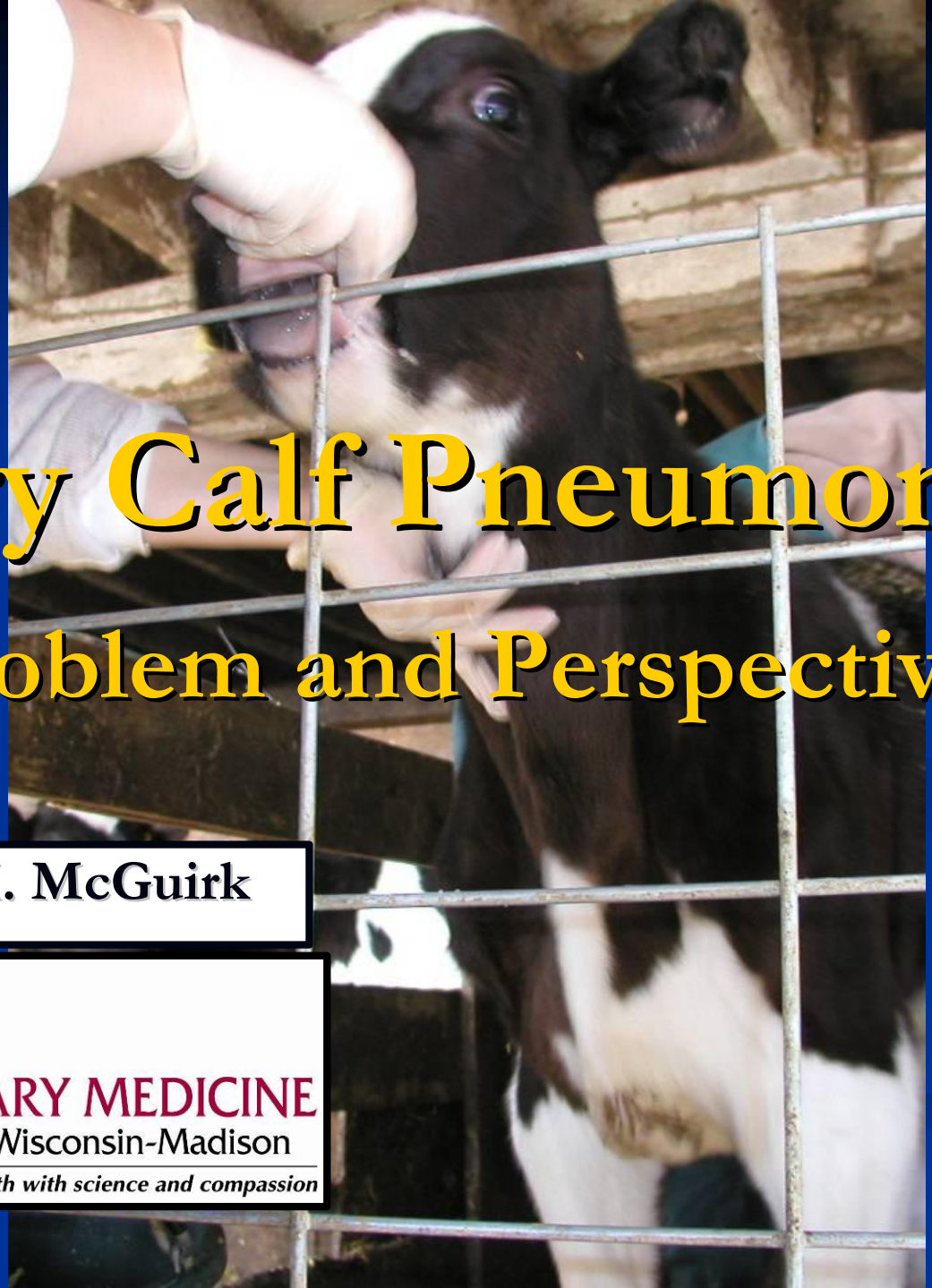


Dairy Calf Pneumonia:

