Bovine Respiratory Disease Complex

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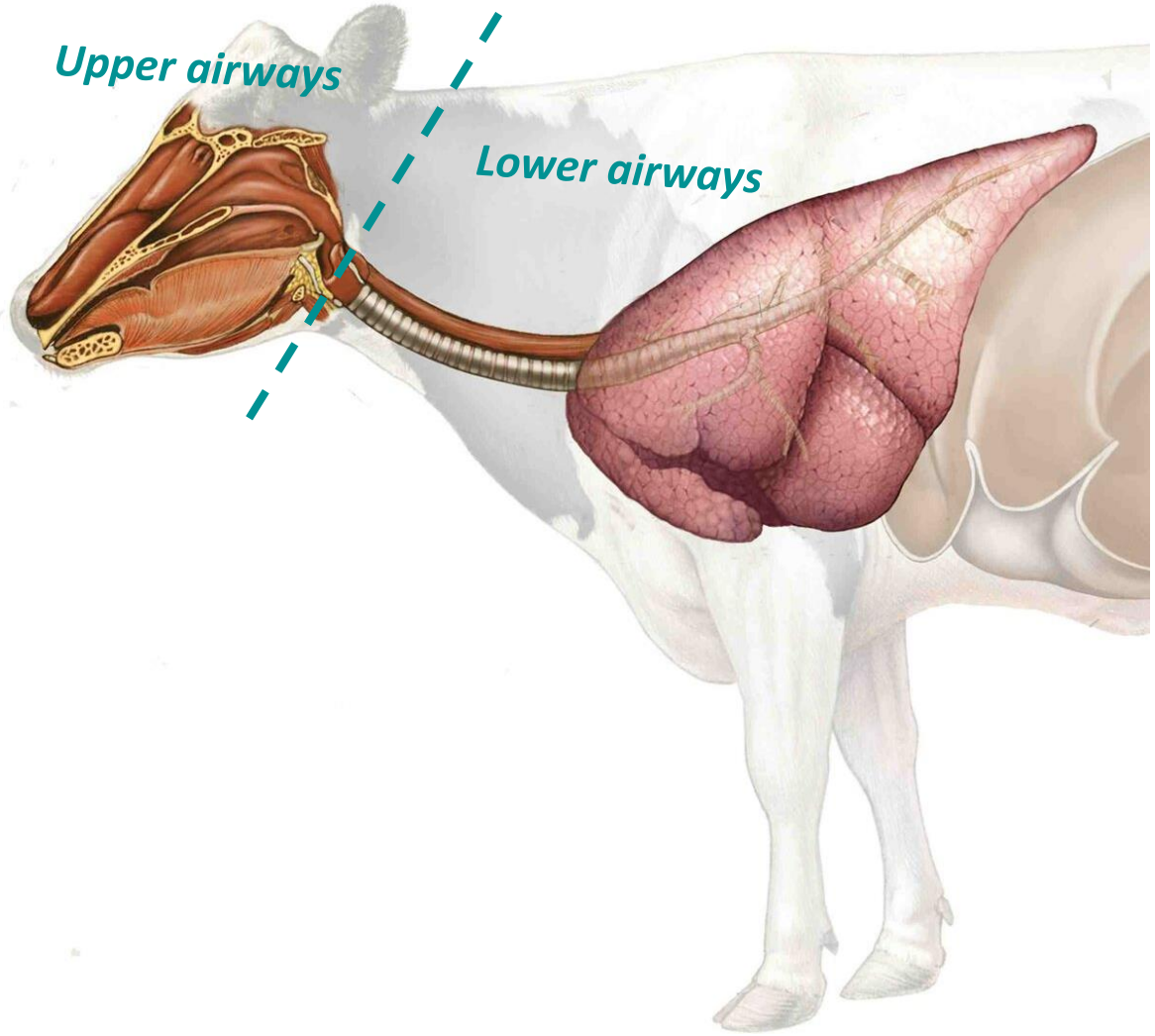
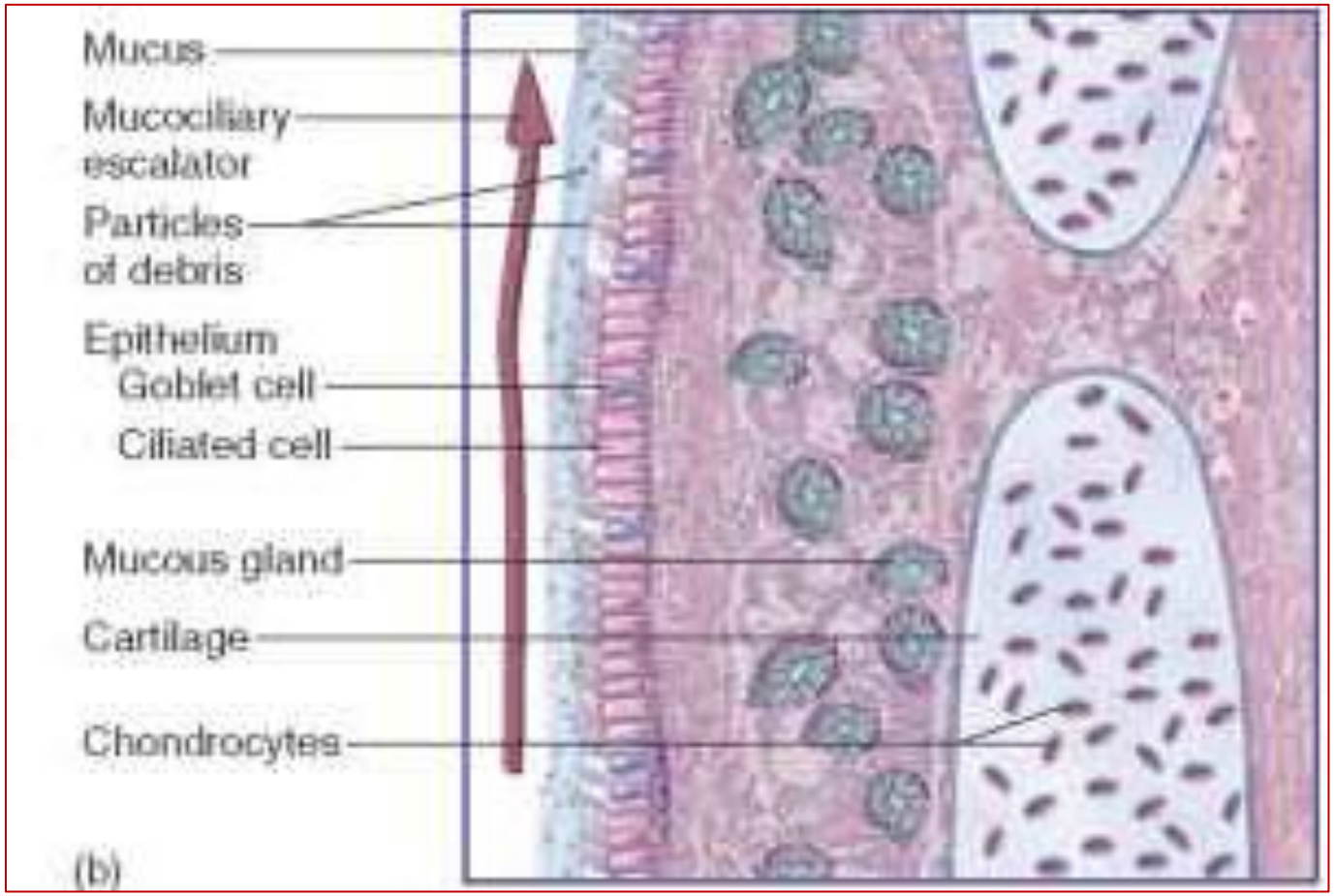
Respiratory System Anatomy

