

Pediatric Transport

When do we use the panda team and why?

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Associate professor of pediatrics

Medical transport is inherently dangerous

- Moving, vibrating environment
 - Hard to auscultate and palpate
 - Hard to place tubes in small holes
 - Things become dislodged
- Monitors may not function well with vibration
- Resources are limited
- Multiple transfers risk missing information
- Exposure to cold and altitude
- You must expect unplanned events!



Deterioration in transport can occur...

- due to inadequacy of care delivered during transport
- due to medical errors
- due to the physical stress of transport itself
 - fear, cold, vibration
 - physiologic changes in flight
- *due to progression of underlying disease*

Pre-transport stabilization

Any hospital is a better hospital than the back of an ambulance



Stacey RN



Duane RT



Julie RT



Bob RN



Tony RT



Rhonda RN



Kevin RT



Jay RT



Elise RN



PANDA
Team



Doernbecher Children's Hospital



Josh RN



Ashley RN



Mark RT



Sara RT



Annie RN



Geoffrey RN



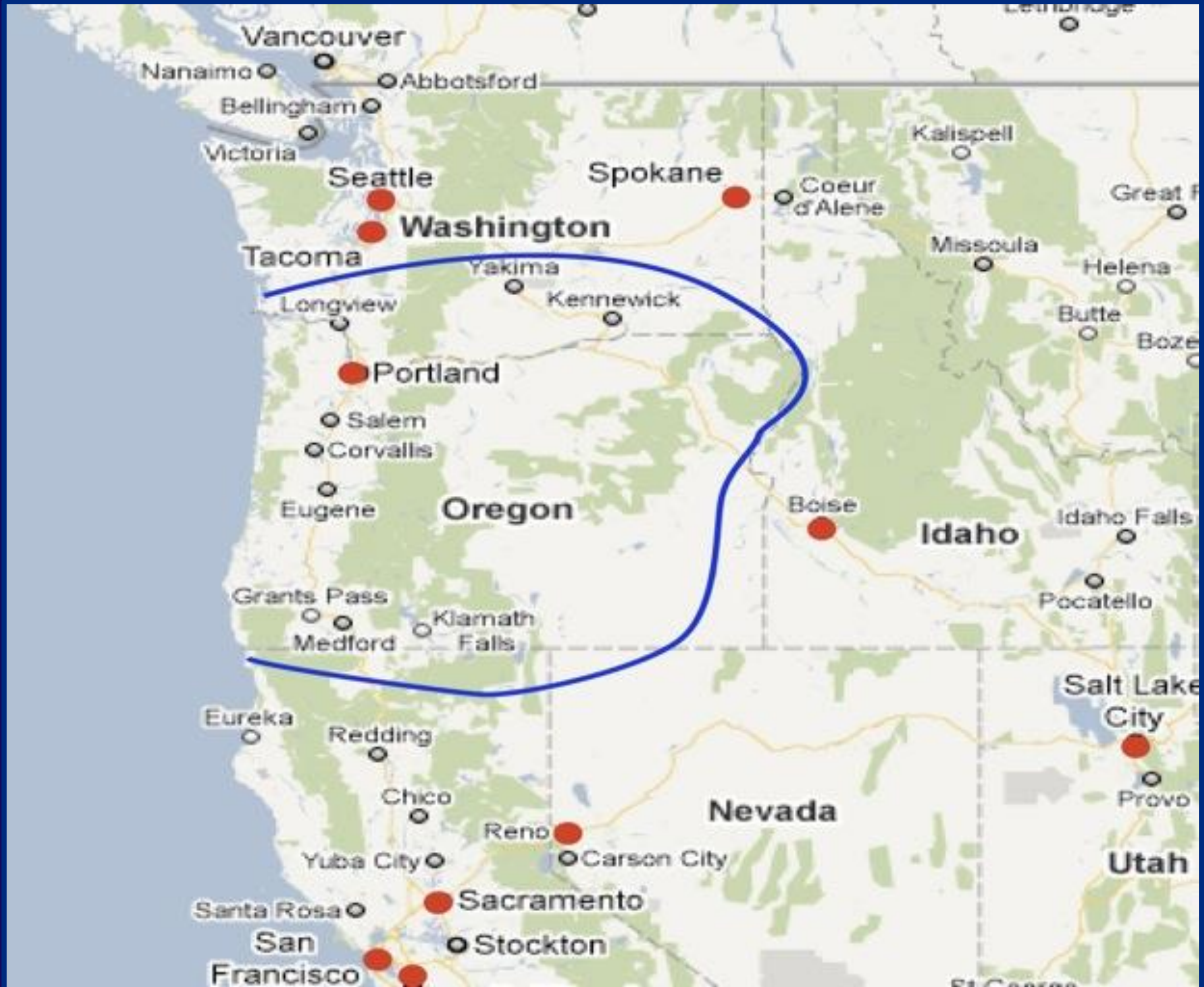
Shawn RT



Kay RN



Rich RT



Ground



Fixed Wing CJ4



Fixed Wing PC12



Rotor- Wing 119 & 135

What's the difference?

