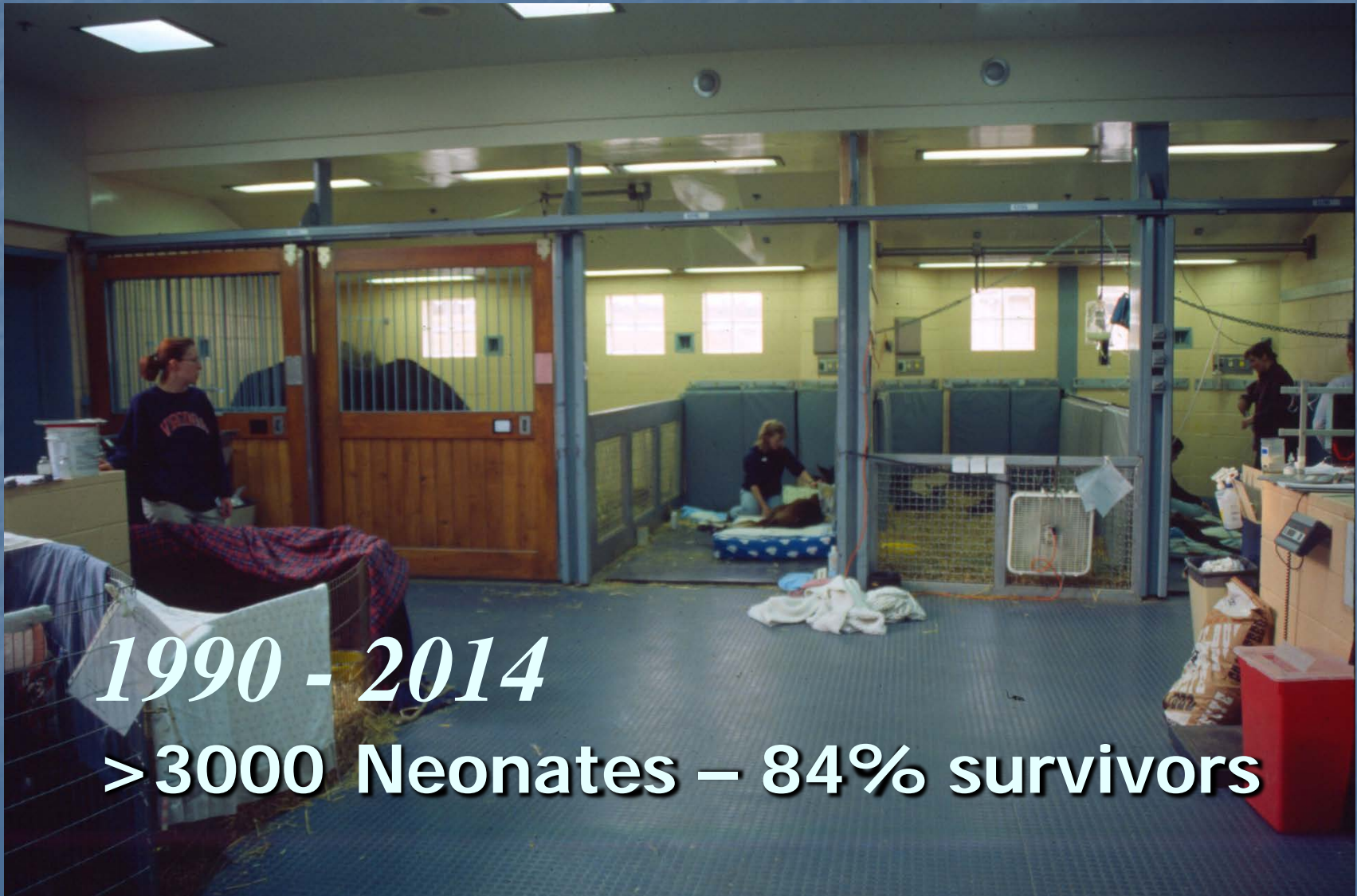


Neonatal Intensive Care

Nursing

Jon Palmer, VMD, DACVIM
Chief, Neonatal Intensive Care Service
Director of Neonatal/Perinatal Programs
New Bolton Center, University of Pennsylvania