- **Upper Airways:** Nasal Passages, Mouth, Naso- and Oro-pharynx, Upper Larynx
  non-sterile
- **Lower Airways:** Lower Larynx, Trachea, Bronchi, Bronchioles, Lungs
  sterile



Respiratory System Anatomy

- Cilia
- Mucous glands – Mucus
  - ↑ production in response to irritants, inflammation, debris
- Immune Cells (Ex. Dendritic Cells)
- Mucocilliary escalator impaired/destroyed by viruses



Graphic: www.rrnursingschool.biz

Physical Examination

- Assessment of the animal using only your senses and a few instruments (thermometer, stethoscope, palpation sleeve)
- Develop a routine and stick to it
- Set yourself up for success with the proper equipment and facilities

Tools

- Carrying pouch
- Thermometer
- Ketone strips/ BHBA meter
- Sleeves
- Stethoscope
- Chalk/paint
- Clipboard/pen

First step of a physical exam: Observe from a distance

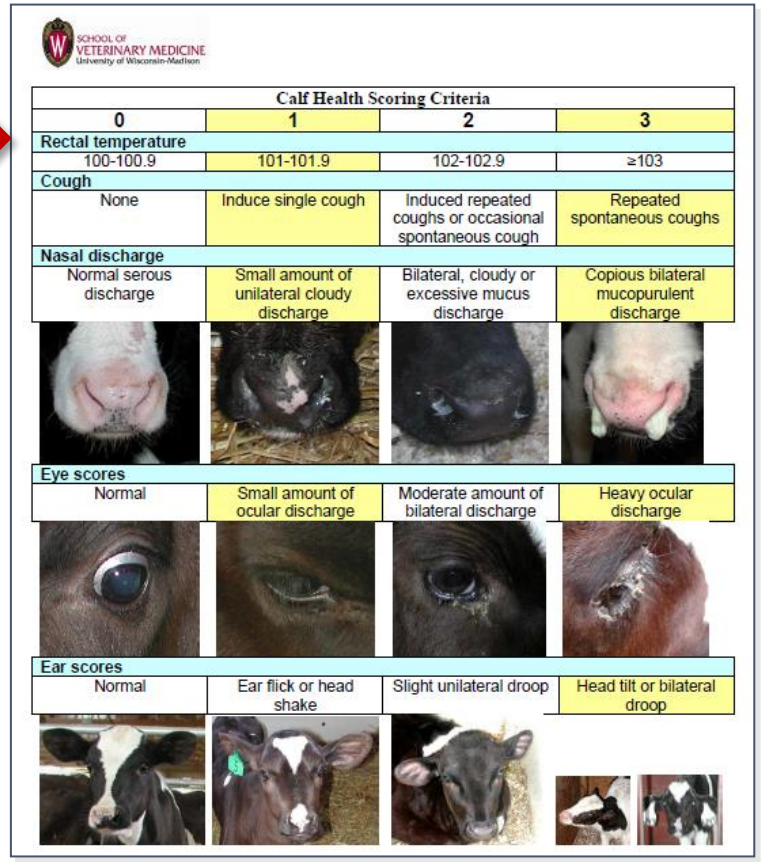
BRD Clinical Signs

- Fever
- ↑ Respiratory rate and effort
- Cough
- ↑ Nasal/Eye discharge +/- off color
- ↓ Appetite
- ↓ Milk
- Weight loss
- Confused with:
  - Other diseases with fever
  - Heat stress
  - Pain

Parameter	Normal Range*
Temperature	100.4-102.5ºF
Respiratory Rate	12-32 Breaths/Min
Heart Rate	60-84 Beats/Min

*All may be increased when heat stressed

Calf Respiratory Disease Scoring (Dr. Sheila McGuirk)



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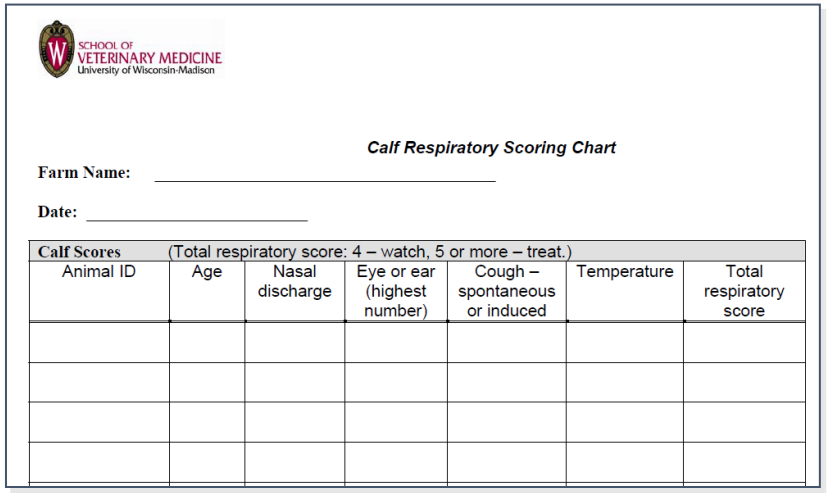
Calf Health Scoring Criteria