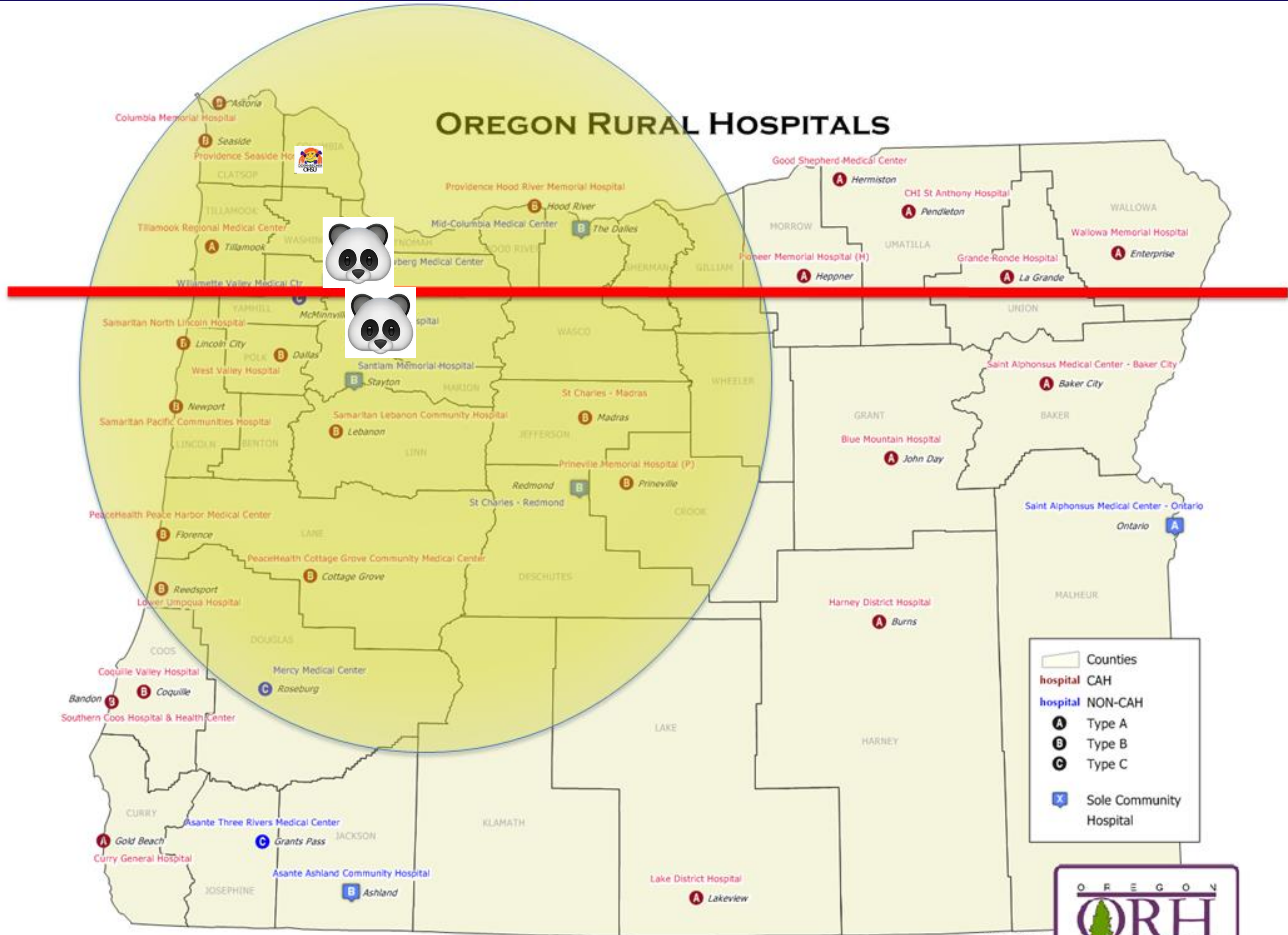
- PANDA team
 - RN/RT and EMT
 - Extensive pediatric experience and training
 - Independent decision making
 - Perform more interventions (Slightly longer bedside time)
 - Communicate directly with physician medical control
 - Many modes of travel
- Adult -oriented flight teams
 - RN and paramedic
 - Limited pediatric training and experience
 - Follow protocols
 - Fewer interventions
 - rarely communicate directly with MD
 - Mostly rotor wing

Why aren't all children transported by pediatric teams?

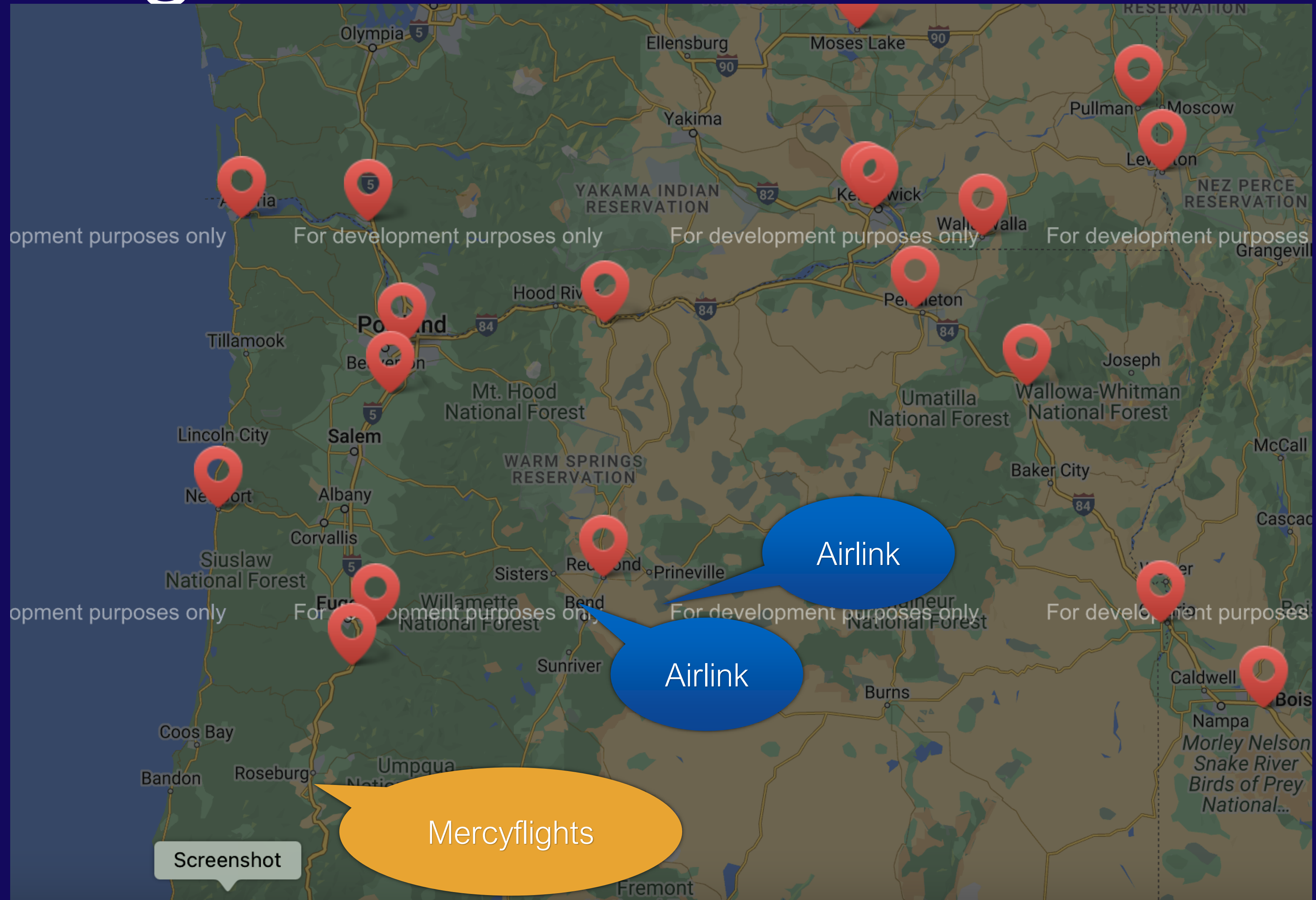
Resources
Preference for speed
Competition
Financial Concerns
Geography & Weather