Graham French Neonatal Section Connelly Intensive Care Unit



1990 - 2014

> 3000 Neonates – 84% survivors









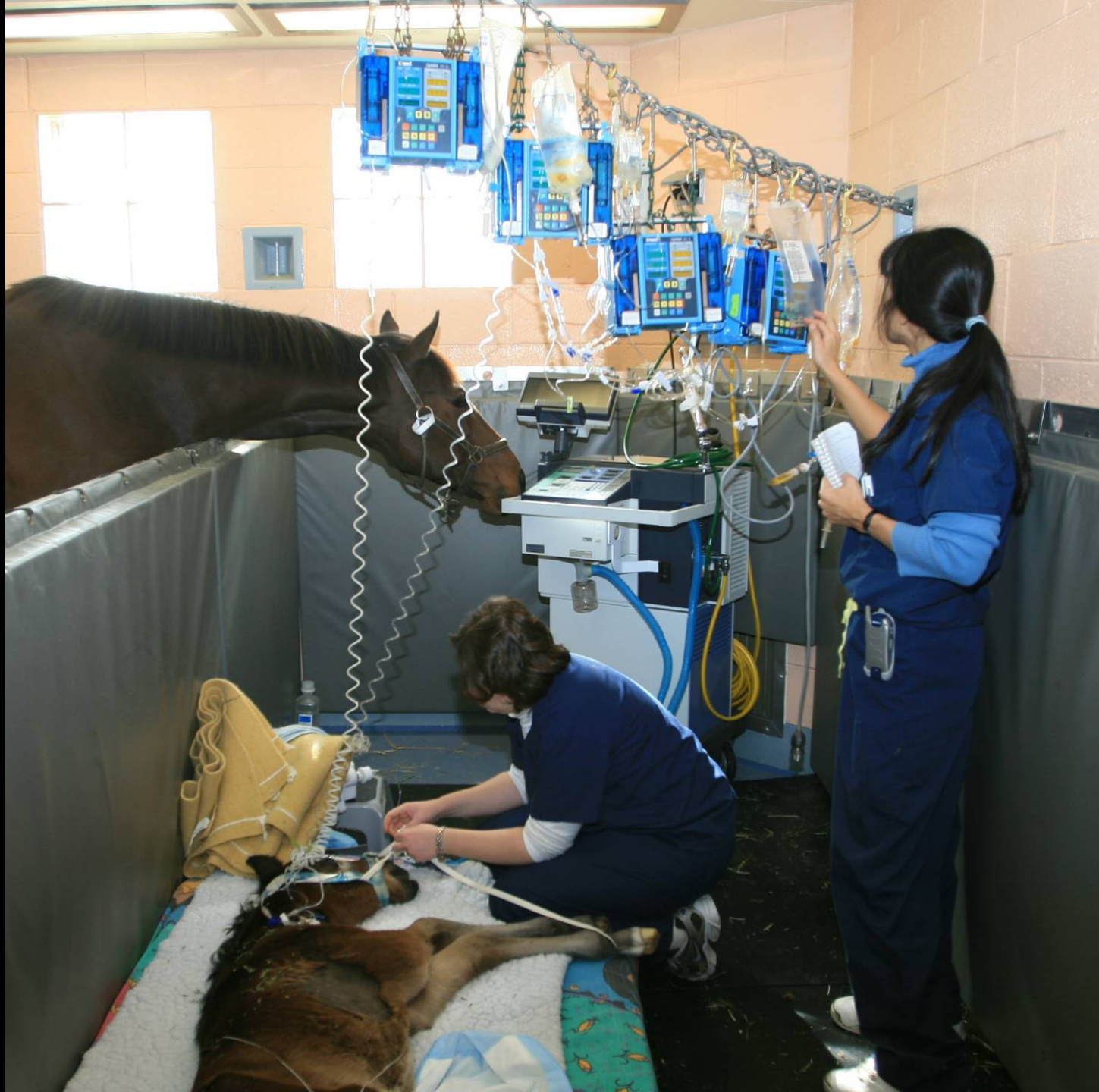












Therapy?

Evidence Based

Traditions

Beliefs

Experience Based

Intensive Care Nursing

- Managing the recumbent Foal
- Neurologic behavioral challenges
- Vascular Access
- Urinary catheterization
- Enteral nutrition
- Respiratory support
- Blood pressure measurement
- Thermal management
- High Risk Pregnancies/dystocia
- Secondary behavioral problems

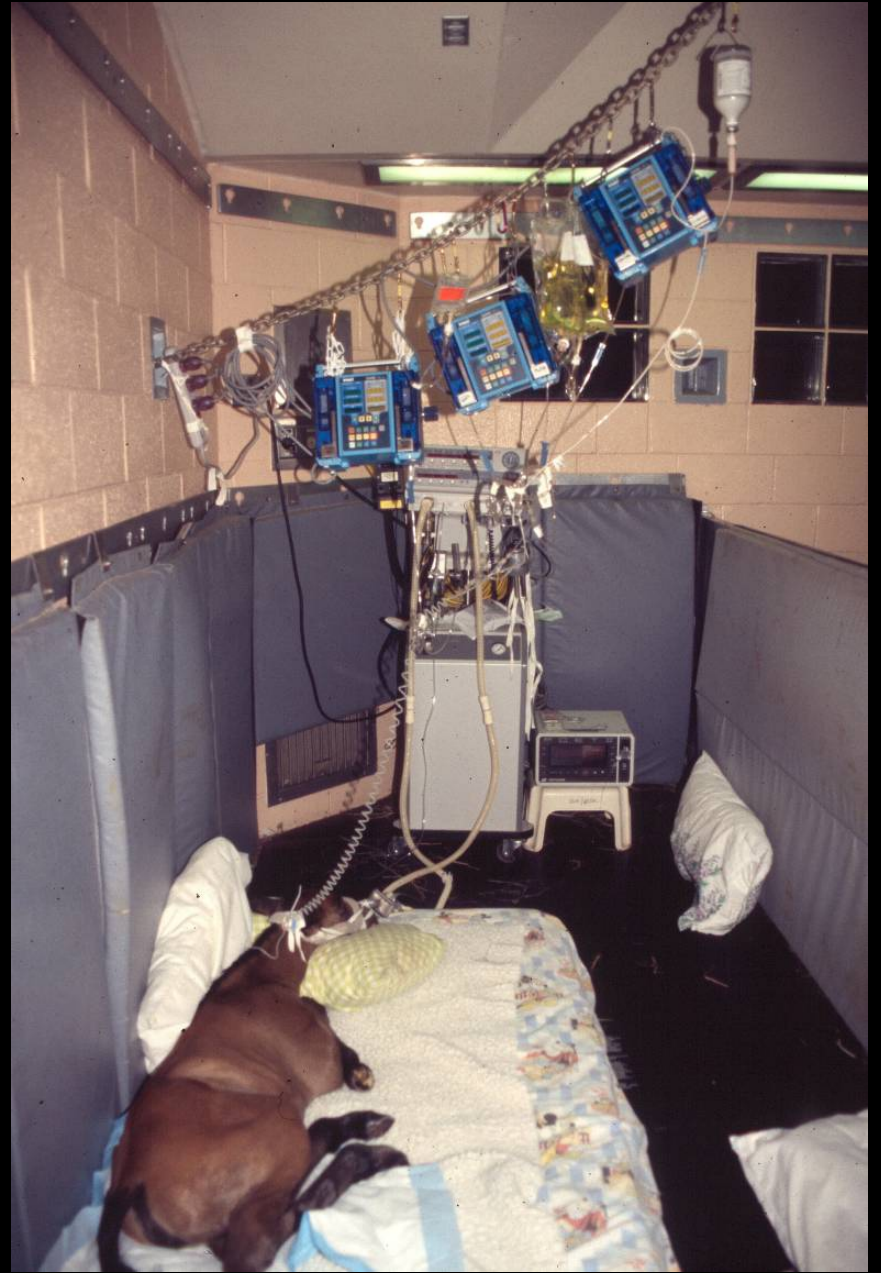
Managing the Recumbent Foal

- Routine
 - Mattress baby
 - Stand/turn q2h
 - Assist to stand
 - Keeping dry
 - Dry bedding, Fleece
 - Diapers, catch urine
 - Supervision
- Exceptions

