0	1	2	3
Rectal temperature			
100-100.9	101-101.9	102-102.9	≥103
Cough			
None	Induce single cough	Induced repeated coughs or occasional spontaneous cough	Repeated spontaneous coughs
Nasal discharge			
Normal serous discharge	Small amount of unilateral cloudy discharge	Bilateral, cloudy or excessive mucus discharge	Copious bilateral mucopurulent discharge
Eye scores			
Normal	Small amount of ocular discharge	Moderate amount of bilateral discharge	Heavy ocular discharge
Ear scores			
Normal	Ear flick or head shake	Slight unilateral droop	Head tilt or bilateral droop



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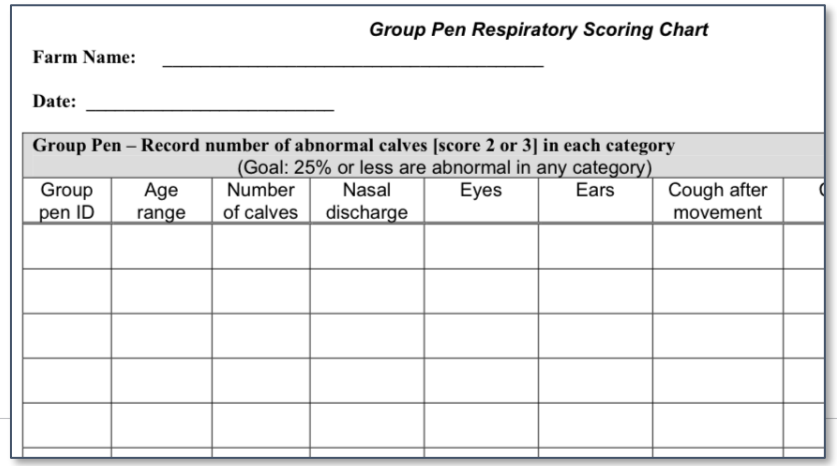
Calf Respiratory Scoring Chart

Farm Name: _____

Date: _____

Calf Scores (Total respiratory score: 4 – watch, 5 or more – treat.)						
Animal ID	Age	Nasal discharge	Eye or ear (highest number)	Cough – spontaneous or induced	Temperature	Total respiratory score



Group Pen Respiratory Scoring Chart

Farm Name: _____

Date: _____

Group Pen – Record number of abnormal calves [score 2 or 3] in each category (Goal: 25% or less are abnormal in any category)						
Group pen ID	Age range	Number of calves	Nasal discharge	Eyes	Ears	Cough after movement

Common BRD Pathogens

Viruses

- **BRSV** (Bovine Respiratory Syncytial Virus)
- **IBR** (Infectious Bovine Rhinotracheitis)
- **BVDV** (Bovine Viral Diarrhea Virus)
- **PI3** (Parainfluenza Virus 3)
- Coronavirus
- H5N1 Influenza

Bacteria

- *Mannheimia haemolytica*
- *Pasteurella multocida*
- *Histophilus somni*
- *Mycoplasma bovis*
- *Bibersteinia trehalose*
- *Trueperella pyogenes*
- Other

Diagnostics

- Deep Nasopharyngeal Swab
- Animals with clinical signs but not yet treated with antibiotics