OREGON RURAL HOSPITALS



LifeFlight Network bases



The golden hour:

time from initial injury to definitive care is associated with mortality

- proposed in the 1950's when prehospital care was limited to supplemental oxygen
- **Not supported by research because early shock resuscitation is critical in most patients**
- mortality from trauma has a trimodal distribution
 - immediate death from brainstem and aortic injuries
 - potentially salvageable patients with blood loss or brain hemorrhage
 - later death from sepsis and multiple organ failure

The Golden Hour is a meaningful concept for some diseases...

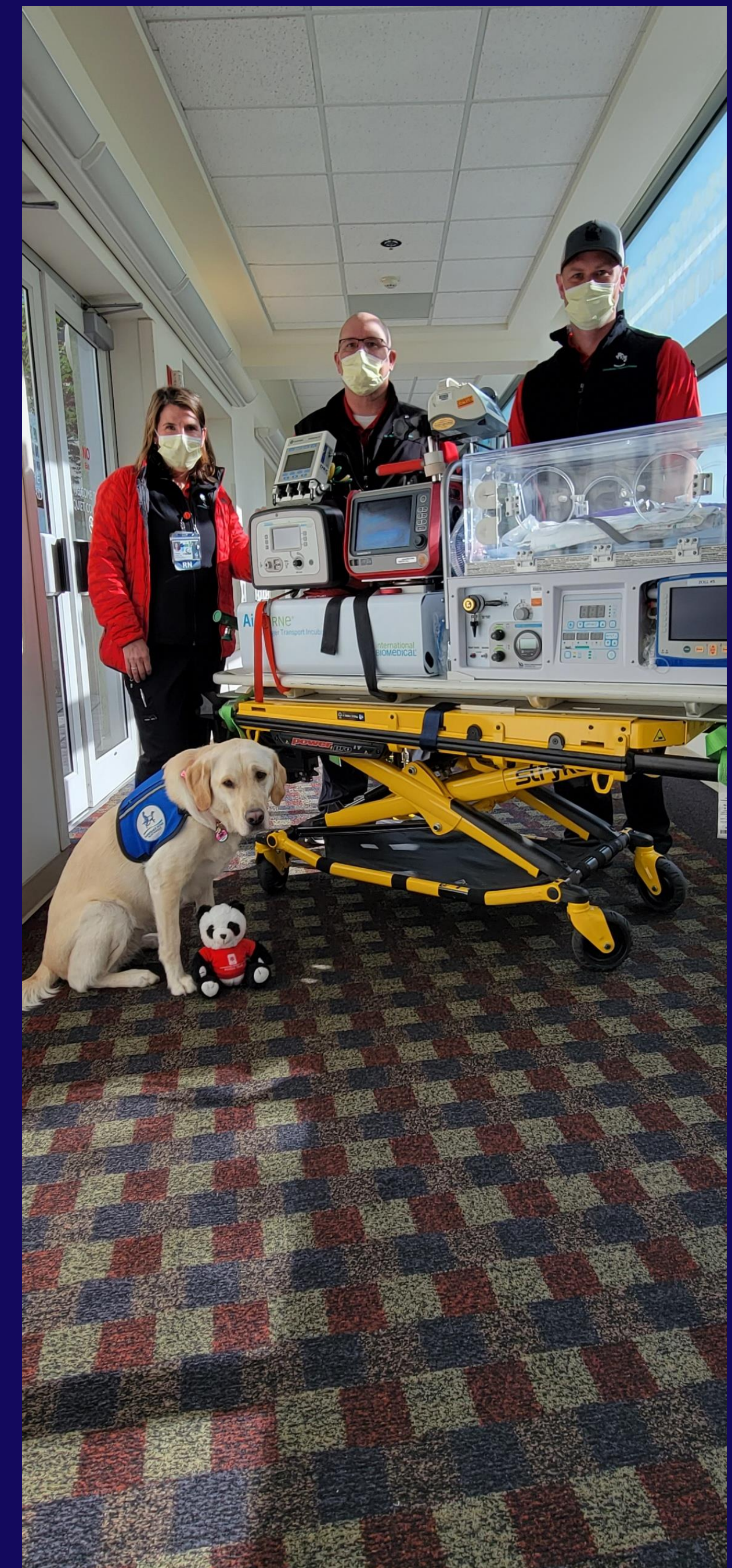
- Need for emergent neurosurgical intervention
- penetrating thoracic trauma
- thrombotic events requiring directed thrombolysis
- complete transposition of the great arteries requiring urgent atrial septostomy

For most kids, the Golden Hour is time from injury to initiation of detail-oriented critical care

- Recognition of shock and respiratory failure
 - Aggressive shock resuscitation
 - Skill with intubation and mechanical ventilation of small children.