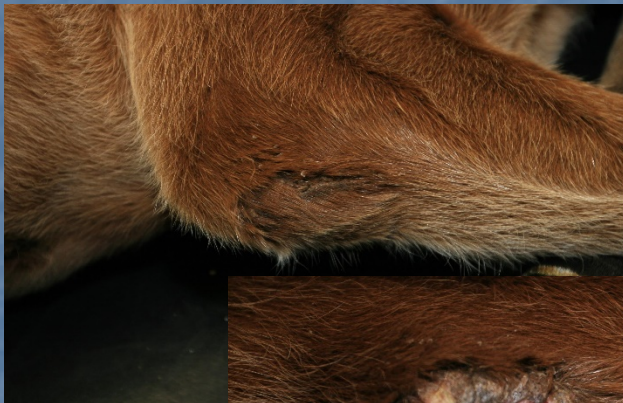


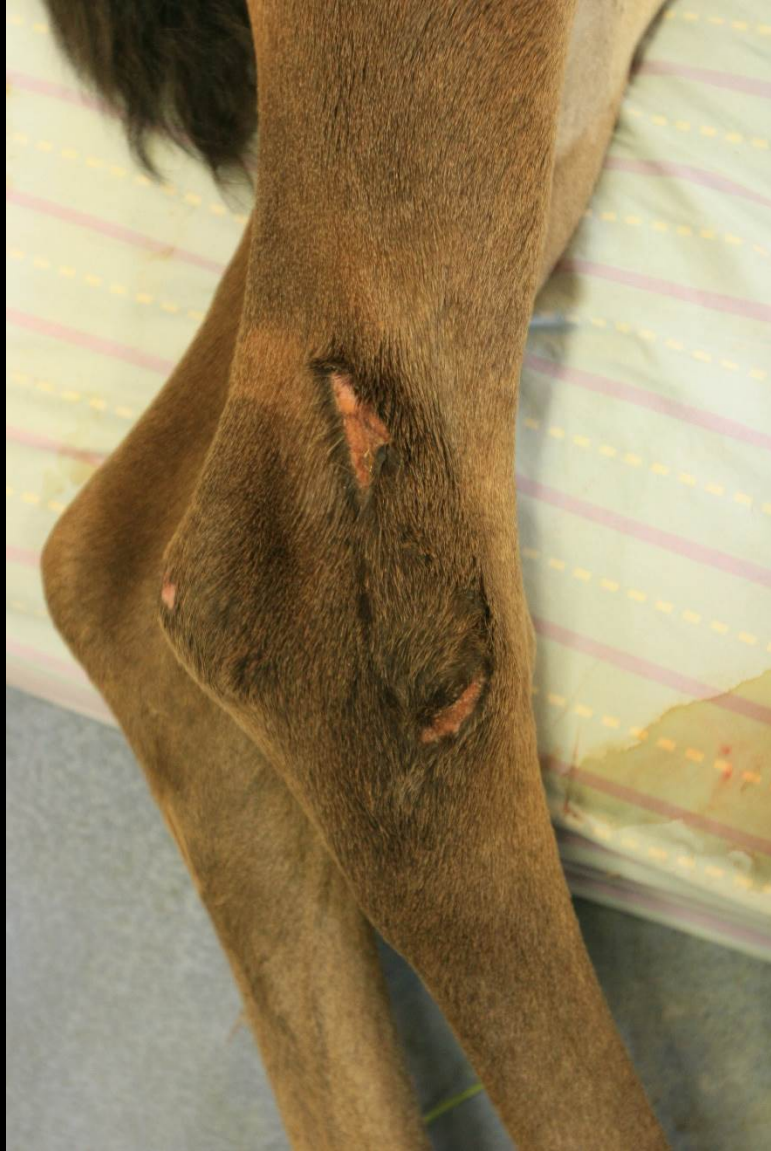




Decubital sores/LDN

- Very important to keep foal clean and dry,
- Dry and powder mattress foals immediately after urination
- Still develop LDN lesions, due to sepsis
- Clean area and apply sucralfate paste









Neonatal Encephalopathy

- Neurologic signs
 - Strength
 - Muscle tone
 - Responsiveness
 - Level of arousal
 - Behavior
 - Respiratory patterns
 - Seizures
 - Abnormal vocalization



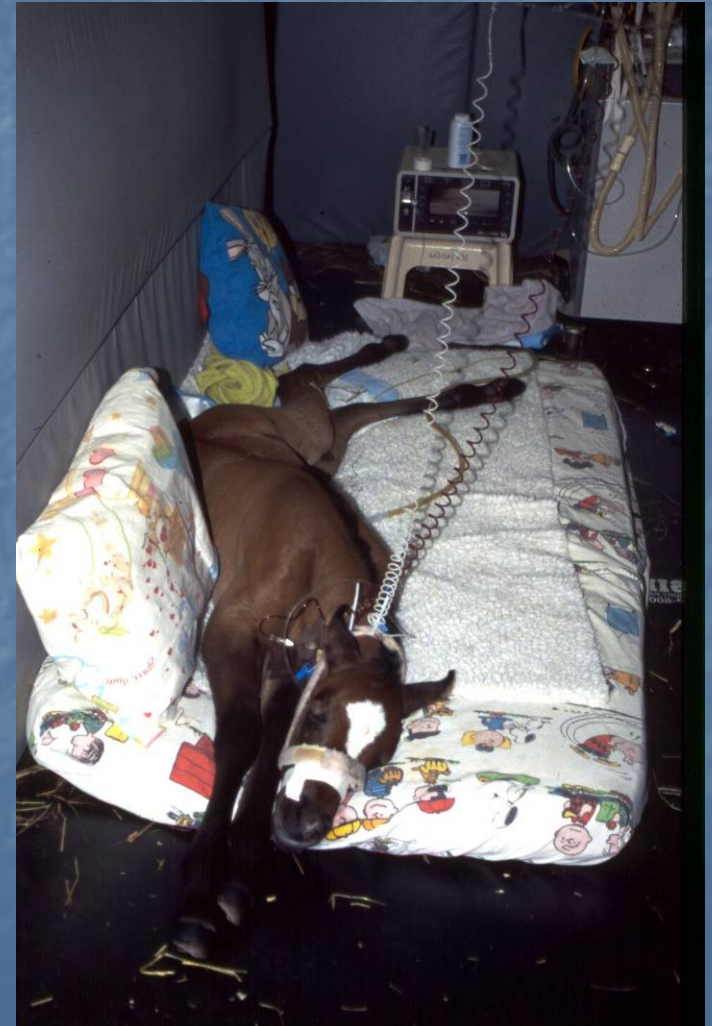
Changes in responsiveness



Changes in muscle tone



Changes in muscle tone



Changes in behavior



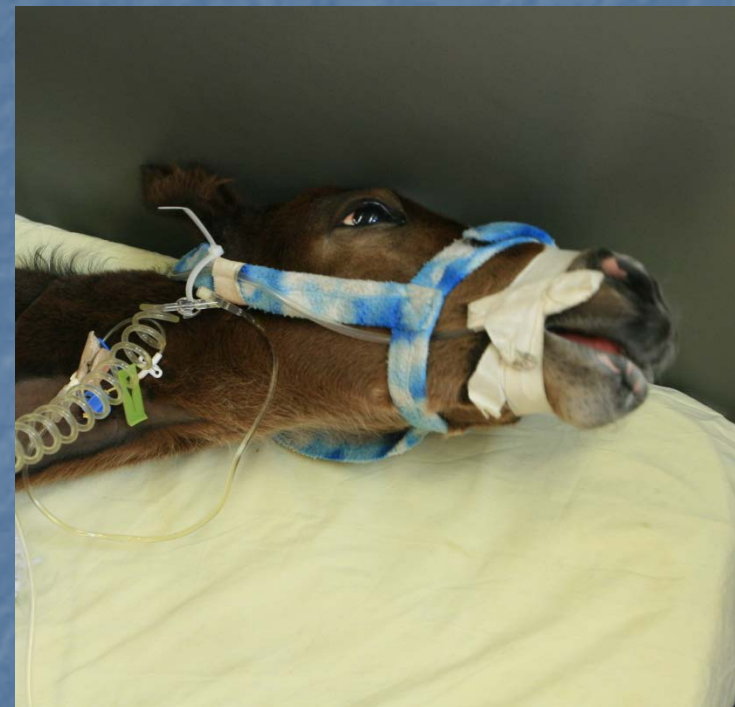




Brain stem damage



Seizure-like behavior



Seizure Control

- Phenobarbital
 - Hypothermia
 - Hypercapnia
 - Hypotension
 - Infused over 15-20 min
 - Half-life of >200 hrs
- Phenytoin
- Others
 - Diazepam
 - Midazolam