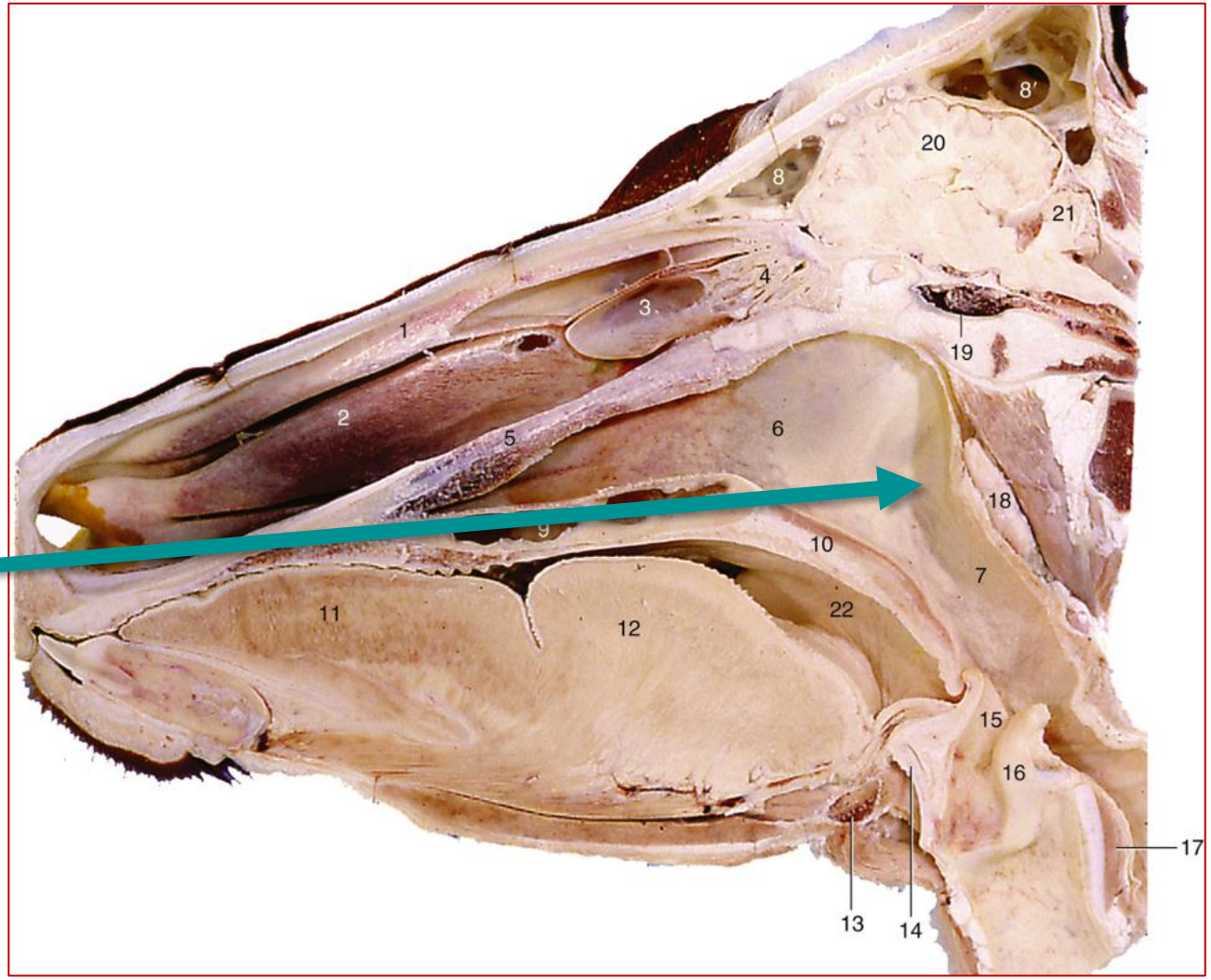
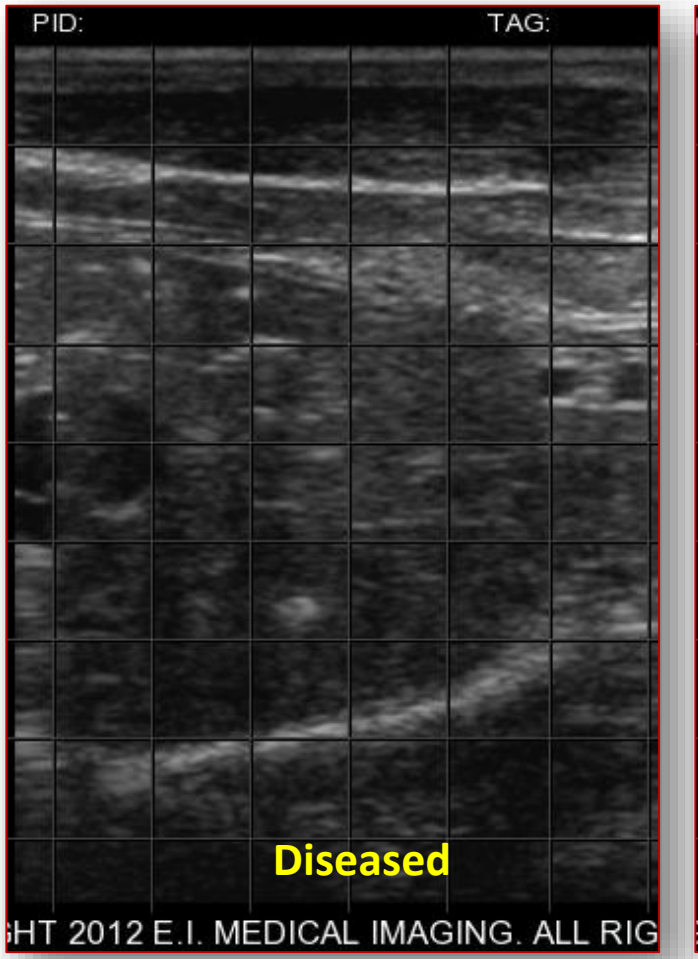
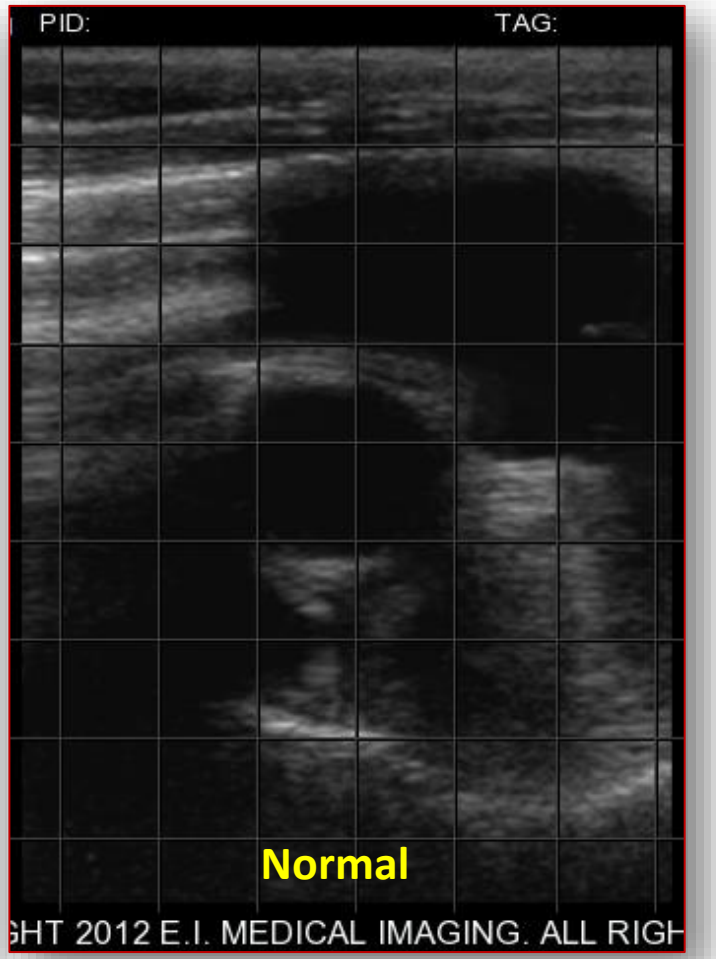


Photo credit: UMN CVM Large Animal Anatomy

Subclinical Pneumonia

- Some animals may have pneumonia for several days prior to showing clinical signs
- Diagnosis: calf lung ultrasound





BRSV (Bovine Respiratory Syncytial Virus)

- Kills respiratory epithelium
- Disrupts mucocilliary escalator
- Associated with high morbidity (60% to 80%) & fatality rates may be as high as 20%[1]

Photo credit: Ellis JA.