Changes in PANDA's practice to improved speed

- One team located at LFN base at Aurora
- Increased use of helicopter transport
 - Team members chose mode of transport
- Shortened average bedside times from 45 min-25 min
 - Pre-arrival planning
 - Call-back while en-route
- Auto activation



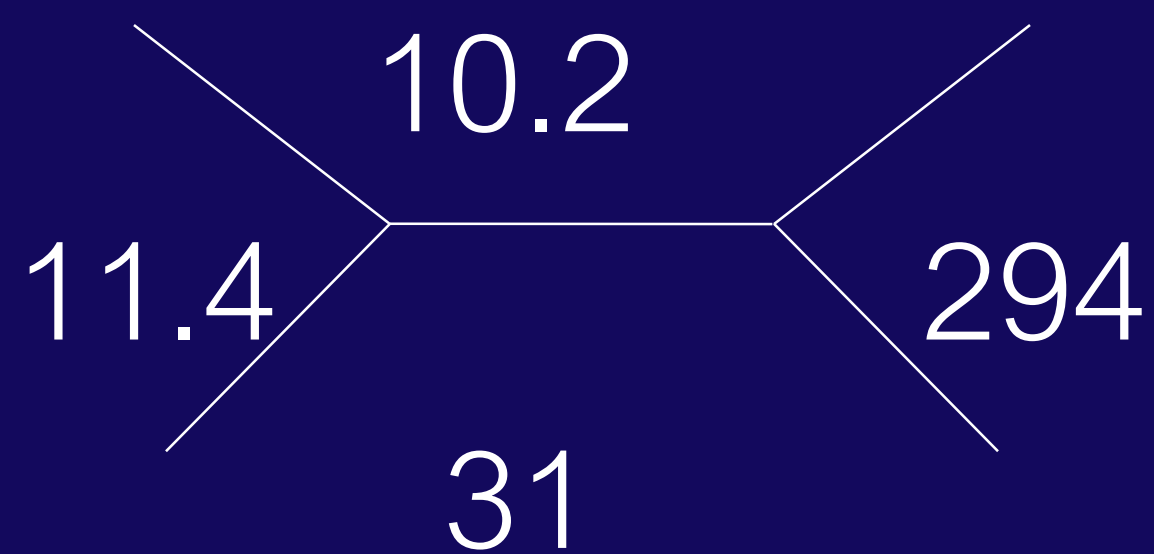
Clinical cases



6 year old pedestrian struck by a car
presents to ED in Roseburg

- 6 year old pedestrian struck by car
- In obvious pain
- Injuries include right femur fracture, grade 3 liver laceration
- HR 150
- BP 116/80
- RR 30
- Received 20 mL/kg LR

CBC



6 year old with liver laceration and femur fracture in Roseburg

- Transport issues:
 - PANDA is at Aurora
 - 45 min fixed wing flight, but we have to wait 90 min for the airplane
 - Rotor is available about 60 min flight, but rain is forecast
- Drive from Aurora is 2 1/2 hours
- Mercy Flights is nearby

Goals for stabilization

- She may have significant hemorrhage
 - mechanism of injury
 - tachycardia with narrow pulse pressure
 - slightly low initial hemoglobin before resuscitation
- May need urgent surgery, BUT, needs resuscitation emergently
- Transport issues:
 - Prioritize speed but with a team that will actively resuscitate
 - Beware of claims that a local air ambulance is faster
 - Prepare blood for the team



WARNING DO NOT SMOKE WHILE OXYGEN IS IN USE

MEDICAL AIR

OXYGEN

CHILD SEATBELT... MAY ONLY BE USED WITH PATIENTS 35 POUNDS OR LESS

12 month old with ALL presents to Riverbend hospital with fever

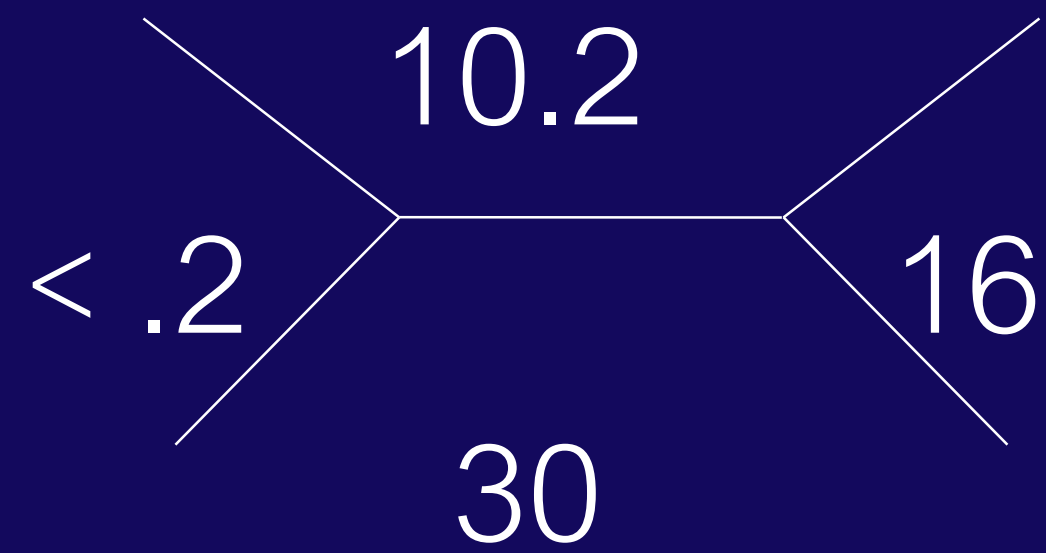
- Finished induction chemotherapy 10 days ago
- Presents with fever 39
- Has a broviac