Vascular Access

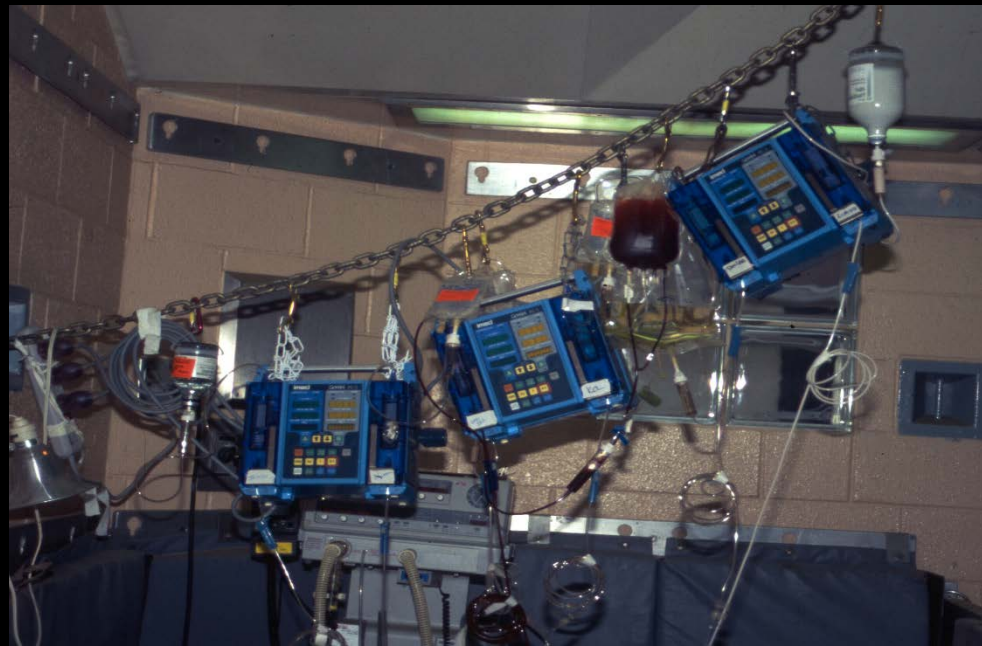
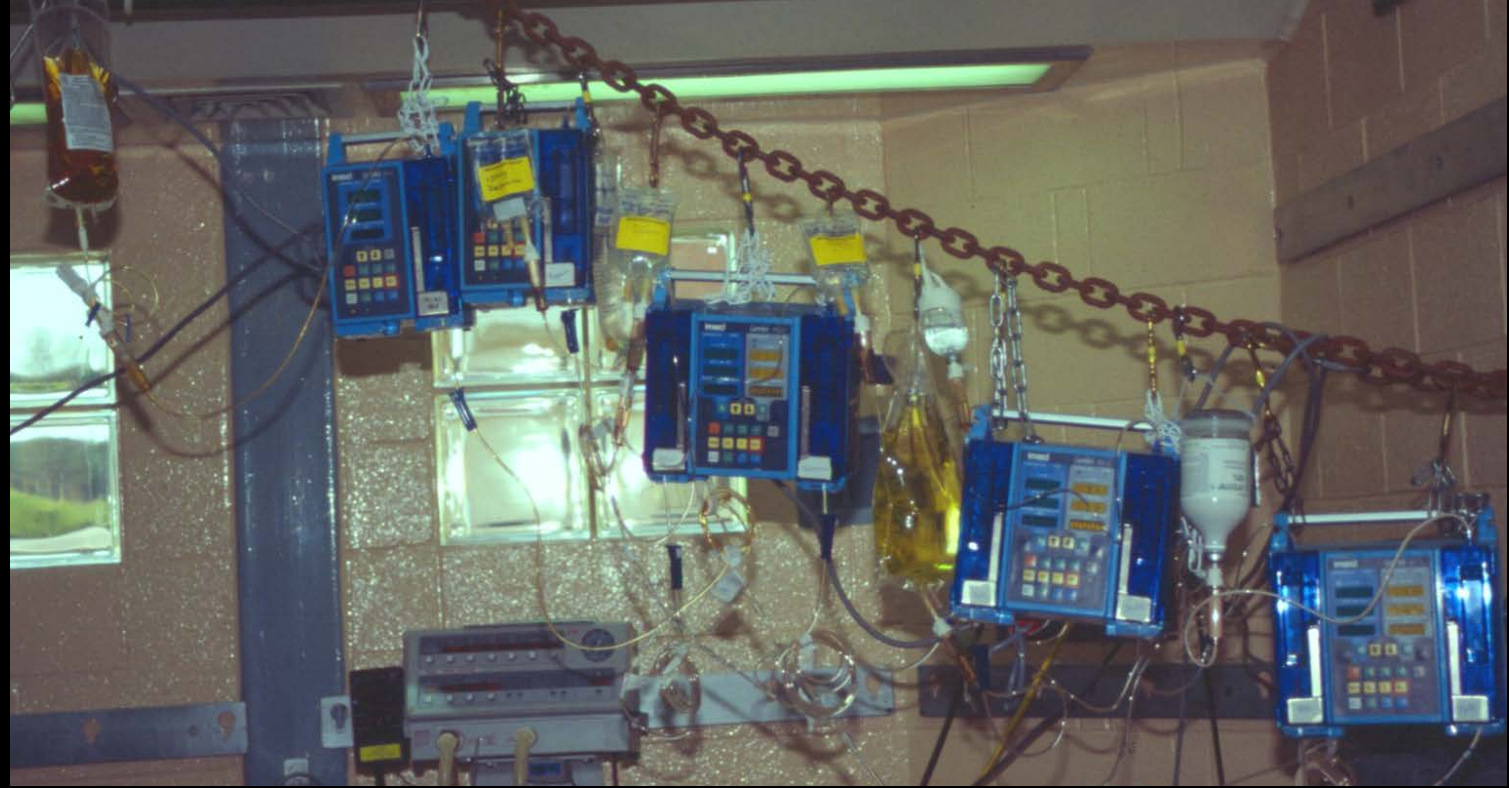
- Jugular Catheter
 - Long term catheters
 - Placement – masks, gloves
 - Catheter care – blood draws
 - Monitoring
 - Replacement
- Other veins, catheters
- Emergency access
 - Intraosseous route (IO)





Intravenous Fluid Pumps







Urinary Catheters

- Folly catheter
- Reasons
- Dangers
- Closed collection
 - Uses
 - I/Os
 - Clearances - saving 1%
 - Handling
 - Changing bag
- Open catheter



Securing The Catheter







Nutrition

- Nutritional support is vital for success
- Enteral nutrition - if possible
 - Lack of full function of GI tract
 - Attempt at least trophic feeding
- Parenteral nutrition
 - Bridge nutritional gap as GI tract function improves
 - Partial parenteral nutrition
- Concept of permissive undernutrition
 - Limit caloric intake
 - 10-12% body weight
 - Goal is modest weight gain



Oral Nutrition



Oral Nutrition

What should be fed?