Problem and Perspective

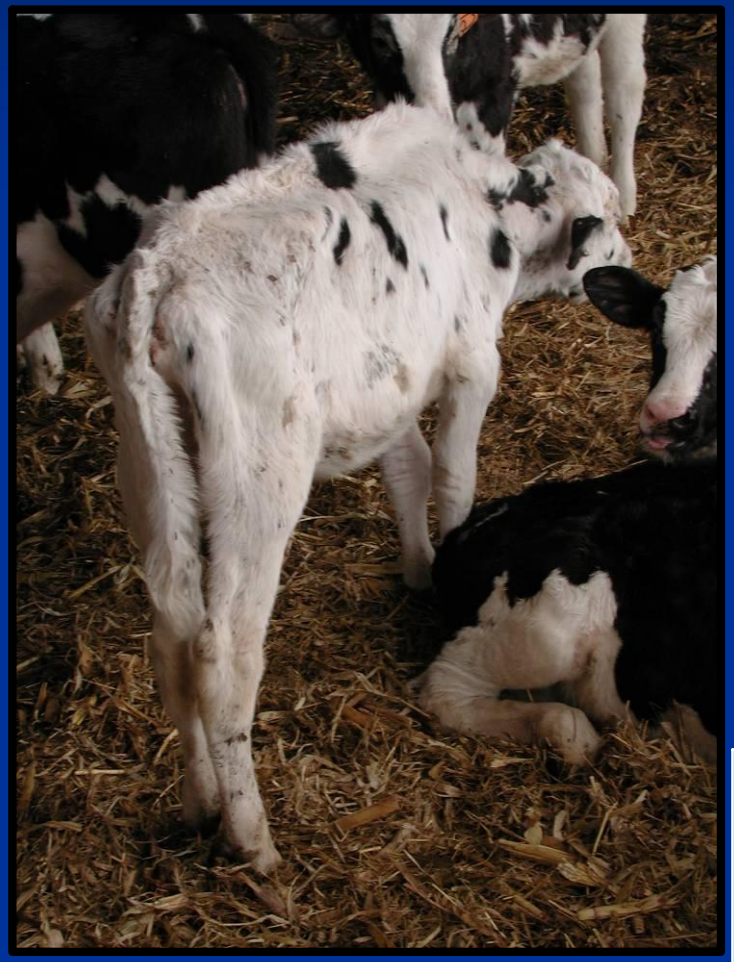
Dr. Sheila M. McGuirk

SCHOOL OF VETERINARY MEDICINE
University of Wisconsin-Madison
Advancing animal and human health with science and compassion

Dairy Calf Pneumonia

- 21.3% of pre-weaned calf mortality
- 50.4% of post weaning heifer deaths
- Economically significant
  - Cost
  - Labor
  - Reproductive performance
  - Milk production
  - Survival

Typically Viewed as a Post-Weaning Problem



Origin and opportunity is here.

Problems/Opportunities

- Early detection
- Effective treatment
- Calf Housing

- **Avoid uncured calves entering the weaning pen**

Early Detection of Pneumonia

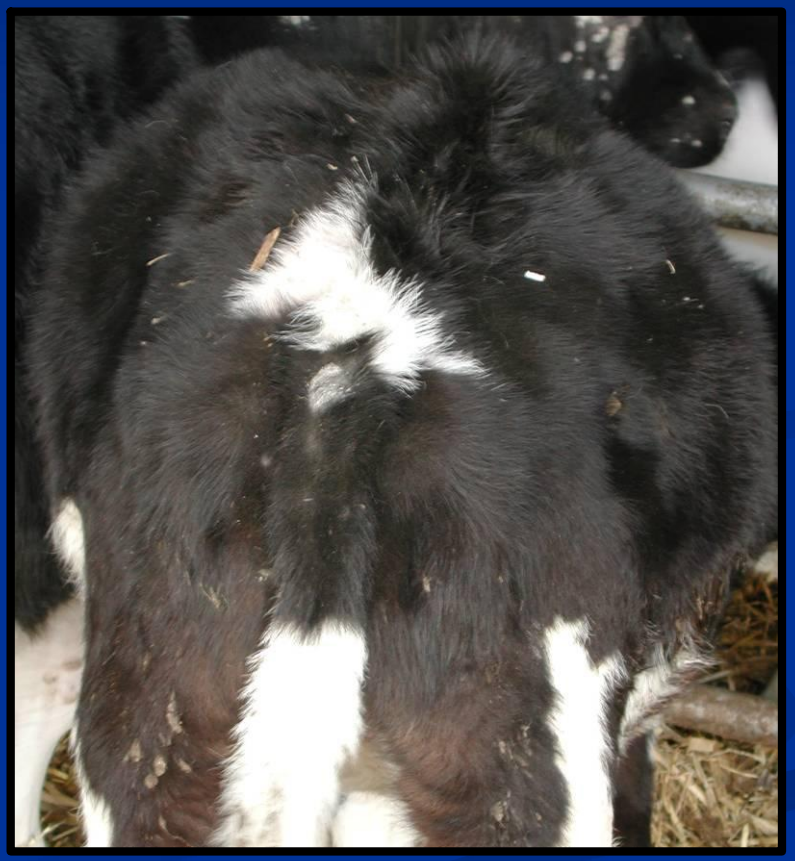
Usually a feeding time focus:

- Appetite is not depressed
- Attitude change is not perceptible
- Cough may not be recognized

More useful indicators?