[1] Valarcher JF, Geraldine Taylor G. Bovine respiratory syncytial virus infection. Vet Res 2007;38:153-180

IBR (Infectious Bovine Rhinotracheitis)

- Disease:
  - Respiratory Disease
  - Abortion (BHV1 & BHV-4), expulsion of fetus delayed, autolysis severe
- IBR Seroprevalence[1]
  - Individual Animals: 20-60%
  - Herd Level: >70%
- Prevention: vaccination

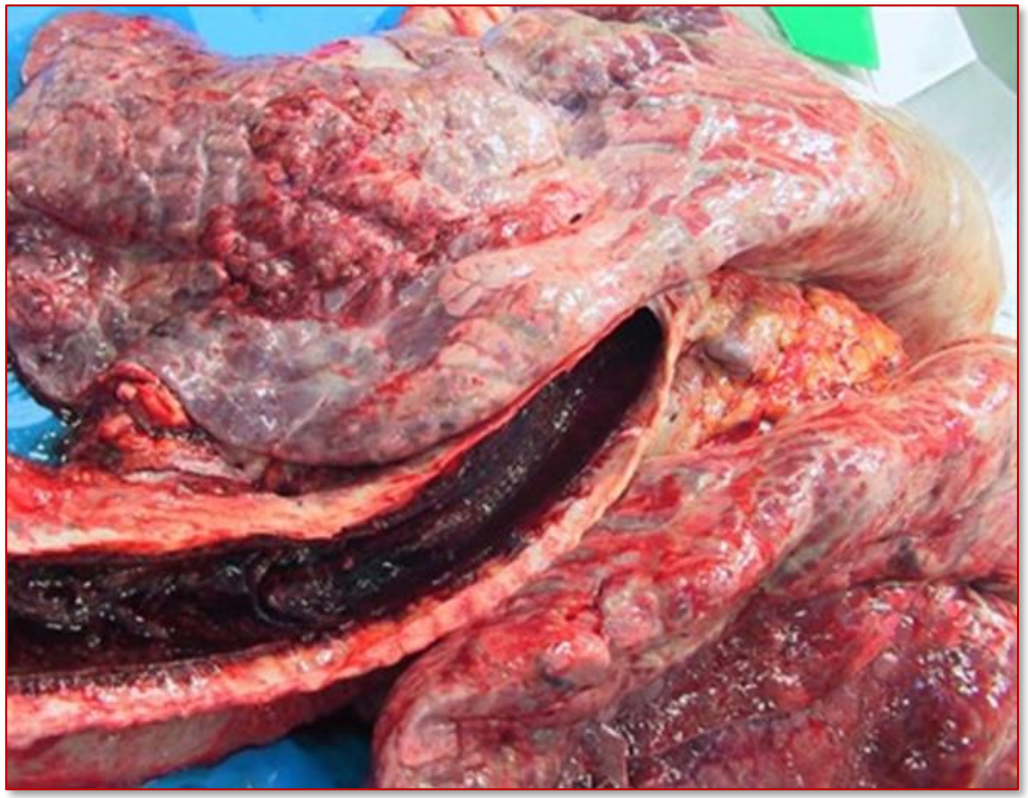
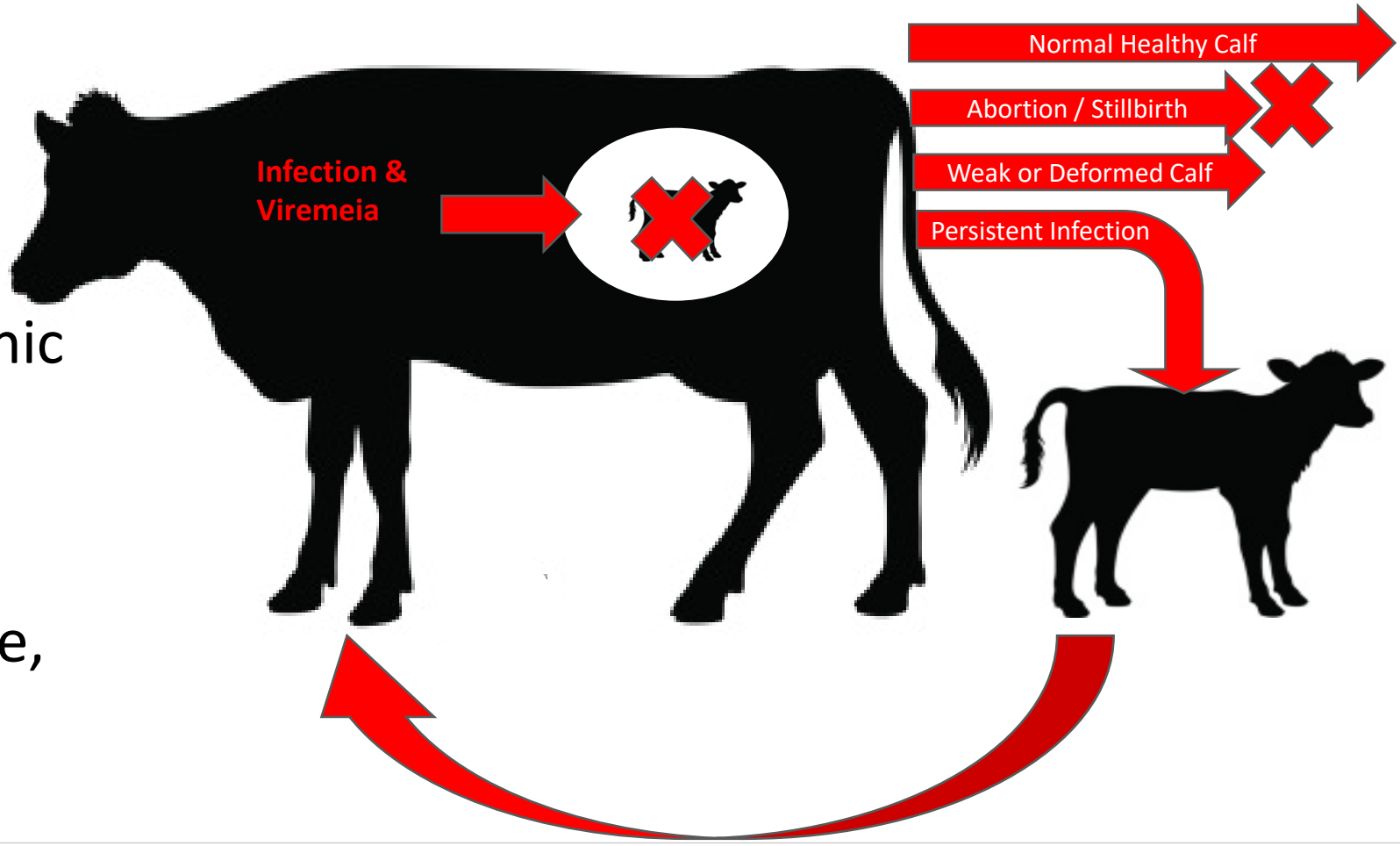