Indwelling Enteral Feeding Tube







Aspiration Pneumonia

Dysphagia

- Milk regurgitation from the nares
 - Cleft palate
 - Very rare cause of milk at nares
 - Dysphagia
 - Esophageal dysmotility



Dysphagia No Aspiration

- Esophageal dysmotility
 - Failure to clear the cervical esophagus
 - Appear to nurse normally and effectively
 - Lower their head
 - Sneeze or shake head
 - Milk flow from one or both nostrils
 - Few drops to 60 ml
 - Delay of up to 5 minutes



Dysphagia *No Aspiration*

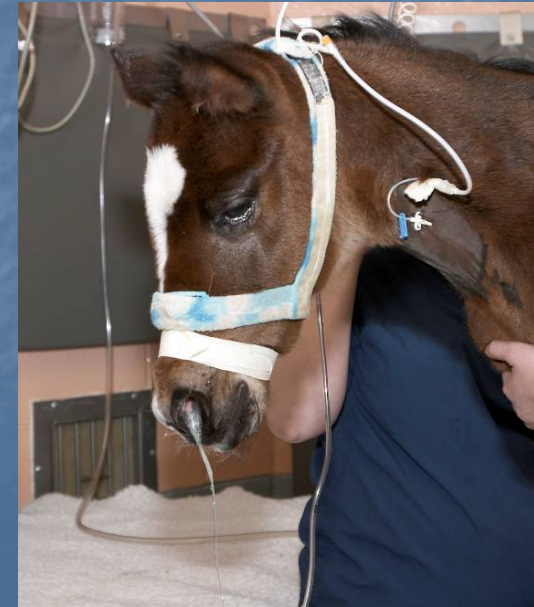
- Esophageal dysmotility
 - Transient problem
 - Once to several days
 - Etiology?
 - Neonatal Encephalopathy
 - Esophageal dysmotility
 - Aspiration rare
 - Swallowing normal
 - Guard airway
 - Most common reason
 - For milk coming from the nostril



Aspiration Pneumonia

Dysphagia

- Congenital esophageal stricture
 - Megaesophagus
 - More danger of aspiration
- Dysphagia secondary to pharyngeal paresis
 - Degree of dysfunction variable
 - Upper airway obstruction
 - With or without dysphagia
 - Mild dysphagia – milk out nose
 - Severe dysphagia – milk aspirated
 - Most severe - aspirate saliva
 - Duration variable days to months
 - Therapy – feeding management



Aspiration Pneumonia

Dysphagia

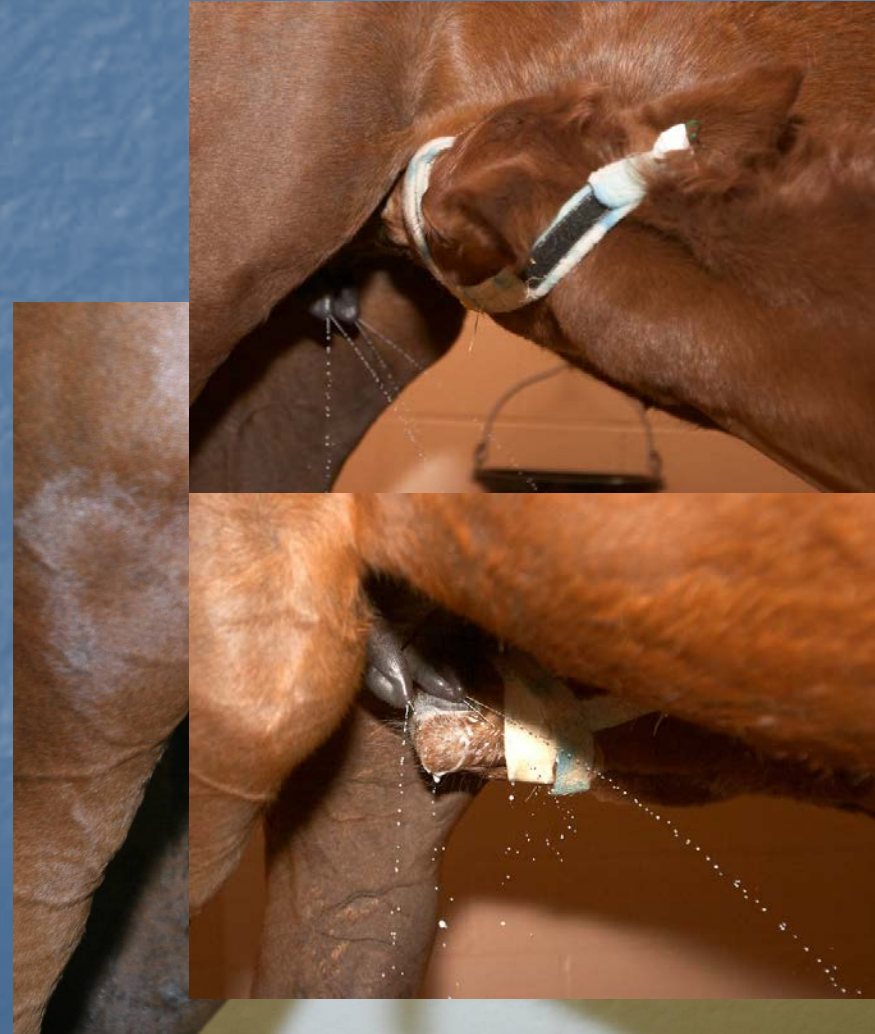
- Other reasons - older foal
 - Botulism
 - Choke
 - Primary oral candidiasis
 - Strangles

