



London Health Sciences Centre

Southwest Ontario Regional Base Hospital Program



CHF and Pulmonary Edema

Rod
Hetherington

Objectives

Given a lecture and group discussion, the paramedic will be able to:

- Identify and name the key anatomical structures of the heart and vessels
- Describe the electrical and mechanical operations of the heart
- Describe the etiology of Congestive Heart Failure
- Recognize the signs and symptoms of Acute Pulmonary Edema and Congestive Heart Failure
- Correctly apply the *Acute Cardiogenic Pulmonary Edema Protocol* in case discussions
- Demonstrate proper documentation for the assessment and treatment of a CHF patient



Cardiovascular System

CONSISTS OF:

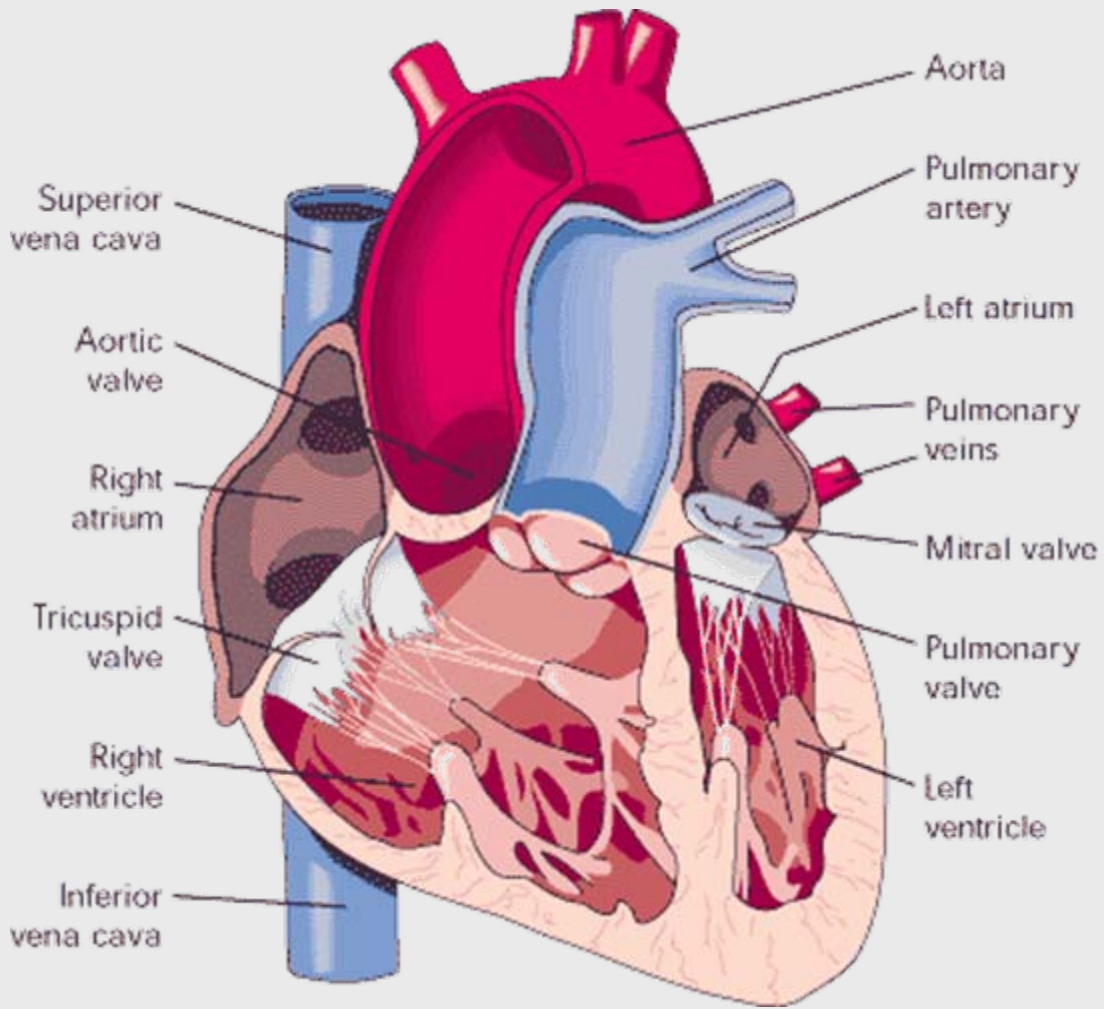
- Heart (pump)
- Arteries and veins (container)
- Capillaries (site nutrient, gas exchange)

Functions

- Transportation of oxygen and other nutrients to the cells
- Removal of carbon dioxide and wastes
- Distributes hormones
- Control heat transfer