Photo credit: www.nadis.org.uk

[1]Newcomer et al., Prev Vet Med, 2017

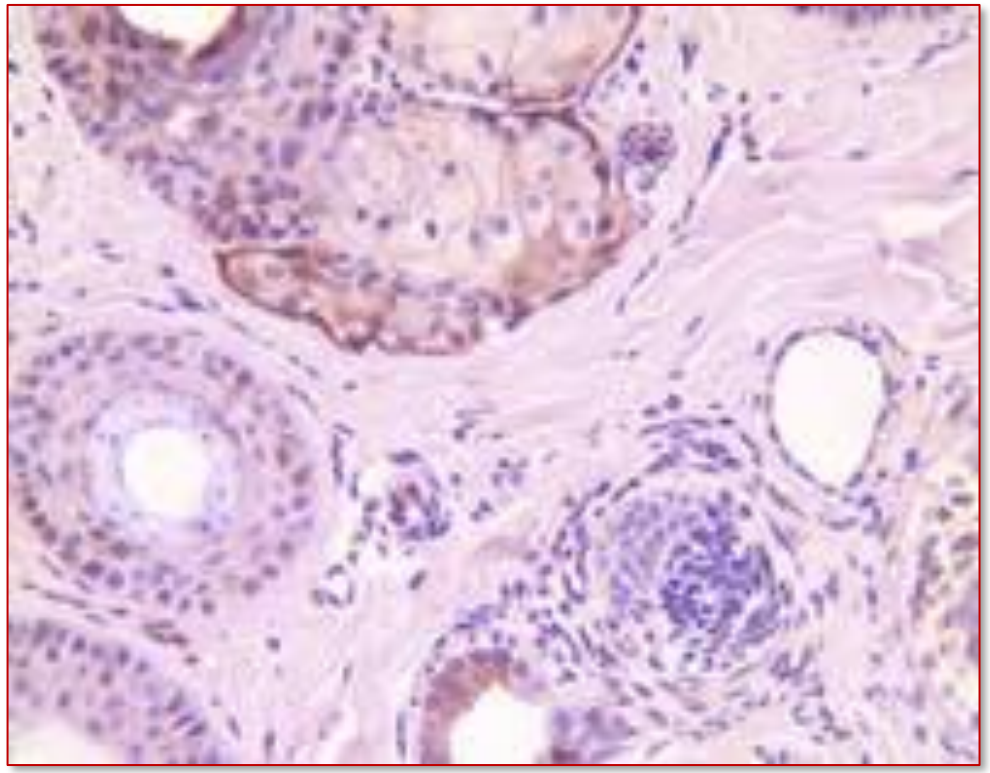
BVDV (Bovine Viral Diarrhea Virus)

- Pestivirus
- Many hundreds of substrains
- Type 1 & 2
- Cytopathic & Noncytopathic
- Disease: Reproductive, Respiratory, Immune Suppression
- Exposure from other cattle, deer
- “Trojan Horse”



BVD Testing

- PI Calves – super shedders of virus, can overwhelm even well vaccinated herd
- Vaccines are good at preventing BVD PIs, but not 100%
- Screening:
  - Test newborn calves (ear notch or blood)
  - Test Dams of positive calves



Mycoplasma

- Clinical signs can be subtle
- Lung abscesses, otitis
- No true cell wall
- New vaccine available