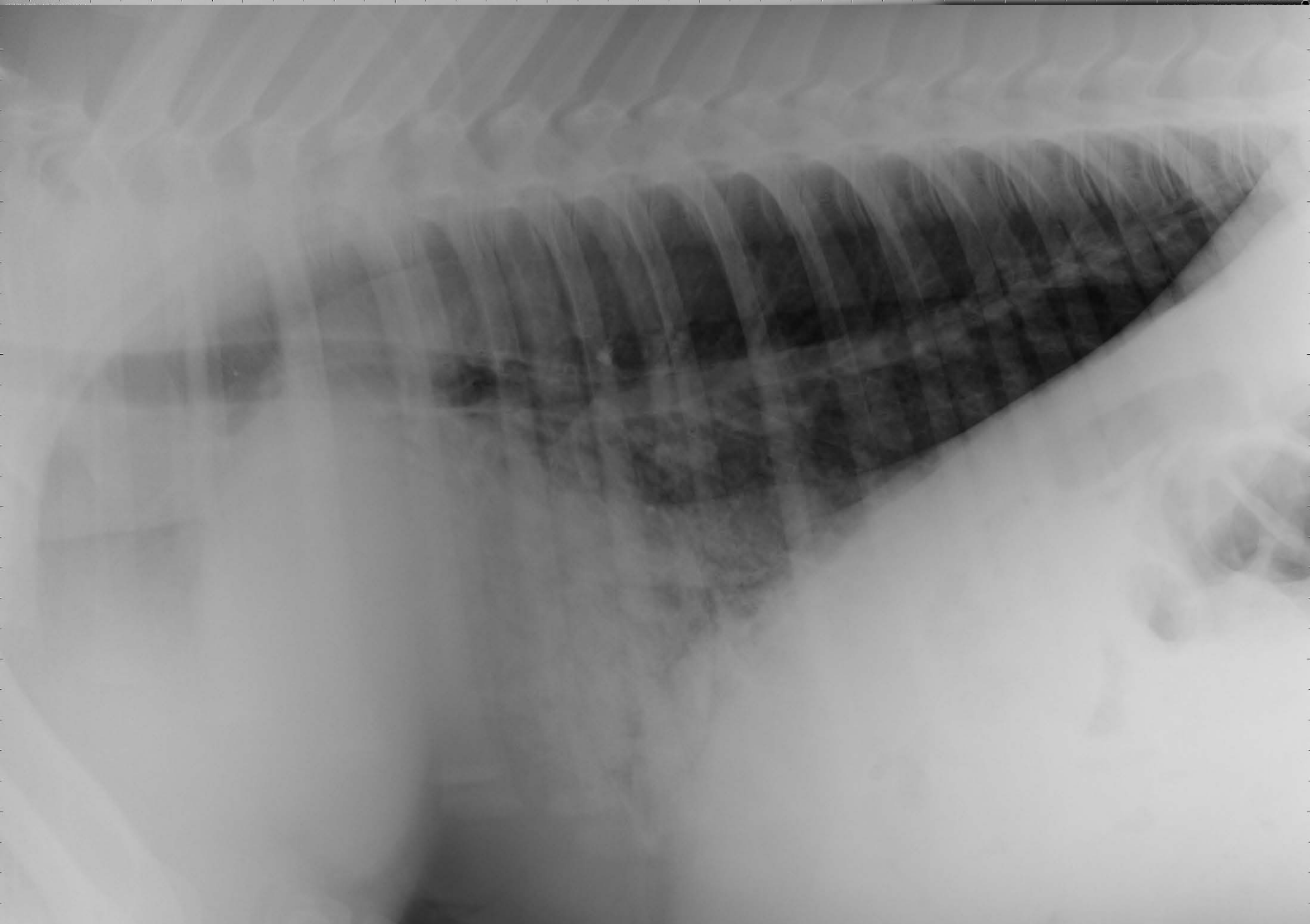


Aspiration Pneumonia

Normal Pharyngeal Function

- Weak foals
 - Neonatal Encephalopathy
 - Poorly coordinated swallowing
 - Prematurity
 - Fatigue
 - Heavily producing mares
- Musculoskeletal problems
 - Contracture
 - Laxity
- Fractured ribs
- Tachypnea
- Bottle feeding
 - Weak foals
 - Inexperienced caregivers