- HR 170 BP 80/40
- RR35, unlabored, saturations 97% on RA
- Alert, fussy, pale

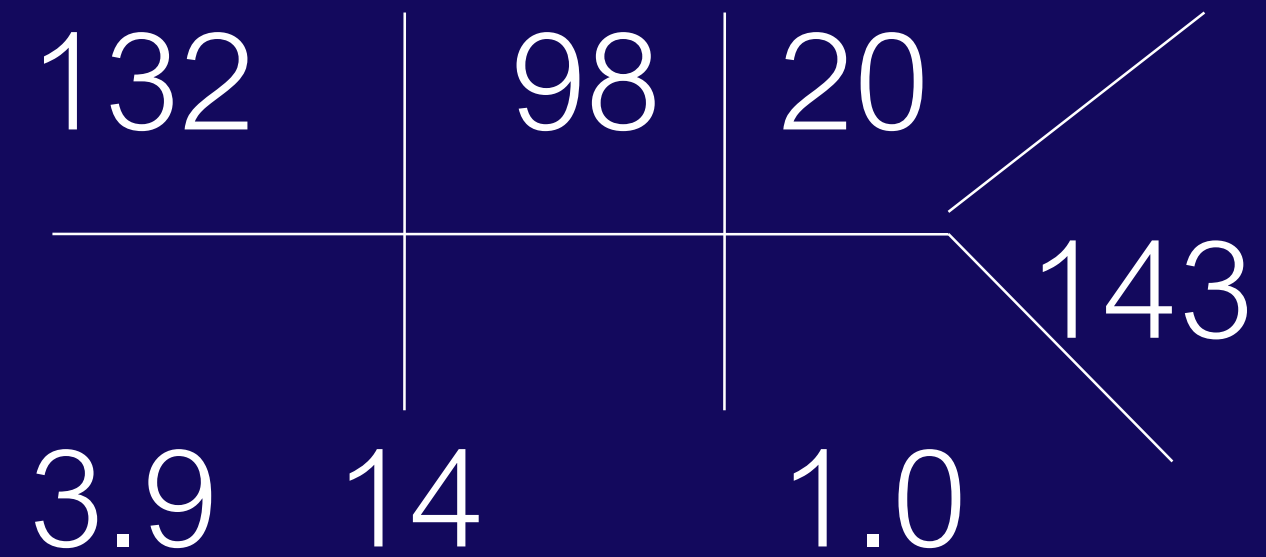
- Used the “easy button” to activated LFN before calling DCH

LABS

CBC



Electrolytes



Coags

PT 18.5

PTT 76

INR 1.8

UA:

pH 7.0

Spec grav 1.017

Trace protein

No blood, LE or nitrites

$$\text{Shock index} = \frac{\text{Heart rate}}{\text{Systolic BP}}$$



$\frac{\text{HR}195}{\text{BP } 126/60}$

SI=1.5



~~$\frac{\text{HR}195}{\text{BP } 60/30}$~~

SI=3.2

Goals for stabilization

- This child is likely to decompensate after antibiotic therapy
- Frequent vitals and examine of perfusion, respiratory effort while en route
 - May need large volume fluid resuscitation
 - May need additional access
 - May develop respiratory compromise quickly
- Transport by PANDA could be lifesaving

...But now our helicopter has left

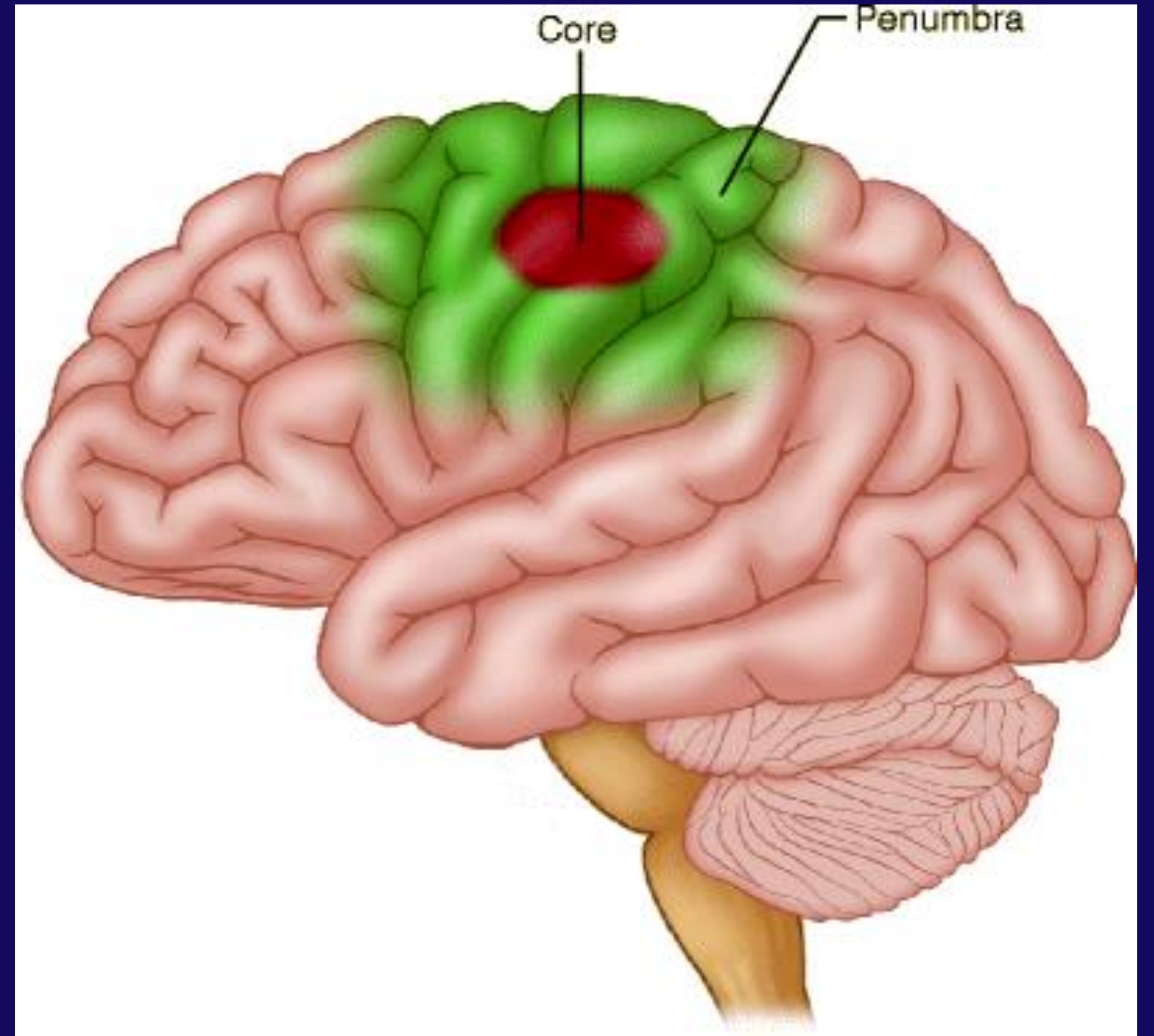
responsive by parents presented to N. Linc