Heart Anatomy





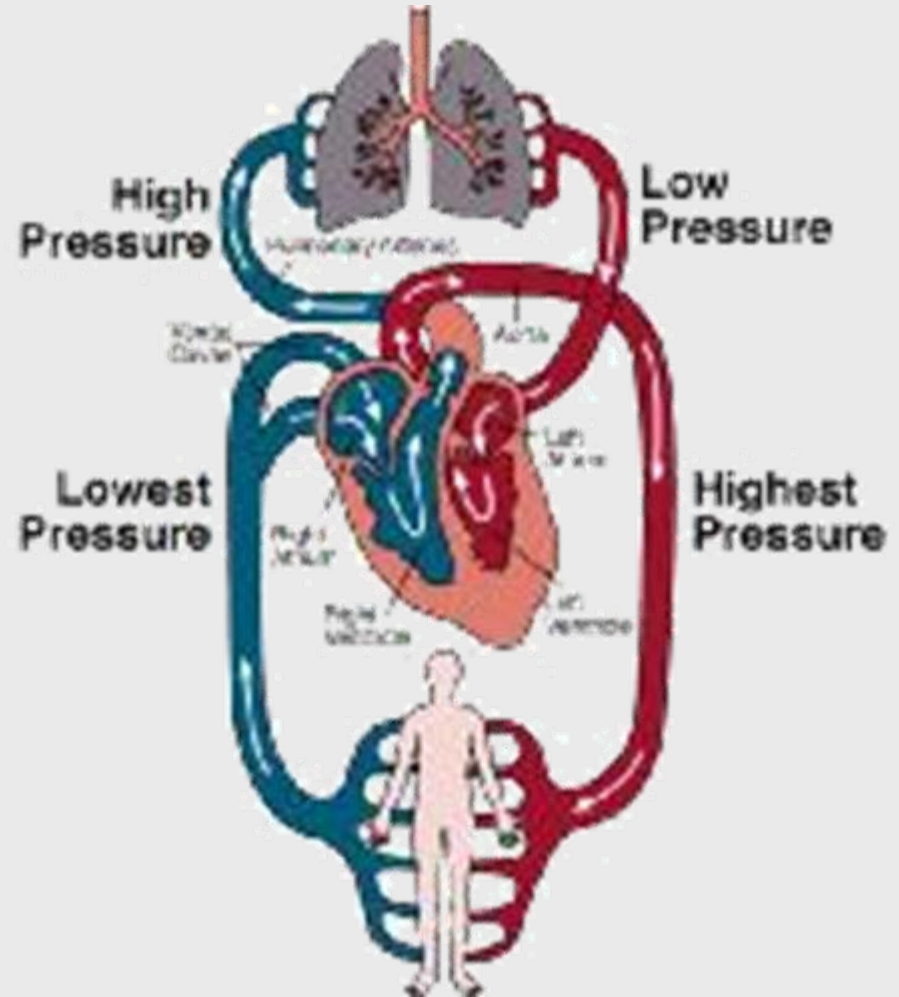
Heart Anatomy

Left Ventricle

- High Pressure
- More Muscle
- Systemic

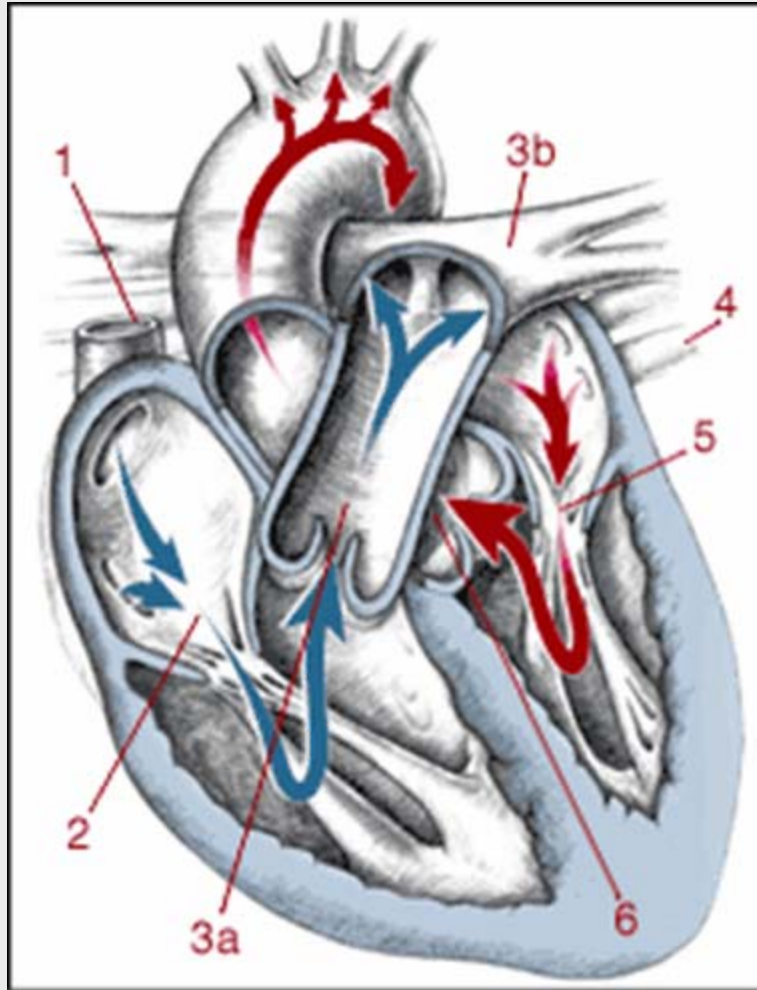
Right Ventricle

- Low Pressure
- Less Muscle
- Pulmonary





Blood Flow

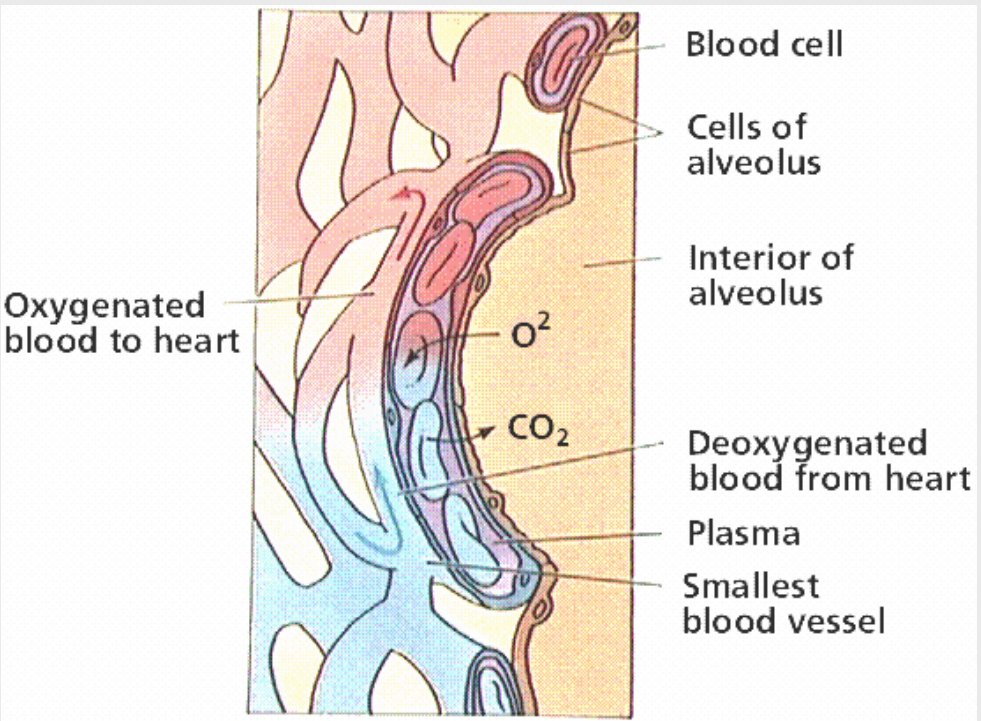
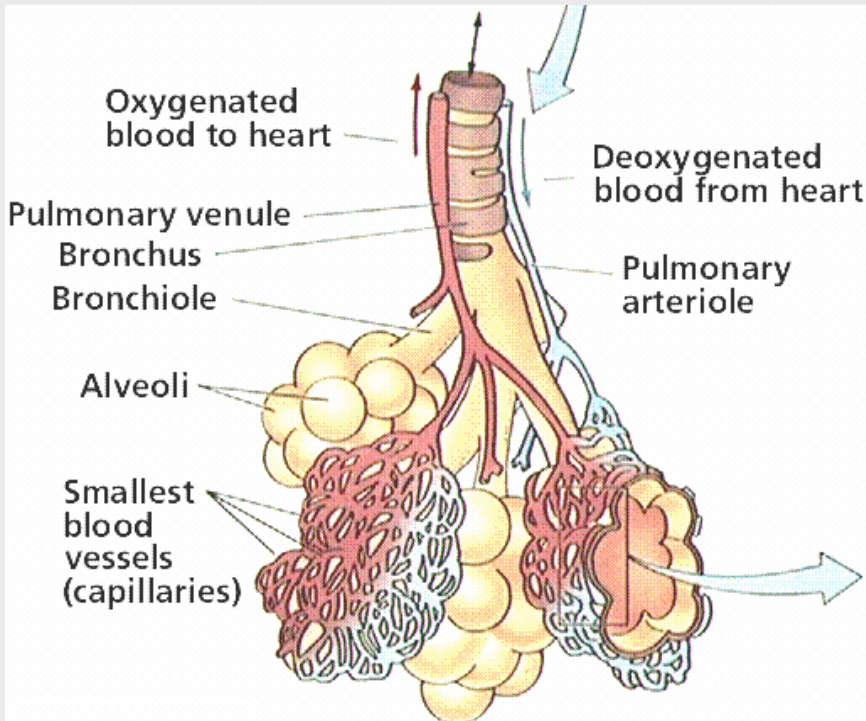