DR. PALMER
SID: 1924 IMAGE: 4
THORAX LATERAL 200 lbs FOAL #2CAUD-DORS
EQ WAFNBLOOD



Respiratory Support

Intranasal Oxygen Insufflation

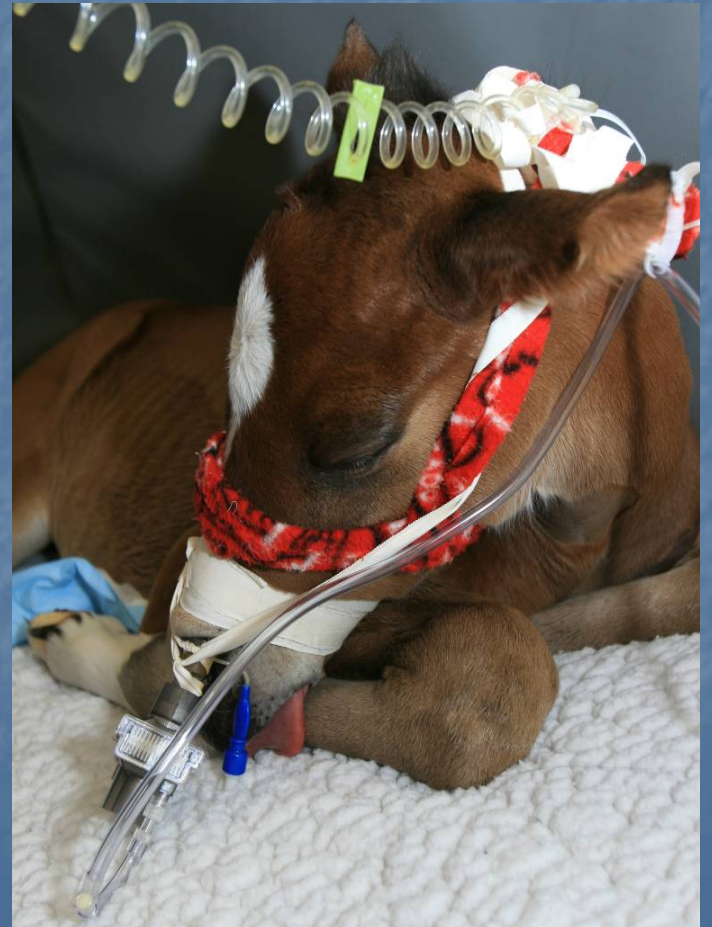




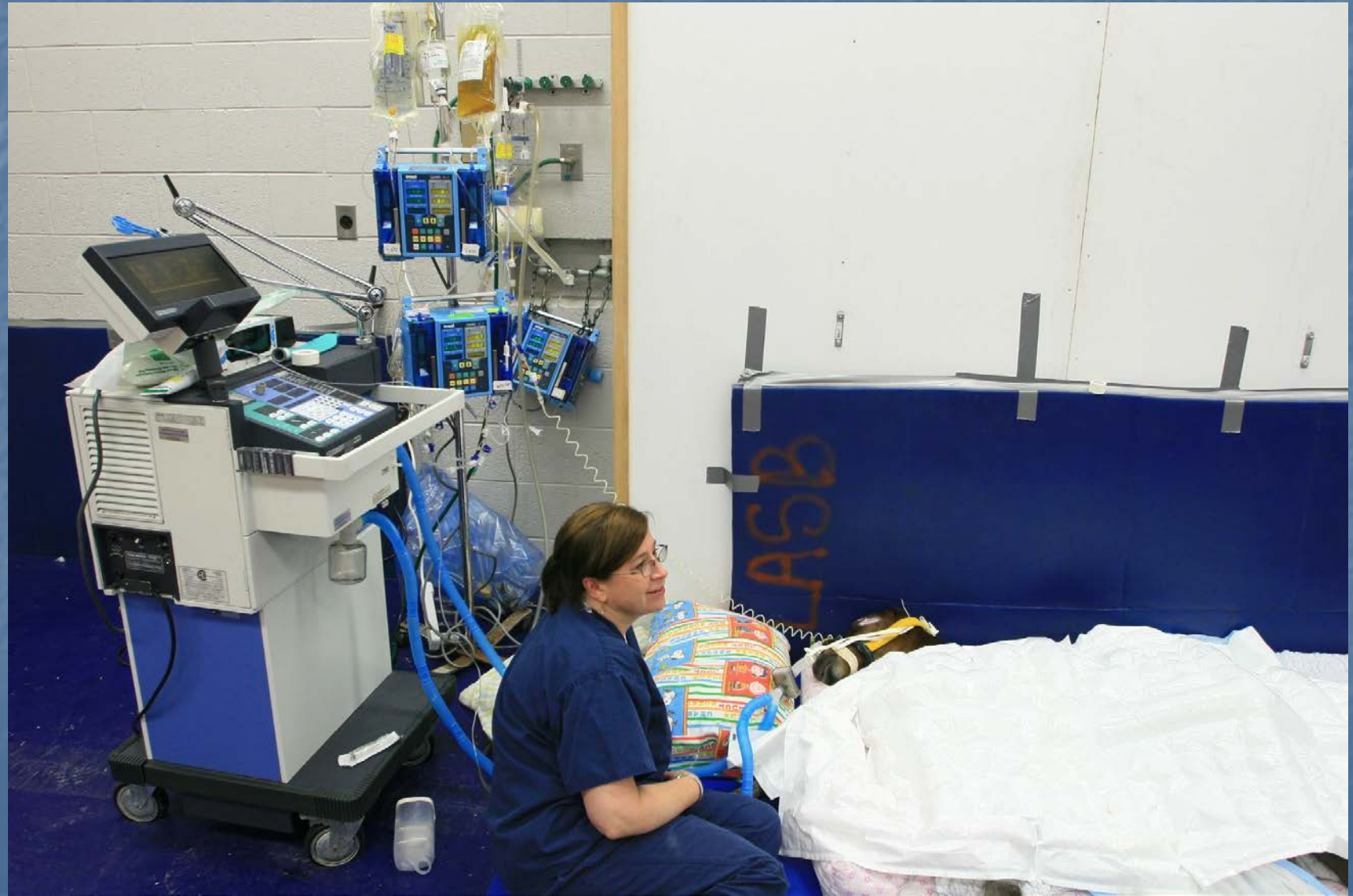




Pharyngeal Collapse



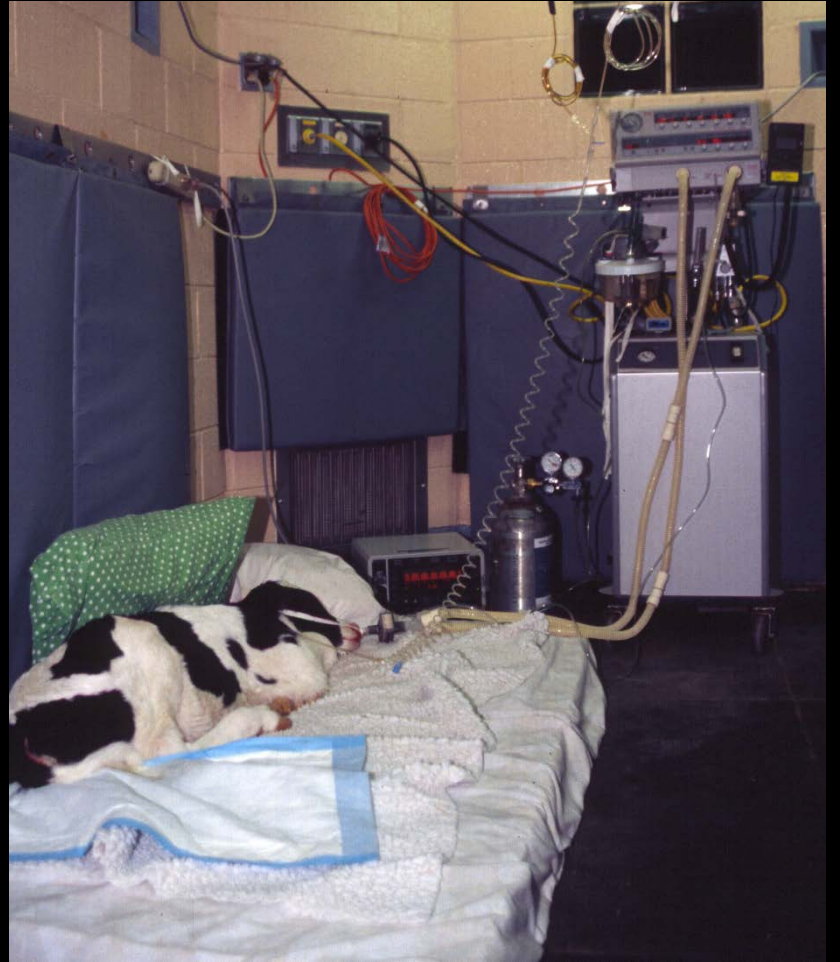
Ventilation











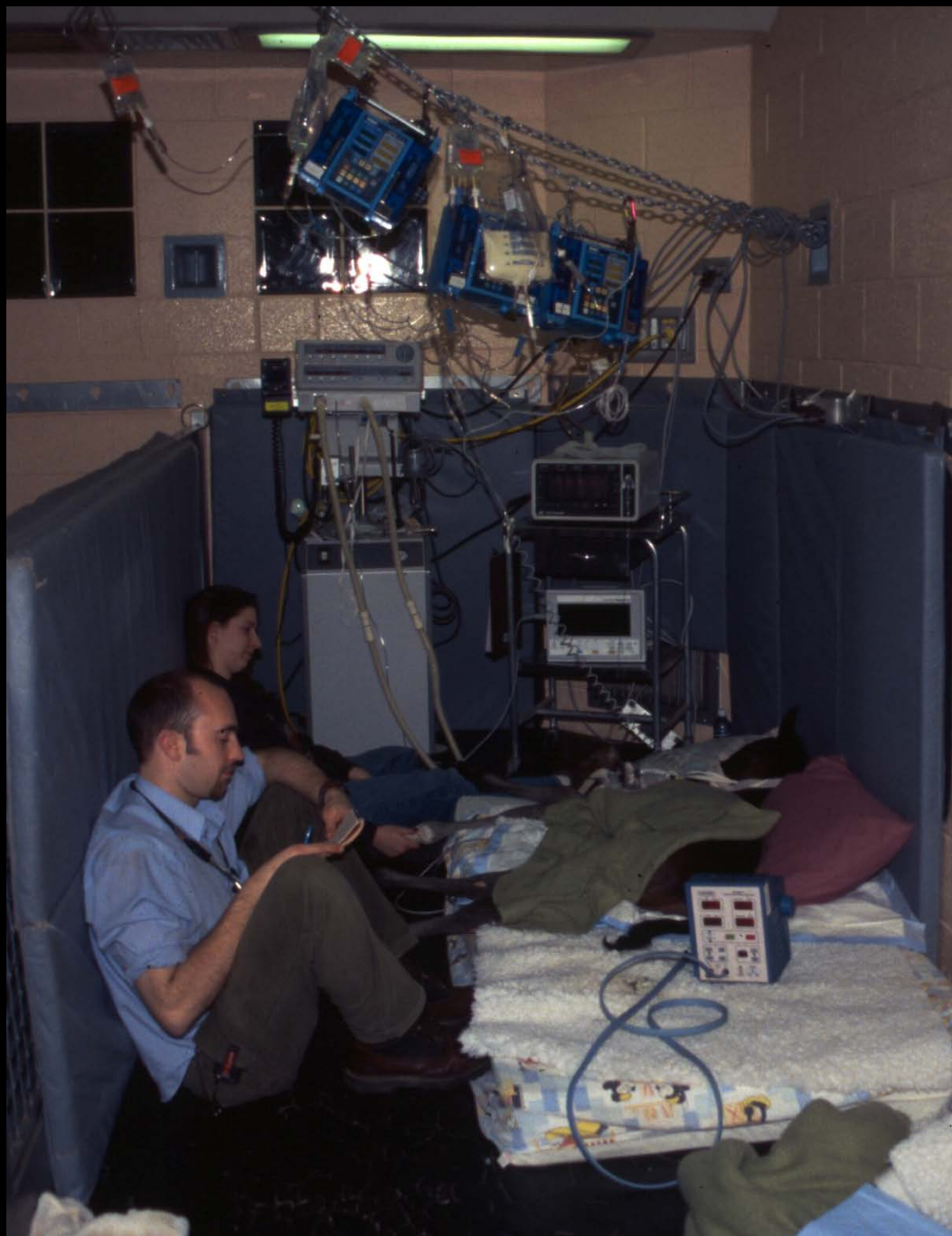


Blood Pressure

- Blood pressure monitor
- Cuff
- Heart rate vs monitor's heart rate
- Series of 3 reading
- Results recorded on BP flow sheet
 - 65/35 (44) 90







Thermal Management

- Thermogenesis
 - Successful resuscitation
- Active warming
 - Contraindicated early
 - Hot air blanket








High Risk Pregnancy







Stage II Labor

- 
- A dark brown horse is shown in profile, standing in a stall. The stall floor is covered with a thick layer of yellow straw. The horse's body is tensed, and its tail is slightly raised. In the background, there is a white brick wall with a window featuring vertical metal bars. The horse is wearing a dark halter with a red tag.
- Begins when water breaks
 - Forceful uterine contractions
 - Abdominal push