15 m/o unresponsive in Lincoln City: initial call 4:04 pm:

- Distraught parents aren't giving any information
- No obvious bruises
- HR 60, SBP 130
- Pupils R4 mm L2 mm,
- respiratory effort seems normal, gag is present
- posturing to painful stimulus
- Intubated with 4.0 uncured ETT with air leak
 - saturation 86 % with hand ventilation

Goals for stabilization

- Rapid transport to get to neurosurgical intervention to evacuate blood and give the brain room to swell
- Minimize secondary injury to salvageable brain tissue
- Hypotension, hypoxia, hypercarbia will cause secondary injury

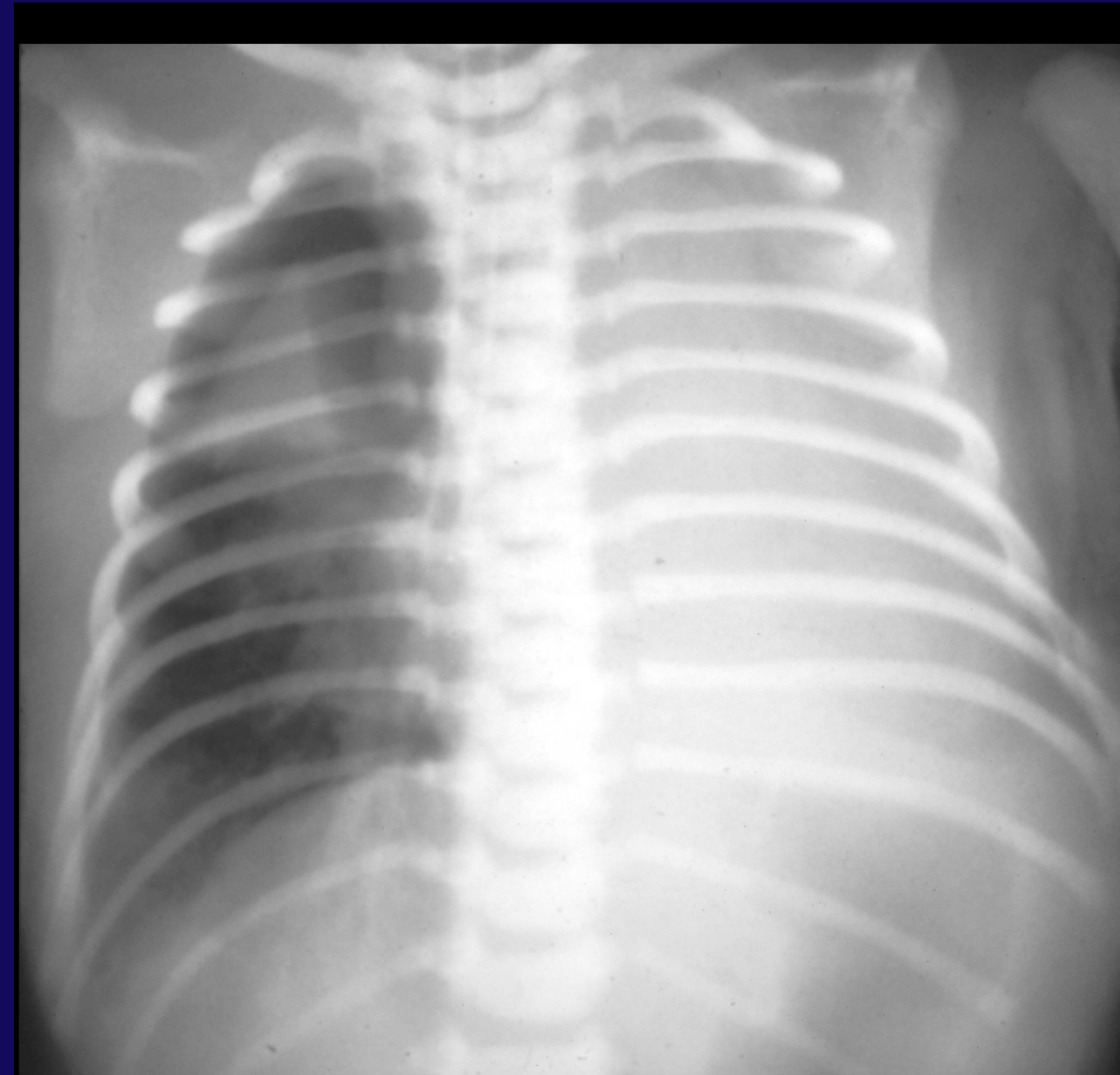


15 m/o unresponsive in Lincoln City: connect with PICU 4:09

- PICU MD recommends
 - Chest x-ray, Consider cuffed ETT hyperventilation aiming for ETCO₂ 32-35
 - Treat for high ICP with 3% saline
 - CT scan is desirable, but do not delay transfer
- Transport considerations
 - Checking weather for rotor travel from Aurora