BLOOD FLOW THROUGH THE HEART

1. Right atria via vena cava
2. Tricuspid valve into right ventricle
3. a) Pulmonic valve to pulmonary artery
b) Right and left pulmonary arteries

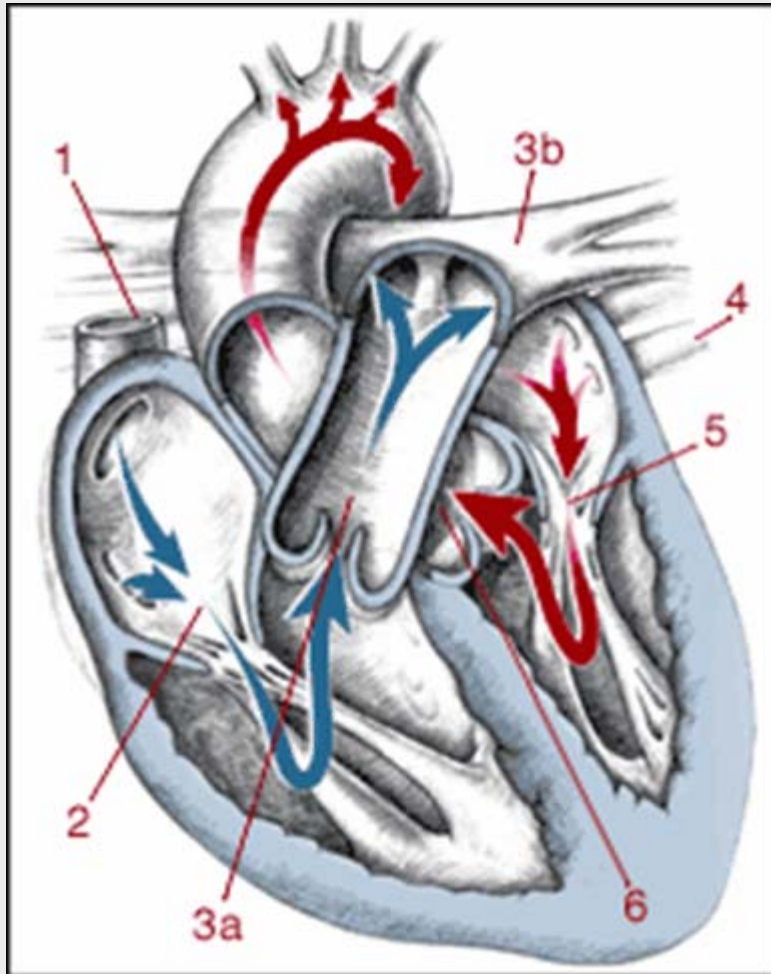
Blood Flow

Pulmonary arterioles to capillaries = gas exchange





Blood Flow



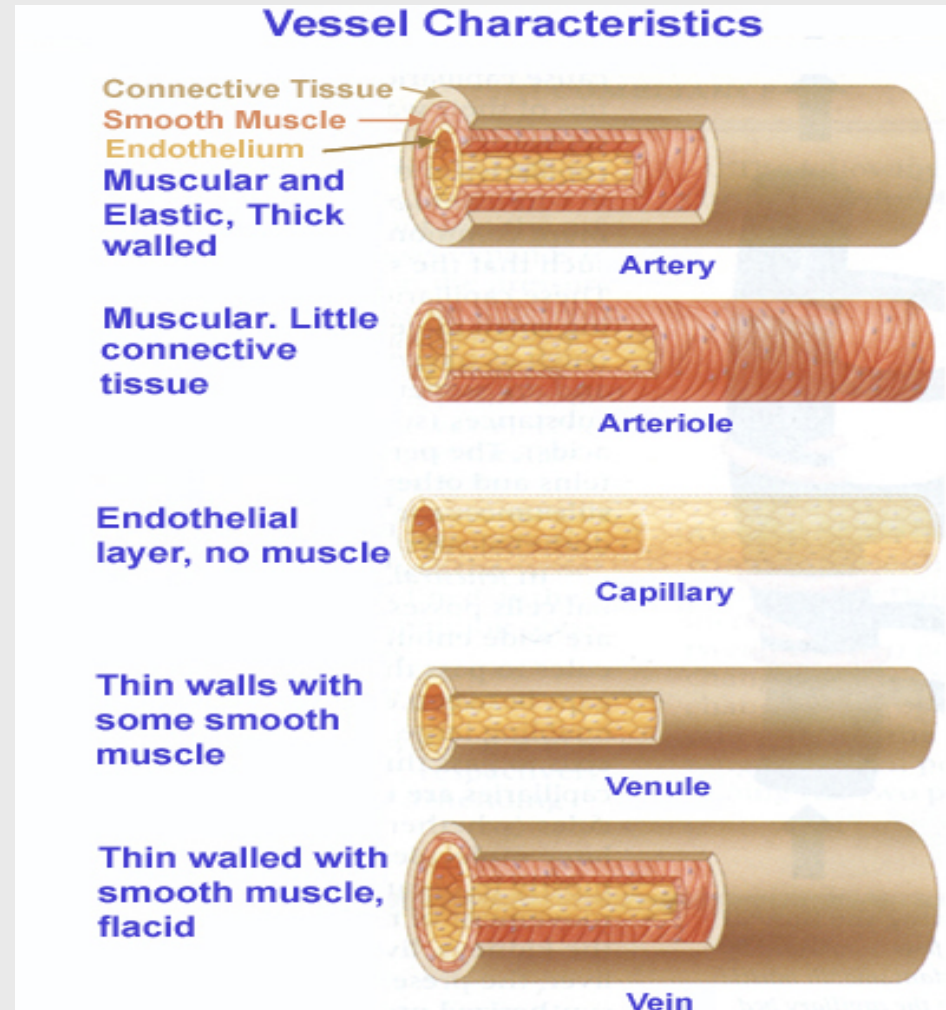
4. Left atrium via pulmonary veins
5. Mitral valve to left ventricle
6. Aortic valve to aorta

BLOOD FLOW THROUGH THE HEART



Arteries and Veins

- Arteries
- Arterioles
- Capillaries
- Venules
- Veins





Heart Failure

When the heart is unable to pump the volume it receives it is said to be in failure

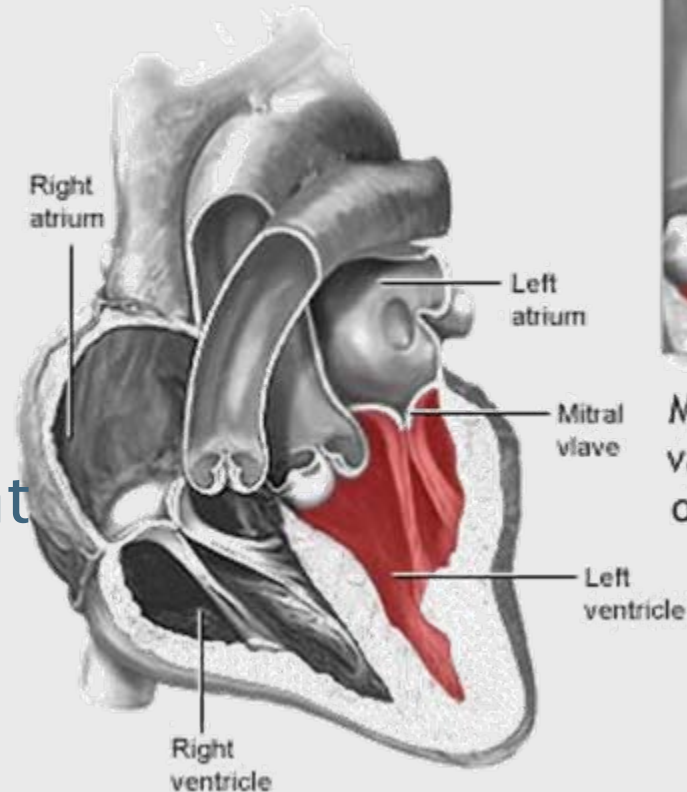
- Right Sided
- Left Sided



Heart Failure

Causes

- Left Ventricular Dysfunction (LVH, Previous MI)
- Rate related
 - Tachycardia
 - Bradycardia
- Hypertensive event
- Valvular disease
 - Prolapse
 - Rupture