Pasteurella

- Acute Severe Bronchopneumonia
- Vaccines available

Mannheimia

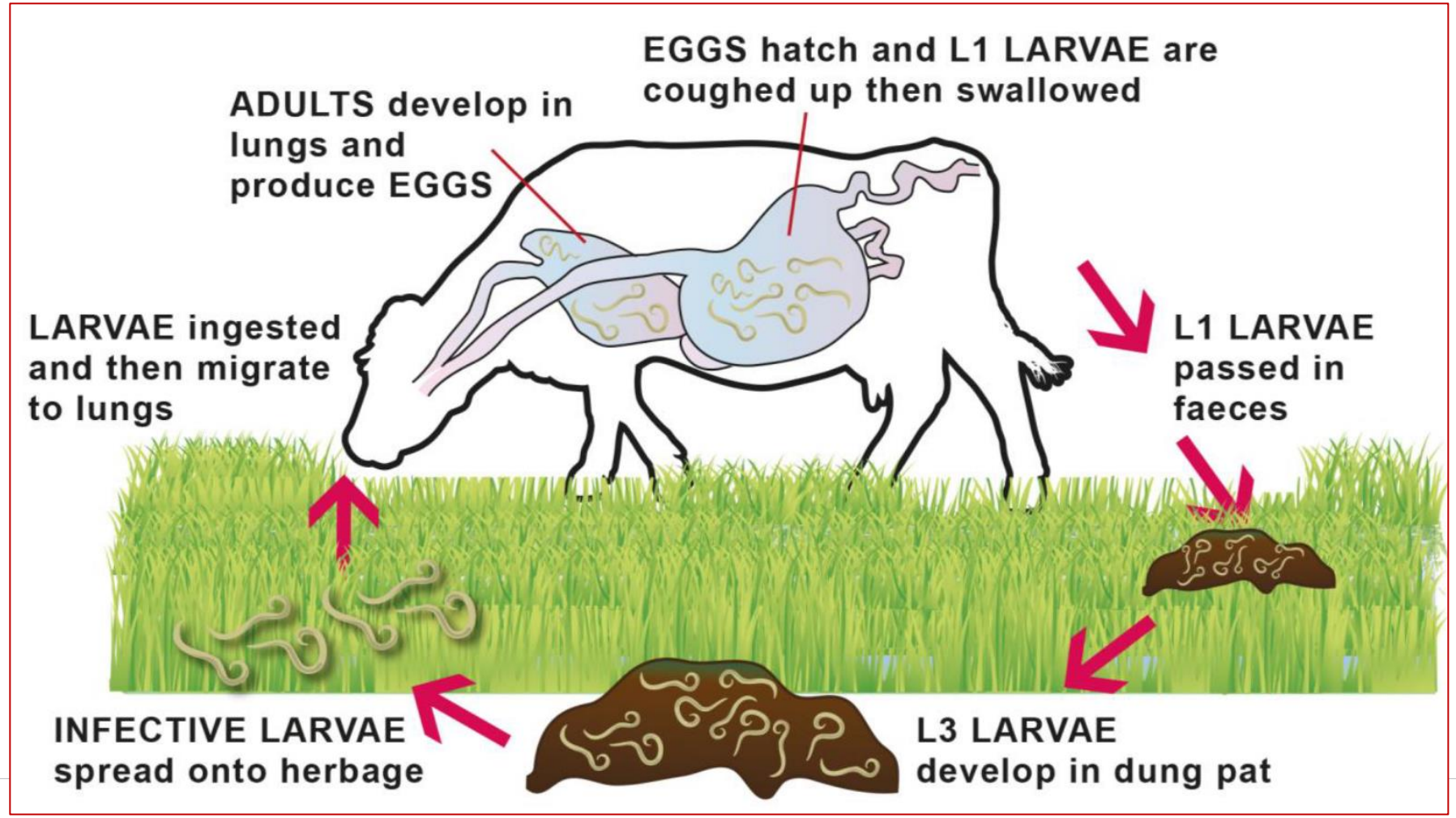
- Acute Severe Bronchopneumonia
- Vaccines available

Histophilus

- Acute Severe Bronchopneumonia
- Also targets heart and brain
- Vaccines available

Lungworm (*Dictyocaulus viviparus*)

- Moist, cool climates
- Cough, weight loss
- Lung damage, secondary bacterial pneumonia



Treatment Protocols

- Specific treatment guidance made by farm's veterinarian
- Requires accurate diagnosis
- Follow protocol exactly

  too little – poor efficacy
  too much – drug residues, potential toxicity

  - Dose (including per injection site limits)
  - Route
  - Frequency
  - Duration
- All treatments must be recorded, these records must be on file for 2 years

BRD Approved Antibiotics

(listed alphabetically)

Lactating Cows

- Ampicillin (Ex. Polyflex)
- Ceftiofur (Ex. Excenel)
- Oxytetracycline (Ex. LA-200)
- Penicillin G
- Sulfadimethoxine

Calves/Heifers (<20mo)

- Enrofloxacin (Ex. Baytril)
- Florfenicol (Ex. Nuflor)
- Gamithromycin (Ex. Zactran)
- Tilidipirosin (Ex. Zuprevo)
- Tilmicosin (Ex. Micotil)
- Tulathromycin (Ex. Draxxin)
- Tylocin (Ex. Tylan)
- also everything listed under Lactating Cows

Treatment Records

1. Treatment date
2. Animal identification
3. Drug and Condition
4. Dosage
5. Route of administration and expected duration
6. Withdrawal time for milk and meat
7. Dates when milk and meat are safe
8. Individual who administered the drug

- NMPF FARM Antibiotic Stewardship Manual

Treatment Records

Individual Animal Treatment Record

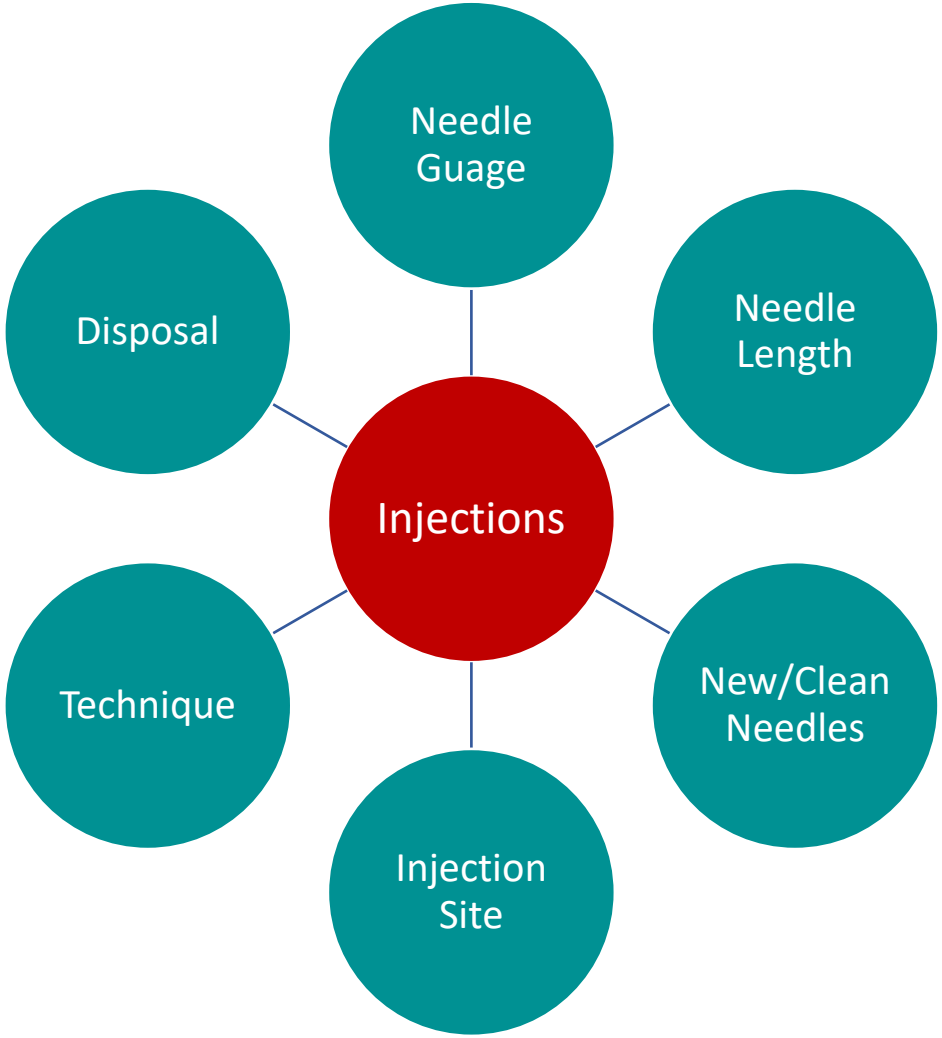
(review with veterinarian)