Stage II Labor

- Passage of fetus through birth canal
- Should last less than 30 minutes
- Foal covered by translucent amnion
 - If it's a "red bag" assist delivery without delay



It's a Foal!

What to Expect at Birth



Tongue may seem swollen/blue
Heart rate accelerating
May not breath for 1-2 minutes
If not breathing – stimulate
Should be moving
Should have good body tone

Signs of Trouble at Birth



If heart rate is falling – trouble

If not breathing after 2 – 3 minutes

If not getting sternal within minutes

Birth







Dystocia



Dystocia Team



Dystocia Team



Dystocia Team



Dystocia Team





Dystocia Team



EXIT Procedures

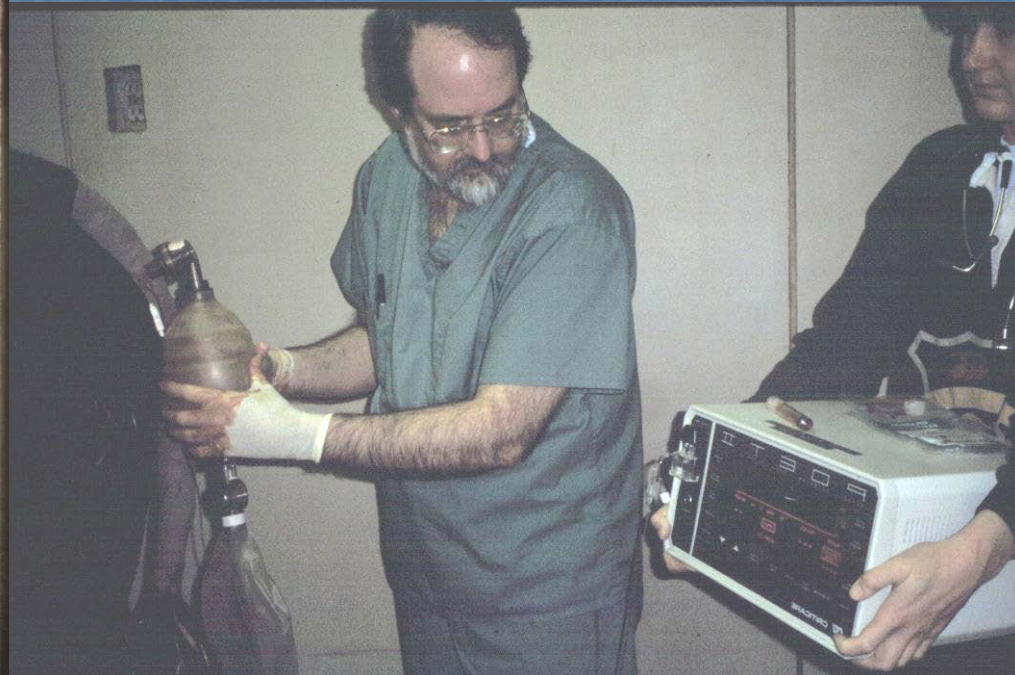


Ex-utero

Intrapartum

Treatment

- Resuscitation during parturition
- Oxygen therapy for the mare
- Fetal ECG
- Cannula in all cases
- Intubate if nose is available
- Resuscitation during parturition
- If can, then the pressure is off
- Use cannograph
- Can make the difference
- Expect initial poor lung perfusion
- No going back





Dystocia Team



Secondary Behavioral Problems







Our patients will grow-up