Malfunctioning mitral valve allows backflow of blood into the left atrium, causing progressive enlargement

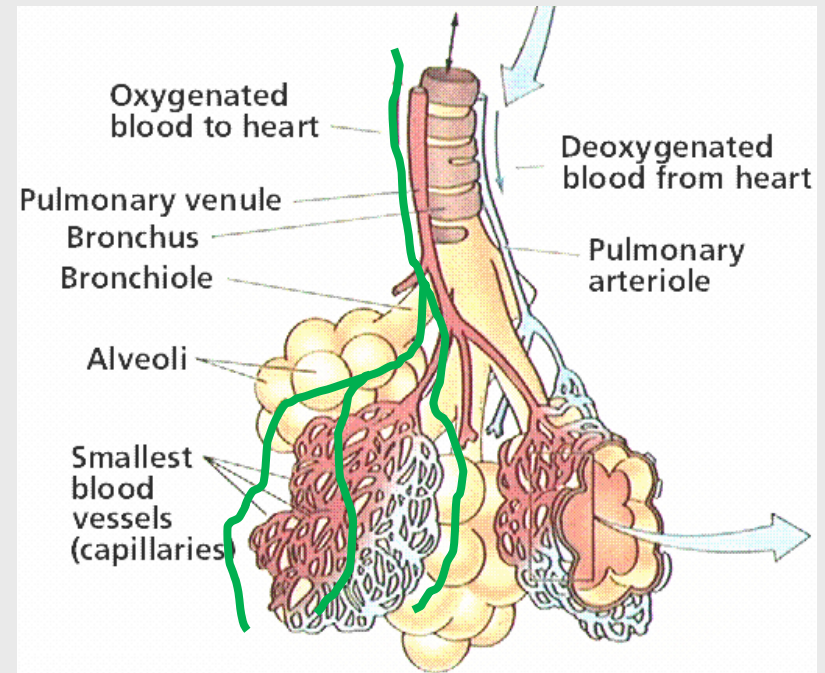
ADAM.



Heart Failure

Causes

- Injury to capillary endothelium (ARDS)
- Blockage of lymphatic Vessels





Heart Failure

Acute Right Sided Failure

associated with acute inferior wall MI

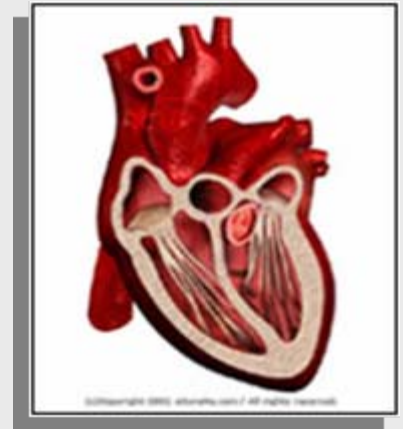
hypotension

normal to slow heart rate

JVD

chest clear

Treatment: fluid resuscitation



Note: NTG contraindicated for HR < 60 and/or hypotension



Heart Failure

Volume overload

- inappropriate fluid resuscitation
- diligent monitoring of respiratory status required when administering IV fluids

Note: Auscultate chest q 250 cc in adults - q 100 cc in Paeds



Categorizing Failure

- **Left** or **Right** sided heart failure
- **Forward** or **Backward** ventricular failure
 - Backward failure is secondary to elevated systemic venous pressures.
 - Forward ventricular failure is secondary to left ventricle failure and reduced flow into the aorta and systemic circulation

LV BACKWARD EFFECTS

Decreased emptying of the left ventricle



Increased volume and end-diastolic pressure in the left ventricle



Increased volume (pressure) in the left atrium



Increased volume in pulmonary veins



LV BACKWARD EFFECTS

Increased volume in pulmonary capillary bed
= increased hydrostatic pressure



Transudation of fluid from capillaries to alveoli



Rapid filling of alveolar spaces



Pulmonary edema

LV FORWARD EFFECTS

Decreased cardiac output



Decreased perfusion of tissues of body



Decreased blood flow to kidneys and glands



Increased reabsorption of sodium and water and
vasoconstriction



LV FORWARD EFFECTS

Increased secretion of sodium and water-retaining hormones



Increased extracellular fluid volume



Increased total blood volume and increased systemic blood pressure

RV **BACKWARD** EFFECTS

Decreased emptying of the right ventricle



Increased volume and end-diastolic pressure
in the right ventricle



Increased volume (pressure) in right atrium



Increased volume and pressure in the great
veins



RV **BACKWARD** EFFECTS

Increased volume in the systemic venous circulation



Increased volume in distensible organs (hepatomegaly, splenomegaly)



Increased pressures at capillary line



Peripheral, dependant edema and serous infusion

RV FORWARD EFFECTS

Decreased volume from the RV to the lungs



Decreased return to the left atrium and subsequent decreased cardiac output



All the forward effects of left heart failure

Treatment

Patient Positioning:

Having the patient sitting upright helps force fluid to the bases and provides the apices with less fluid

Results in fluid free alveolar respiration in apices



Treatment

- Ventilatory Assistance – BVM



Treatment

- **Symptom Relief – Vasodilator**
 - Indications / Contra Indications
 - IV versus no IV



Treatment

CPAP

- Continuous Positive Airway Pressure

Case Study

Surname: Doe
 Given Name: John
 Mailing Address: 123 Main Street
 City / Town: Anytown
 Province: Ontario Postal Code: N9N 9N9
 Hospital Registration Number: [Blank]
 Date of Birth (YMD): 2010 / 01 / 01
 Health Card No.: 1 2 3 4 5 6 7 8 H C Ver. [Blank]

Confidential when completed
 Please press hard, you are making multiple copies.