Prolonged time in the bucket
Longer standing after drinking

Signs of Detection Problems



Delayed Diagnosis of Pneumonia

- A herd problem that doesn't go away
- Lots of antibiotics
- High recurrence rate
- Chronic pneumonia with abscesses
- Ear infections
- Recurring bloat

Screening is the answer for early detection

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
			

http://www.vetmed.wisc.edu/dms/fapm/fapmtools/8calf/calf_respiratory_scoring_chart.pdf

Respiratory Scoring System

- **Signs to screen**
  - Temperature
  - Nasal discharge
  - Cough
  - Eye/Ear
- **Numerical**
  - 0: Normal
  - 1: Mild
  - 2: Moderate
  - 3: Severe
- **Total Score determines treat, watch or normal**

- Usable
- Trainable
- Doable
- Easy to interpret
- Picks up early disease
- Doesn't over diagnose

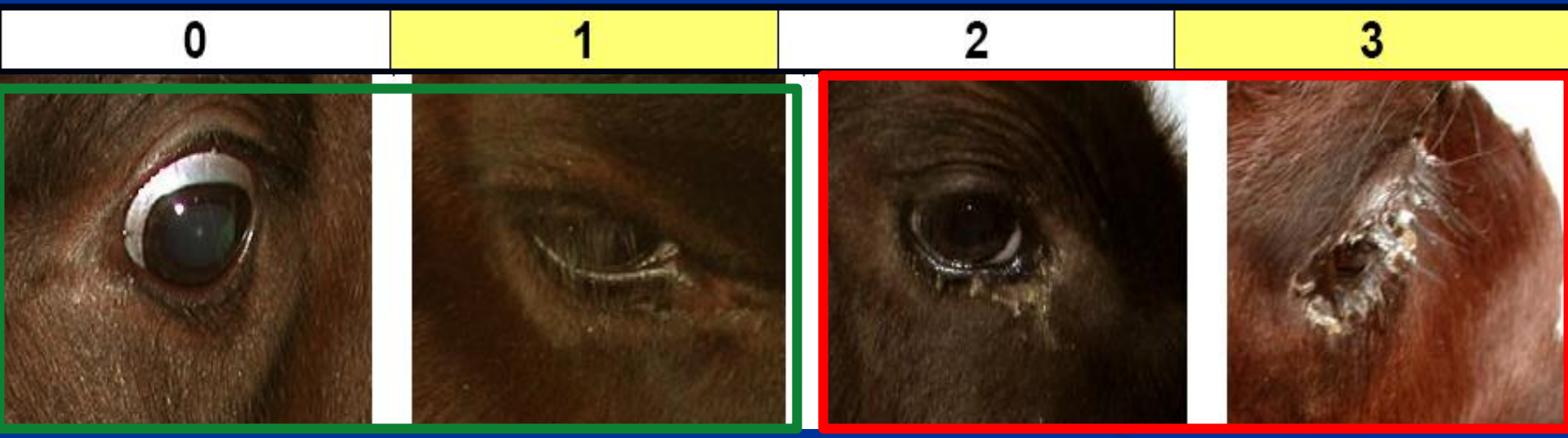
- At best, regular screening
  - Twice weekly
- At least, performed at critical times
  - Begin at age of onset (~ 3weeks)
  - Weaning screen

Scoring from outside the pen

- Nasal discharge
- Eye discharge
- Ear score

Respiratory Scoring Criteria: Nasal Discharge

Respiratory Scoring Criteria: Eye Discharge



Respiratory Scoring Criteria: Ear Score

Eye/ear category – highest score is assigned.

Calf Contact Required

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

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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	Temp-erature	Nasal discharge	Cough – spontaneous or induced	Eye or ear	Total respiratory score
7383	4 wk	1	0	0	0	1
7524	4 wk	1	0	0	2	3
7518	4 wk	3	1	2	3	**9**
7512	4 wk	3	2	2	2	**9**
7506	4 wk					**6**
7540	2 wk					3
7557	1 wk					6
7545	2 wk					2
7538	2 wk	3	1	1	0	**5**

Total Respiratory Score

- < 4 Normal
- = 4 Watch/Recheck
- > 4 Treat

The Respiratory Scoring Was Validated

Using lung fluid

- Compare calves with low (<4) and high (>4) respiratory scores
  - Cells
  - Culture
  - Some virus testing