 - Nearest fixed wing is in the Dalles, will arrive to pick up panda in 90 min
 - Should we start driving?

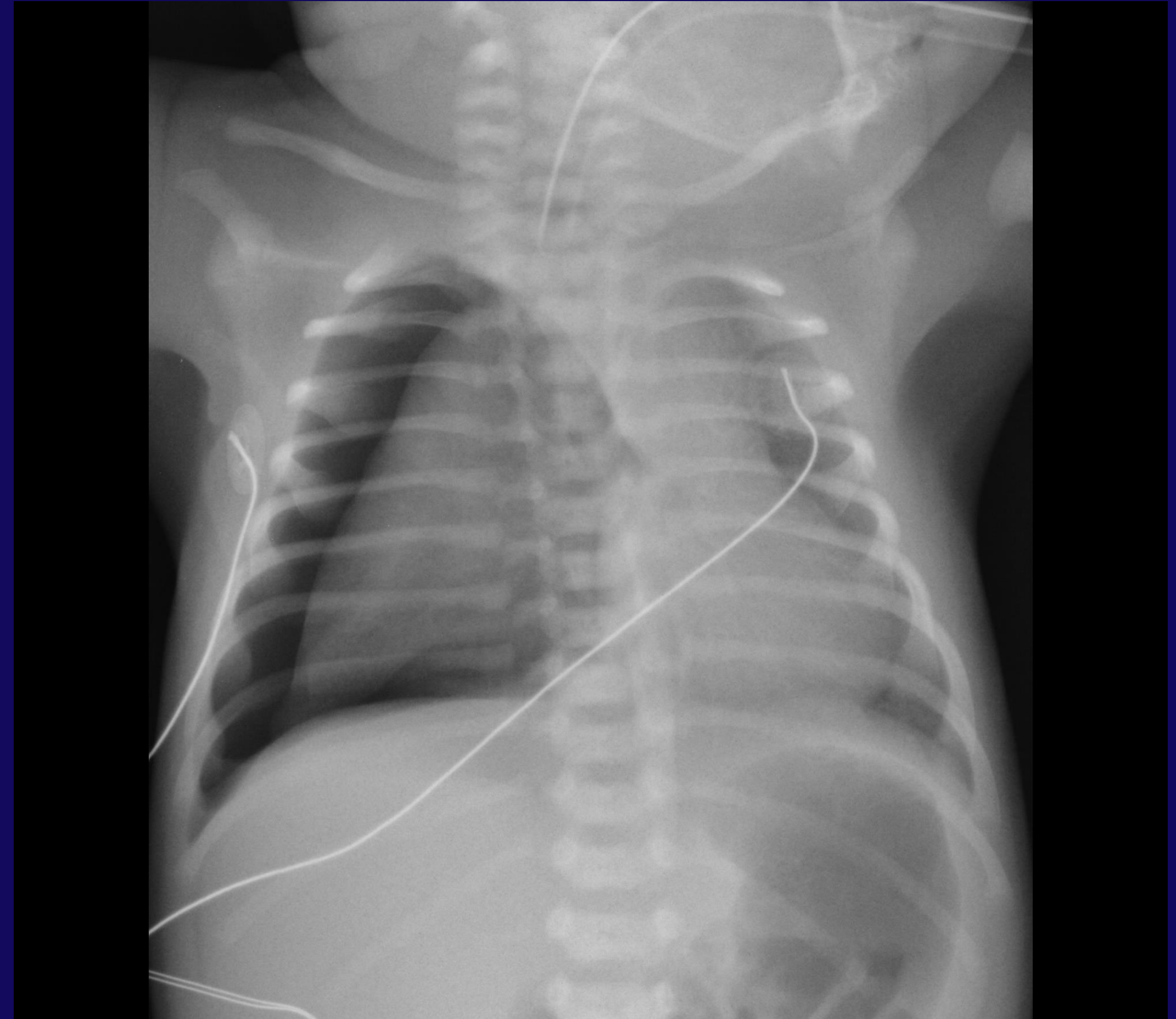
15 m/o unresponsive in Lincoln City: callback at 4:21

- CXR shows right mainstem intubation and right pneumothorax
 - Needled chest with 14 gauge angiocath, air evacuated, saturations improving
- Secondary survey shows bruising on chest, flank
- Transport considerations:
 - Still waiting on weather check from Aurora
 - Referring plans to use LFN and anticipate their arrival at 4:50
 - PANDA stands down



15 m/o unresponsive in Lincoln City: callback at 4:50 pm

- Still unresponsive, pupils 2-3 mm and reactive,
- Still hypoxic, ETT replaced with 4.5 cuffed ETT
- PICU MD recommends
 - Need to resolve tension pneumo before rotor transport
 - Options for treating draining air, troubleshooting ways to hook to suction
 - Discussed vent settings
- Transport plan: LFN unable to land, flying to Grande Ronde with plan to drive to Lincoln City