Animal Identification

Veterinarian

Veterinarian Phone Number

	Protocol Number	Diagnosis or Conditions Treated and Signs	Treatment Plan						Withdrawal		Calculated Withdrawal Period Expires		Remarks/Cautionary Statements *Example: initials of person treating or testing*
			Date	Treatment	Dose	Route of Admin.	Frequency of Treatment	Length of Treatment	Milk (hrs)	Meat (days)	Milk	Meat	
Sample	1	Mild Mastitis	1/1/20	Oxytocin	2cc	IM	every milking	4 Milkings	0	0			
Sample	2	Mastitis w/ hard qtr.	1/2/20	Pirsue	1 tube/ quarter	IMM	every 24 hours	2 days	36	9	4/3/20 PM	4/10/20	
Sample	3	Dry treat	1/3/20	Tomorrow	1 tube/ quarter	IMM	once at dry off	Once	72	42	4/4/20 PM	5/16/20	


Needle Guage
Needle Length
New/Clean Needles
Injection Site
Technique
Disposal
Injections


0.5
1
1.5
2.5

Injections

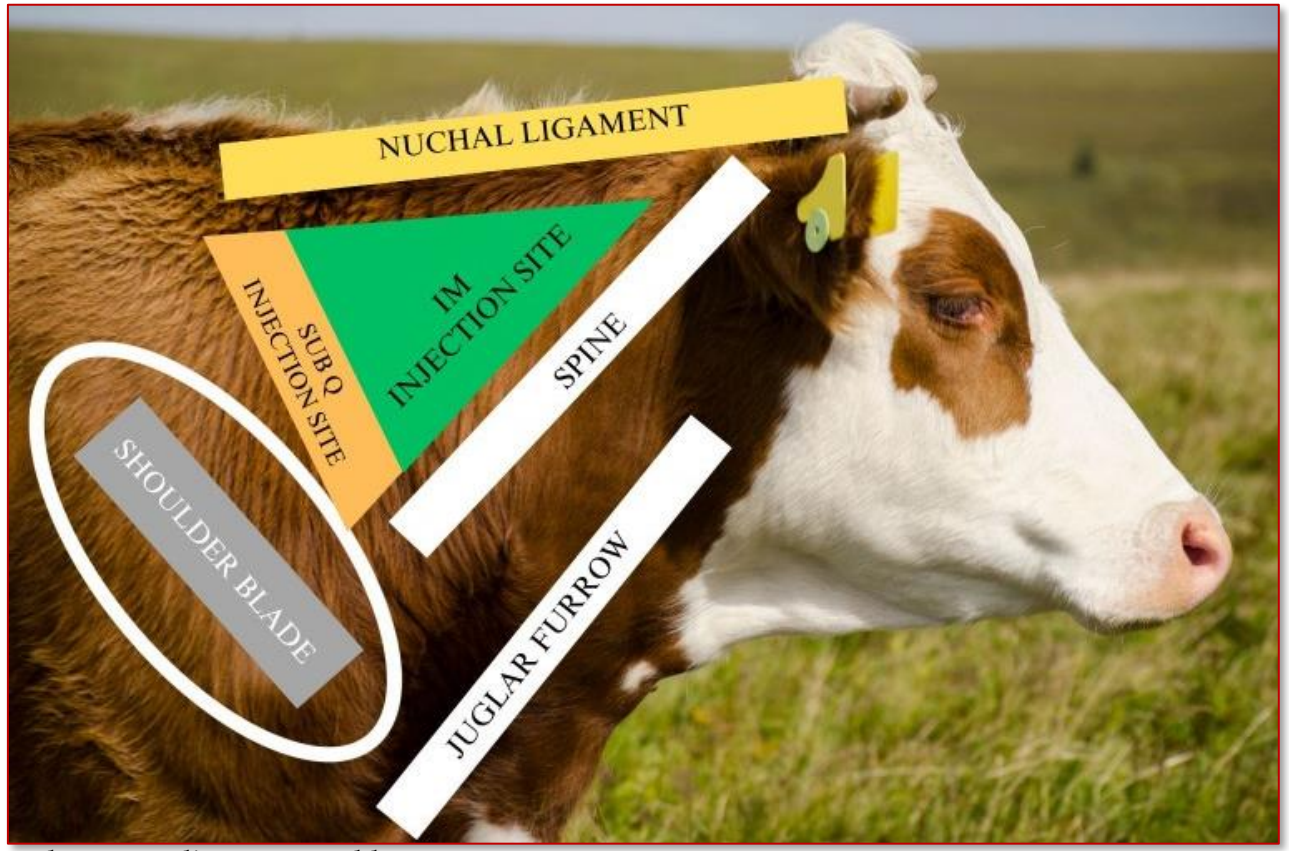


Photo credit: Amy Barkley, SWNY CCE

INJECTIBLE VISCOSITY	ROUTE OF ADMINISTRATION VIA NEEDLE								
	SQ (½ - ¾" Needle)			IV (1½" Needle)			IM (1 - 1½" Needle)		
	Cattle Weight (lbs.)			*Cattle Weight (lbs.)*			*Cattle Weight (lbs.)*		
	<300	300-700	>700	<300	300-700	>700	<300	300-700	>700
***THIN** (gauge)* *Example: Saline*	18	18-16	16	18-16	16	16-14	20-18	18-16	18-16
***THICK** (gauge)* *Example: Tetracycline*	18-16	18-16	16	16	16-14	16-14	18	16	16

Select the needle to fit the cattle size (the smallest practical size without bending)