- | | | |
|------------------------------------|------------------------------|----------------------------------|
| <input type="checkbox"/> Crew Type | <input type="checkbox"/> EMA | <input type="checkbox"/> BLS |
| <input type="checkbox"/> PCP | <input type="checkbox"/> ACP | <input type="checkbox"/> SR |
| <input type="checkbox"/> ACP | <input type="checkbox"/> CCP | <input type="checkbox"/> AED |
| <input type="checkbox"/> FLIGHT | <input type="checkbox"/> FR | <input type="checkbox"/> IV ONLY |
| | | <input type="checkbox"/> ALS |
| | | <input type="checkbox"/> CCT |

Service Name: **Essex - Windsor EMS**

CACC	CALL NUMBER / PATIENT NUMBER	Call Date (YMD)				
W I N	9 9 9 9 9 9 9	2010 / 05 / 25				
Vehicle Number	Service	Station	Status	Start (km)	PU (km)	Dest. (km)
9 9 9 9 7 0 5 1 1 7 0 0 1 2 3 4 1 2 4 0 1 2 6 5						
UTM Code / Flight #	Dsp., Prb., Cde.	Dispatch	Return	Patients	Seg	
3 3 3 4 4 4 4	2 1 0 4 0 4	0 4 0 1 0 1				

Special Codes: [Blank]

Warning Systems:
 To Scene
 To Destination
 None
 Lights
 Lights & Siren

Pick-up Location or Sending Facility: [Blank]
 City / Town: [Blank]

Same as above Pick-up Location Code: **R, Ø**
 Sending Hospital: [Blank] Landing Site: [Blank]
 Primary Problem: **2, 1** Secondary Problem: [Blank]
 Time of Occurrence: **~15 mins**

Chief Complaint: **Difficulty Breathing**

Incident History: **PQRST AEIOU** Mechanism of injury / direction of force:
 Pt. states he was doing some light housework when he suddenly became short of breath. Pt then called 911 and sat down as his breathing became more difficult. Pt. also complains of cough and has twice expelled pinkish sputum. Pt. denies any chest pain or pressure. Pt's wife states he has not felt well for the past couple of days.

Traumatic Injury Site/Type			
Location	Type	Mechanism	
1	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Medical History: Previously Healthy
 1 Cardiac 3 Stroke/TIA 5 Seizure 7 Psychiatric 9 Cancer
 2 Respiratory 4 Hypertension 6 Diabetes 8 Other

Medications: None Nitrates Digoxin Insulin ASA Ventolin Oral Diabetic Meds Lasix Oral Contraceptive Not Determined

Allergies: NKA ASA Sulpha Penicillin Codeine Other Not Determined

Treatment prior to arrival: None Fire Police E.F.R.T. Other Ambulance Bystander Other
 Sending Physician: [Blank]

Cardiac Arrest Information: Arrest Witnessed By EMS Personnel Bystander Unwitnessed
 DNR Fire/Police Family Member Bystander
 CPR Started By: P.C.P. A.C.P./C.C.P. Other Medical
 Duration of CPR Prior to arrival of transporting crew: [Blank] Est. Time of Arrest: [Blank]

Age: [Blank] Gender: [Blank] Weight (kg): [Blank] C.T.A.S.: **DECEASED**
 1 - Resus 2 - Emerg. 3 - Urgent 4 - Less Urg. 5 - Non-Urg.
 Pronounced Dead By BHP Obviously Dead

General Appearance: [Blank]
 Skin (Initial Assessment):
 Colour: Flush Normal Pale Jaundiced Cyanosed
 Temp: Hot Normal Cool
 Cond.: Dry Normal Wet

Head/Neck: Trachea - Midline Shifted - R - L JVD - Elevated - Not Elevated

Chest: Air Entry: = Bilaterally Decreased - R - L Breath Sounds: - Clear - Wheezes - Crackles - Rub - Absent

Abdomen: - Soft - Rigid - Distended - Tender - Mass - Pulsatile - RU - LU - LL - RL - Center

Back/Pelvis: - Unremarkable
 Extremities: - Unremarkable Peripheral Edema - Absent - Present Pedal Pulse - Absent - Present

Surname: Doe
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 Province: Ontario Postal Code: N9N 9N9
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Allergies:
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Treatment prior to arrival:
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3 3 3 4 4 4 4	2 1 0 4 0 4 0 4 0 1 0 1					

Special Codes: [Blank]

Warning Systems:
 To Scene: None Lights Lights & Siren
 To Destination: None Lights Lights & Siren

Pick-up Location or Sending Facility: [Blank] City / Town: [Blank]

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Age: [Blank] Gender: [Blank] Weight (kg): [Blank] C.T.A.S.: 1 - Resus 2 - Emerg. 3 - Urgent 4 - Less Urg. 5 - Non-Urg. DECEASED Pronounced Dead By BHP Obviously Dead

General Appearance: [Blank]

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 Date of Birth (YMD): 2010 / 01 / 01
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 Ver.: [Blank]



Ambulance Call Report

Confidential when completed
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- | | |
|------------------------------------|------------------------------------|
| <input type="checkbox"/> Crew Type | <input type="checkbox"/> Call Type |
| <input type="checkbox"/> EMA | <input type="checkbox"/> BLS |
| <input type="checkbox"/> PCP | <input type="checkbox"/> SR |
| <input type="checkbox"/> ACP | <input type="checkbox"/> AED |
| <input type="checkbox"/> CCP | <input type="checkbox"/> IV ONLY |
| <input type="checkbox"/> FLIGHT | <input type="checkbox"/> ALS |
| <input type="checkbox"/> FR | <input type="checkbox"/> CCT |

Service Name: **Essex - Windsor EMS**

CACC	CALL NUMBER / PATIENT NUMBER	Call Date (YMD)				
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UTM Code / Flight #		Dsp., Prb., Cde.	Dispatch	Return	Patients	Seg
3 3 3 4 4 4 4		2 1 0 4 0 4	0 4 0 1 0 1			

Special Codes: [Blank]

Warning Systems:
 To Scene: None Lights
 Lights & Siren

Pick-up Location or Sending Facility: [Blank]
 City / Town: [Blank]

Same as above Pick-up Location Code: **R, 0**
 Sending Hospital: [Blank] Landing Site: [Blank]

Primary Problem: **2, 1** Secondary Problem: [Blank]
 Time of Occurrence: **~15 mins**

Chief Complaint: **Difficulty Breathing**

Incident History: **PQRST AEIOU** Mechanism of injury / direction of force:
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Allergies: NKA ASA Sulpha Penicillin Codeine Other Not Determined
 As per pt.'s wife

Treatment prior to arrival: None Fire Police E.F.R.T. Other Ambulance Bystander Other
 Sending Physician: [Blank]

Cardiac Arrest Information: Witnessed By DNR EMS Personnel Fire/Police CPR Started By PCP ACP / CCP Other
 Bystander Family Member Other Medical Other
 Est. Time of Arrest: [Blank]

Age: **60** Gender: **M** Weight (kg): **99kg**
 C.T.A.S.: **DECEASED**
 1 - Resus 2 - Emerg. 3 - Urgent 4 - Less Urg. 5 - Non-Urg.
 Pronounced Dead By BHP Obviously Dead

General Appearance: **Male pt. found in tri pod position sitting at kitchen table, appears distressed. Pt conscious and alert Oriented to person, place and time**

Skin (Initial Assessment):
 Colour: Flush Normal Pale Jaundiced Cyanosed
 Temp: Hot Normal Cool
 Cond.: Dry Normal Wet

Head/Neck: Trachea - Midline Shifted - R - L JVD - Elevated - Not Elevated
JVD with pt. semi-fowlers at 45° - Airway Patent and Currently Clear - PEARL

Chest: Air Entry: = Bilaterally Decreased - R - L Breath Sounds: - Clear - Wheezes - Crackles - Rub - Absent
Course Crackles Bilaterally more in the bases

Abdomen: - Soft - Rigid - Distended - Tender - Mass - Pulsatile - RU - LU - LL - RL - Center
No pain on palpation

Back/Pelvis: - Unremarkable
 Extremities: - Unremarkable Peripheral Edema - Absent - Present Pedal Pulse: - Absent - Present
Range of motion x 4 with strong radial pulses, no paresthesia.