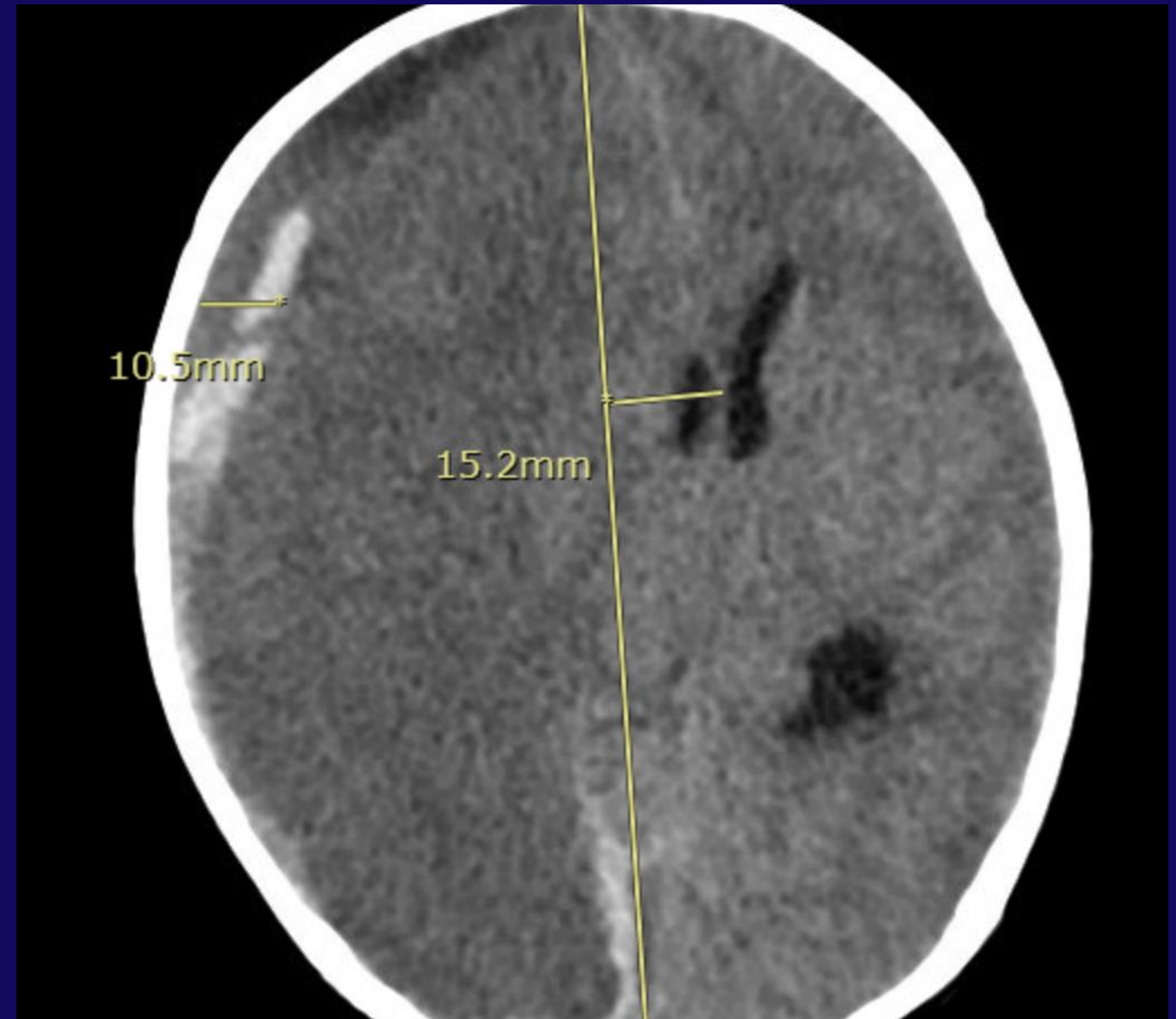


15 m/o unresponsive in Lincoln City: callback at 5:28

- Cordis placed in pleural space and connected to suction
- Saturation 100% ETCO2 35
- LFN expected imminently
- Plan to get CT scan to help prepare OHSU response

15 m/o unresponsive in Lincoln City: Callback at 6:10 pm

- CT scan shows old and new subdural with 15 mm midline shift and edema with loss of grey-white differentiation
- Additional 3% given
- Parents appraised of poor prognosis
- Neurosurgery preparing OR at DCH



15 m/o unresponsive in Lincoln City:

LFN arrives at 6:17

LFN departs at 6:27

15 m/o unresponsive in Lincoln City: callback at 6:54 pm

- LFN calls en route to grande ronde casino by ground
- Discussion is difficult due to reception and wind
 - Report both pupils “blown” since shortly after leaving left N Lincoln hospital
- Question should we give additional 3% or increase respiratory rate
 - Vent rate 45, but still not meeting ETCO₂ targets
- Vent settings discussed, tidal volume 20 mL total
- Liftoff 7:06 pm

Arrival at DCH helipad 17:25

- Neurosurgery and trauma team meets them on the helipad
- OR is prepared and standing by
- Pupils have been fixed and dilated for 1 hour
- Decision is made not to offer surgery
- Child expires in the ICU at 8:05 pm

Criteria for using panda:

Its not always clear!

- Prioritize rapid transport for cases where immediate surgical intervention will be lifesaving BUT
- Remember that interfaculty transport ALWAYS occurs while the acute illness is rapidly evolving
- Shock resuscitation and maintenance of good oxygenation and ventilation have a greater impact on outcome than time to OR in most cases
- There are many variables and many unknowns

Take away points

- The decision for how to transport is very complex
- Using a local service is not always best or fastest, even when speed is critical
- Nobody knows the system like the panda team members—trust them to make the best decision

