIT, ↑ PVR, ↓ RV outflow, ↓ EF, ↑ RVEDV, ↑ CVP