ADMINISTRATION

CLINICAL INFORMATION

PHYSICAL EXAM

Time	Procedure Code	Route	Treatment/Procedure/Medication										Result							Crew 1st Attendant	Crew 2nd Attendant
			Pulse			Respirations			Blood Pressure		Temp	ECG CODE	O2 Sat	CO2	GCS			Pupils			
			R	Rh	V	R	Rh	V	Systolic	Diastolic					E	V	M	R	L		
	020 338		BLS Assessment SPO2 Monitor										ABCs Present 82% Room Air								

Fluid	Pre Trans	Enroute	Total	Remarks / Orders		
				<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">In/Intake</div> <div> <p>Pt. Outcome in Emerg. Pronounced <input type="checkbox"/> Admitted <input type="checkbox"/> Unknown <input type="checkbox"/></p> <p>Tertiary Trans <input type="checkbox"/> Discharged <input type="checkbox"/></p> </div> </div>		
Total				<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Output</div> <div> <p>Final Primary Problem</p> <p>Base Hospital No. Base Hospital</p> <p>Hospital No. Receiving facility/destination</p> <p>Crew Member 1 (Attendant) No. Name</p> <p>Crew Member 2 (Driver) No. Name</p> <p>Crew Member 3 (Other) No. Name</p> <p>Crew Member 4 (Other) No. Name</p> </div> </div>		
Urine				Problem Code	Final Status	
NG				Base Hospital Physician Name (If Patch)		
Chest Tube				Receiving Facility Signature		
Other				Signature No. 1		
Other				Signature No. 2		
Total				Signature No. 3		
Fluid Balance				Signature No. 4		
Altitude	Landing Site-D	Travel Cond.				

CALL EVENTS	Call Received	Crew Notified	Crew Mobile	Arrive Scene	Arrive Patient	Depart Scene	Arrive Dest.	Depart Dest.	Arrive Base	TAT Resp.

CLINICAL TREATMENT / PROCEDURES & RESULTS

GENERAL ADMINISTRATION

Time	Procedure Code	Route	Treatment/Procedure/Medication										Result						Crew 1st Attendant	Crew 2nd Attendant	
			Pulse			Respirations			Blood Pressure		Temp	ECG CODE	O2 Sat	CO2	GCS			Pupils			
			R	Rh	V	R	Rh	V	Systolic	Diastolic					E	V	M	R			L
	020 338 130		BLS Assessment SPO2 Monitor O2 via NRB @ 12L/m										ABCs Present 82% Room Air Patient Tolerates								

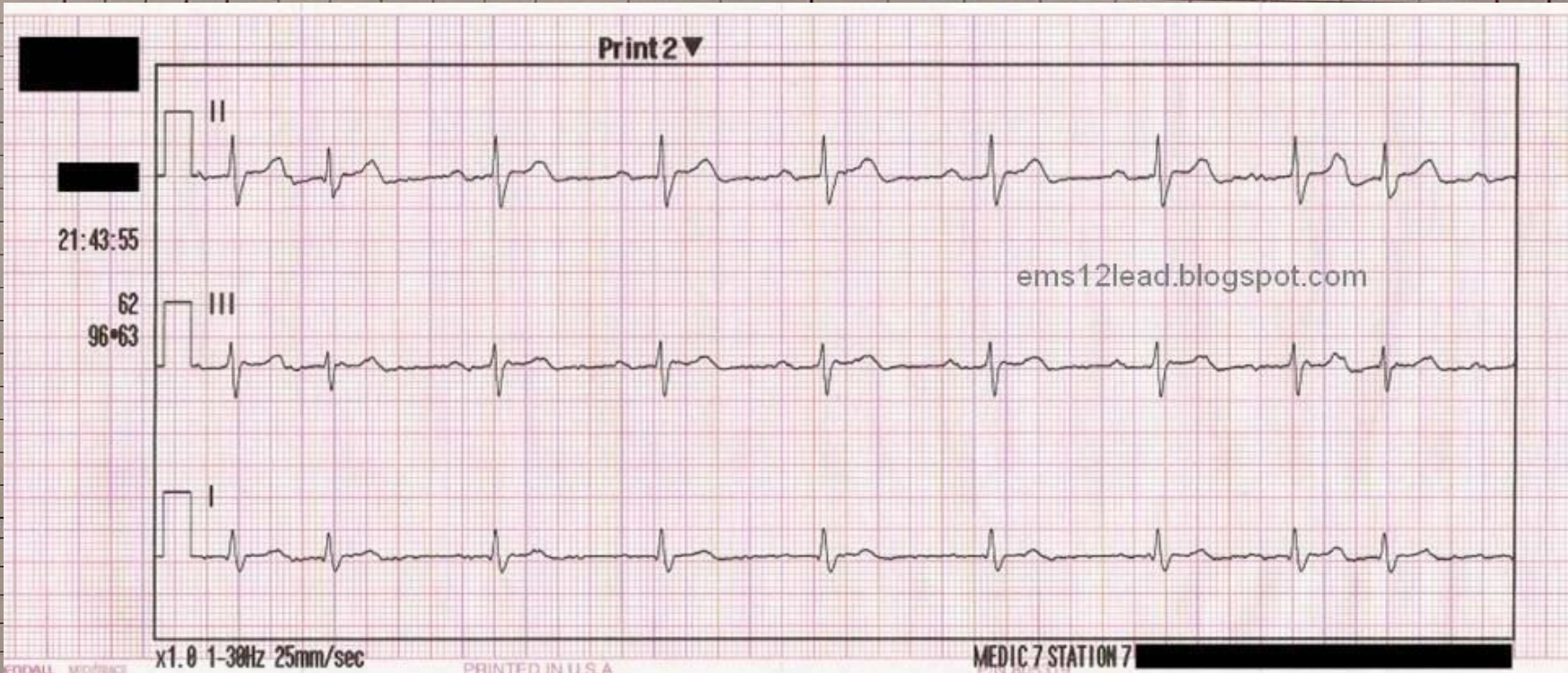
Fluid	Pre Trans	Enroute	Total	Remarks / Orders																																
				<table border="1"> <tr> <td rowspan="2">Pt. Outcome in Emerg.</td> <td>Pronounced <input type="checkbox"/></td> <td>Admitted <input type="checkbox"/></td> <td>Unknown <input type="checkbox"/></td> </tr> <tr> <td>Tertiary Trans <input type="checkbox"/></td> <td>Discharged <input type="checkbox"/></td> <td></td> </tr> <tr> <td>Final Primary Problem</td> <td colspan="2">Base Hospital No.</td> <td>Base Hospital</td> </tr> <tr> <td></td> <td colspan="2">Hospital No.</td> <td>Receiving facility/destination</td> </tr> <tr> <td></td> <td colspan="2">Crew Member 1 (Attendant) No.</td> <td>Name</td> </tr> <tr> <td></td> <td colspan="2">Crew Member 2 (Driver) No.</td> <td>Name</td> </tr> <tr> <td></td> <td colspan="2">Crew Member 3 (Other) No.</td> <td>Name</td> </tr> <tr> <td></td> <td colspan="2">Crew Member 4 (Other) No.</td> <td>Name</td> </tr> </table>		Pt. Outcome in Emerg.	Pronounced <input type="checkbox"/>	Admitted <input type="checkbox"/>	Unknown <input type="checkbox"/>	Tertiary Trans <input type="checkbox"/>	Discharged <input type="checkbox"/>		Final Primary Problem	Base Hospital No.		Base Hospital		Hospital No.		Receiving facility/destination		Crew Member 1 (Attendant) No.		Name		Crew Member 2 (Driver) No.		Name		Crew Member 3 (Other) No.		Name		Crew Member 4 (Other) No.		Name
Pt. Outcome in Emerg.	Pronounced <input type="checkbox"/>	Admitted <input type="checkbox"/>	Unknown <input type="checkbox"/>																																	
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Fluid Balance																																				
Altitude	Landing Site-D	Travel Cond.																																		

CALL EVENTS	Call Received	Crew Notified	Crew Mobile	Arrive Scene	Arrive Patient	Depart Scene	Arrive Dest.	Depart Dest.	Arrive Base	TAT Resp.

CLINICAL TREATMENT / PROCEDURES & RESULTS

GENERAL ADMINISTRATION

Time	Procedure Code	Route	Treatment/Procedure/Medication				Result				GCS	Pupils	Crew Status	Crew Status					
			Pulse	Respirations	Blood Pressure		Temp	ECG CODE	O2 Sat	CO2					E	V	M	R	L
			R	Rh	V	R	Rh	V	Systolic	Diastolic									
	0 2 0		BLS Assessment				ABCs Present												
	3 3 8		SPO2 Monitor				82% Room Air												
	1 3 0		O2 via NRB @ 12L/m				Patient Tolerates												
	0 1 0		70	R	F 26	R	L 190	110	36.8		84%	4	5	6	15	4+	4+		
	3 0 1		Cardiac Monitor - Lead II				44 Sinus Rhythm with wide QRS												



Total		Pt. Outcome in Emerg.		Pronounced <input type="checkbox"/> Admitted <input type="checkbox"/> Unknown <input type="checkbox"/>	
Urine		Final Primary Problem		Tertiary Trans <input type="checkbox"/> Discharged <input type="checkbox"/>	
NG		Base Hospital No.		Base Hospital	
Chest Tube		Hospital No.		Receiving facility/destination	
Other		Crew Member 1 (Attendant) No.		Name	
Other		Crew Member 2 (Driver) No.		Name	
Total		Crew Member 3 (Other) No.		Name	
Fluid Balance		Crew Member 4 (Other) No.		Name	
Altitude		Landing Site-D		Travel Cond.	
CALL EVENTS		Call Received		Crew Notified	
		Crew Mobile		Arrive Scene	
		Arrive Patient		Depart Scene	
		Arrive Dest.		Depart Dest.	
		Arrive Base		TAT Resp.	

CLINICAL TREATMENT / PROCEDURES & RESULTS

GENERAL ADMINISTRATION

Time	Procedure Code	Route	Treatment/Procedure/Medication										Result									
			Pulse			Respirations			Blood Pressure		Temp	ECG CODE	O2 Sat	CO2	GCS			Pupils	Crew 1st Attendant	Crew 2nd Attendant		
			R	Rh	V	R	Rh	V	Systolic	Diastolic					E	V	M				R +	L +
0 2 0			BLS Assessment										ABCs Present									
3 3 8			SPO2 Monitor										82% Room Air									
1 3 0			O2 via NRB @ 12L/m										Patient Tolerates									
0 1 0			70	R	F	26	R	L	190	110	36.8	84%	4	5	6	15	4+	4+				
3 0 1			Cardiac Monitor - Lead II										44 Sinus Rhythm with wide QRS									
6 1 5			Nitro Spray 0.4mg										Successful Under Tongue									
2 3 5			Fowlers with straps and blanket										Pt. Comfort and Secure									
3 7 0			Close Observation										Patient becoming more distressed									

Fluid	Pre Trans	Enroute	Total	Remarks / Orders									
				<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Intake</div> <div> <p>Pt. Outcome in Emerg. <input type="checkbox"/> Pronounced <input type="checkbox"/> Admitted <input type="checkbox"/> Unknown <input type="checkbox"/></p> <p>Tertiary Trans <input type="checkbox"/> Discharged <input type="checkbox"/></p> </div> </div>									
Total				<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Output</div> <div> <p>Final Primary Problem</p> <p>Base Hospital No. Base Hospital</p> <p>Hospital No. Receiving facility/destination</p> </div> </div>									
Urine				<p>Problem Code Final Status</p> <p>Base Hospital Physician Name (if Patch)</p>									
NG				Receiving Facility Signature									
Chest Tube				Signature No. 1									
Other				Signature No. 2									
Other				Signature No. 3									
Total				Signature No. 4									
Fluid Balance													
Altitude	Landing Site-D	Travel Cond.											
				<p>Crew Member 1 (Attendant) No. Name</p> <p>Crew Member 2 (Driver) No. Name</p> <p>Crew Member 3 (Other) No. Name</p> <p>Crew Member 4 (Other) No. Name</p>									

CALL EVENTS	Call Received	Crew Notified	Crew Mobile	Arrive Scene	Arrive Patient	Depart Scene	Arrive Dest.	Depart Dest.	Arrive Base	TAT Resp.

CLINICAL TREATMENT / PROCEDURES & RESULTS

GENERAL ADMINISTRATION

Time	Procedure Code	Route	Treatment/Procedure/Medication										Result									
			Pulse			Respirations			Blood Pressure		Temp	ECG CODE	O2 Sat	CO2	GCS			Pupils	Crew Obs. Methods	Crew Obs. Res.		
			R	Rh	V	R	Rh	V	Systolic	Diastolic					E	V	M				R +	L +
0 2 0			BLS Assessment										ABCs Present									
3 3 8			SPO2 Monitor										82% Room Air									
1 3 0			O2 via NRB @ 12L/m										Patient Tolerates									
0 1 0			70	R	F	26	R	L	190	110	36.8	84%	4	5	6	15	4+	4+				
3 0 1			Cardiac Monitor - Lead II										44 Sinus Rhythm with wide QRS									
6 1 5			Nitro Spray 0.4mg										Successful Under Tongue									
2 3 5			Fowlers with straps and blanket										Pt. Comfort and Secure									
3 7 0			Close Observation										Patient becoming more distressed									
1 4 1			NIPPV via BVM @ 12 L/m										Pt. non combative allowed 6 breaths									
3 7 0			Close Observation										Breathing distress decreased									
3 4 2			18G. to Right AC with 10cc NS flush										IV Patent - Successful									
0 1 0			68	R	F	24	R	L	178	106		89%	4	5	6	15	4+	4+				
6 1 5			Nitro Spray 0.8mg - 2 sprays										Successful Under Tongue									
3 7 0			Auscultate Lung Sounds										Crackles in both bases									

Fluid	Pre Trans	Enroute	Total	Remarks / Orders																																							
				<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Intake</div> <div> <p>Pt. Outcome in Emerg. <input type="checkbox"/> Pronounced <input type="checkbox"/> Admitted <input type="checkbox"/> Unknown <input type="checkbox"/></p> <p>Tertiary Trans <input type="checkbox"/> Discharged <input type="checkbox"/></p> </div> </div>																																							
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Fluid Balance																																											
Altitude	Landing Site-D	Travel Cond.																																									

CALL EVENTS	Call Received	Crew Notified	Crew Mobile	Arrive Scene	Arrive Patient	Depart Scene	Arrive Dest.	Depart Dest.	Arrive Base	TAT Resp

CLINICAL TREATMENT / PROCEDURES & RESULTS

GENERAL ADMINISTRATION

Time	Procedure Code	Route	Treatment/Procedure/Medication										Result									
			Pulse			Respirations			Blood Pressure		Temp	ECG CODE	O2 Sat	CO2	GCS			Pupils	Crew Obs. Methods	Crew Obs. Res.		
			R	Rh	V	R	Rh	V	Systolic	Diastolic					E	V	M				R +	L +
0 2 0			BLS Assessment										ABCs Present									
3 3 8			SPO2 Monitor										82% Room Air									
1 3 0			O2 via NRB @ 12L/m										Patient Tolerates									
0 1 0			70	R	F	26	R	L	190	110	36.8	84%	4	5	6	15	4+	4+				
3 0 1			Cardiac Monitor - Lead II										44 Sinus Rhythm with wide QRS									
6 1 5			Nitro Spray 0.4mg										Successful Under Tongue									
2 3 5			Fowlers with straps and blanket										Pt. Comfort and Secure									
3 7 0			Close Observation										Patient becoming more distressed									
1 4 1			NIPPV via BVM @ 12 L/m										Pt. non combative allowed 6 breaths									
3 7 0			Close Observation										Breathing distress decreased									
3 4 2			18G. to Right AC with 10cc NS flush										IV Patent - Successful									
0 1 0			68	R	F	24	R	L	178	106		89%	4	5	6	15	4+	4+				
6 1 5			Nitro Spray 0.8mg - 2 sprays										Successful Under Tongue									
3 7 0			Auscultate Lung Sounds										Crackles in both bases									
0 1 0			74	R	F	24	R	L	130	90		93%	4	5	6	15	4+	4+				
6 1 5			Nitro Spray 0.4mg										Successful Under Tongue									
0 1 0			79	R	F	20	R	L	118	76		96%	4	5	6	15	4+	4+				
3 7 0			Pt. + Report given to Nurse										Pt. + Report Received									

Fluid	Pre Trans	Enroute	Total	Remarks / Orders									
				<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Intake</div> <div> <p>Pt. Outcome in Emerg. <input type="checkbox"/> Pronounced <input type="checkbox"/> Admitted <input type="checkbox"/> Unknown <input type="checkbox"/></p> <p>Tertiary Trans <input type="checkbox"/> Discharged <input type="checkbox"/></p> </div> </div>									
Total				<div style="display: flex; justify-content: space-between;"> <div style="writing-mode: vertical-rl; transform: rotate(180deg);">Output</div> <div> <p>Final Primary Problem</p> <p>Base Hospital No. Base Hospital</p> <p>Hospital No. Receiving facility/destination</p> <p>Crew Member 1 (Attendant) No. Name</p> <p>Crew Member 2 (Driver) No. Name</p> <p>Crew Member 3 (Other) No. Name</p> <p>Crew Member 4 (Other) No. Name</p> </div> </div>									
Urine				<div style="display: flex; justify-content: space-between;"> <div> <p>Problem Code</p> <p>Final Status</p> </div> <div> <p>Base Hospital Physician Name (If Patch)</p> <p>Receiving Facility Signature</p> <p>Signature No. 1</p> <p>Signature No. 2</p> <p>Signature No. 3</p> <p>Signature No. 4</p> </div> </div>									
NG													
Chest Tube													
Other													
Other													
Total													
Fluid Balance													
Altitude	Landing Site-D	Travel Cond.											

CALL EVENTS	Call Received	Crew Notified	Crew Mobile	Arrive Scene	Arrive Patient	Depart Scene	Arrive Dest.	Depart Dest.	Arrive Base	TAT Resp

CLINICAL TREATMENT / PROCEDURES & RESULTS

GENERAL ADMINISTRATION

Time	Procedure Code	Route	Treatment/Procedure/Medication										Result									
			Pulse			Respirations			Blood Pressure		Temp	ECG CODE	O2 Sat	CO2	GCS			Pupils	Crew 1st Aid	Crew 2nd Aid		
			R	Rh	V	R	Rh	V	Systolic	Diastolic					E	V	M				R +	L +
020			BLS Assessment										ABCs Present									
338			SPO2 Monitor										82% Room Air									
130			O2 via NRB @ 12L/m										Patient Tolerates									
010			70 R	F	26 R	L	190	110	36.8		84%	4	5	6	15	4+	4+					
301			Cardiac Monitor - Lead II										44 Sinus Rhythm with wide QRS									
615			Nitro Spray 0.4mg										Successful Under Tongue									
235			Fowlers with straps and blanket										Pt. Comfort and Secure									
370			Close Observation										Patient becoming more distressed									
141			NIPPV via BVM @ 12 L/m										Pt. non combative allowed 6 breaths									
370			Close Observation										Breathing distress decreased									
342			18G. to Right AC with 10cc NS flush										IV Patent - Successful									
010			68 R	F	24 R	L	178	106			89%	4	5	6	15	4+	4+					
615			Nitro Spray 0.8mg - 2 sprays										Successful Under Tongue									
370			Auscultate Lung Sounds										Crackles in both bases									
010			74 R	F	24 R	L	130	90			93%	4	5	6	15	4+	4+					
615			Nitro Spray 0.4mg										Successful Under Tongue									
010			79 R	F	20 R	L	118	76			96%	4	5	6	15	4+	4+					
370			Pt. + Report given to Nurse										Pt. + Report Received									

Fluid	Pre Trans	Enroute	Total
N/S	10 cc	--	10cc
Intake			
Total	10 cc	--	10cc
Urine			
NG			
Chest Tube			
Other			
Other			
Total			
Fluid Balance			10cc
Altitude	Landing Site-D	Travel Cond.	
		6	
Output			
Pt. Outcome in Emerg.	Pronounced <input type="checkbox"/> Admitted <input type="checkbox"/> Unknown <input type="checkbox"/>		
Final Primary Problem	Tertiary Trans <input type="checkbox"/> Discharged <input type="checkbox"/>		
Base Hospital No.	Acute Pulmonary Edema		
Incident No.	BH 013		
Receiving Facility/destination	S.W.O.R.B.H.P.		
Crew Member 1 (Patch) No.	Hotel Dieu Grace Hosp.		
Crew Member 2 (Patch) No.	99999		
Crew Member 3 (Other) No.	Primary Care Paramedic		
Crew Member 4 (Other) No.	00000		
Name My Partner			

Problem Code	2	1	Final Status	2
Base Hospital Physician Name (If Patch)				
Receiving Facility Signature				
Signature No. 1				
Signature No. 2				
Signature No. 3				
Signature No. 4				

CALL EVENTS	Call Received	Crew Notified	Crew Mobile	Arrive Scene	Arrive Patient	Depart Scene	Arrive Dest.	Depart Dest.	Arrive Base	TAT Resp

CLINICAL TREATMENT / PROCEDURES & RESULTS

GENERAL ADMINISTRATION

Summary

- Pulmonary Edema involves fluid accumulating in the alveoli of the lungs.
- It can be recognized by
 - Shortness of breath
 - Decreased LOC
 - Pink frothy sputum
 - Crackles in the lungs more often in the bases
 - It is usually the result of Left Sided Heart Failure

Summary

- Treatment of Pulmonary Edema includes
 - Sitting the patient upright position of comfort
 - NIPPV via BVM with 100% oxygen
 - Nitroglycerine
 - CPAP

Questions?