Study Calves

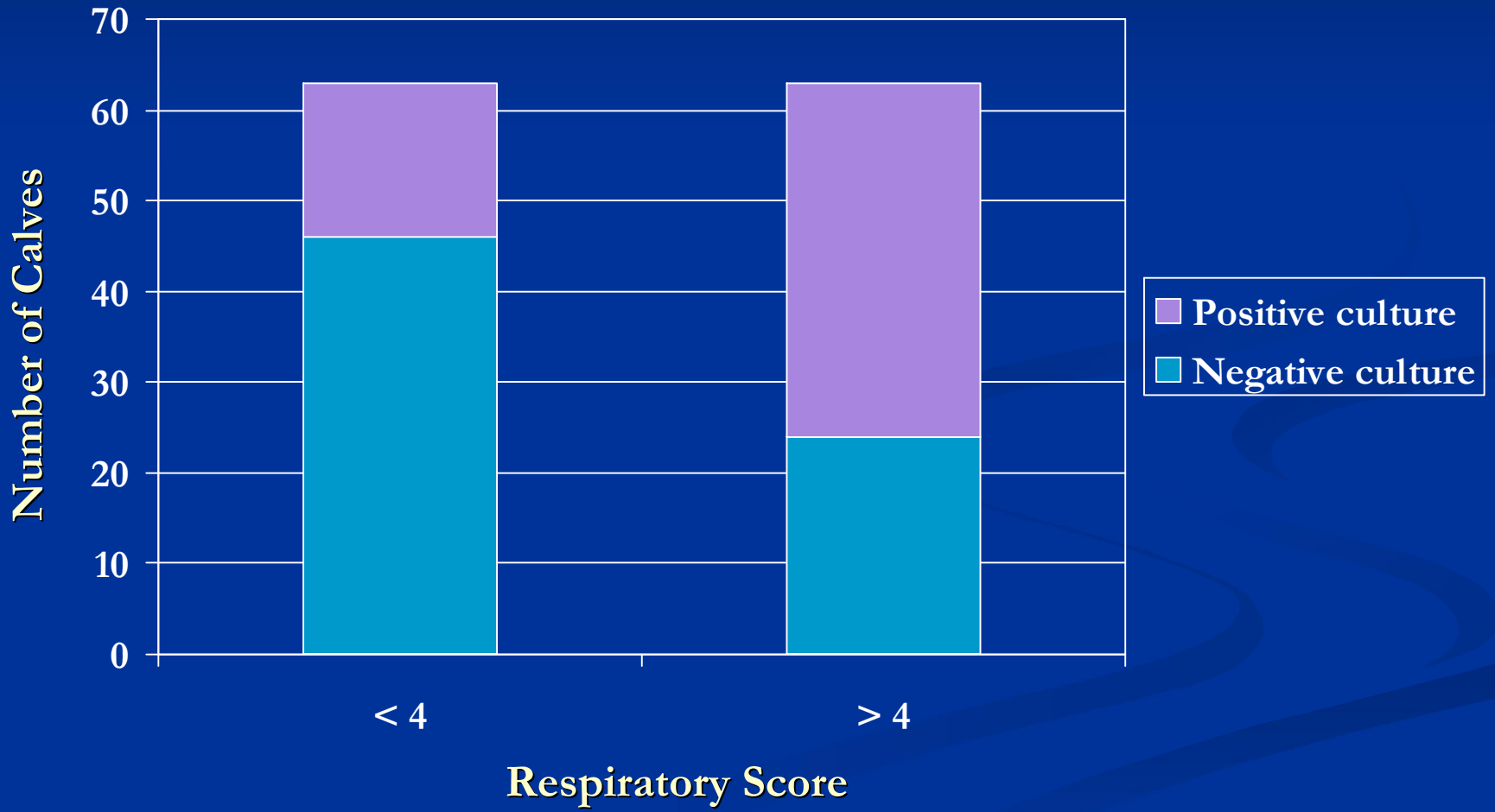
- Calves from 24 farms
  - Low and high scoring calves on the same farm
- 126 Calves in the study
  - 63 respiratory score < 4
  - 63 respiratory score > 4

Lung Fluid Collection: Bronchoalveolar Lavage (BAL)

Bronchoalveolar Lavage (BAL) Procedure

- 2 or 3 people
- Sedated with 0.1 mg/kg xylazine IM

Culture Results by Respiratory Score



BAL Cultures

Respiratory Score < 4

- *Arcano. pyogenes* (3)
- *Past. multocida* (15)

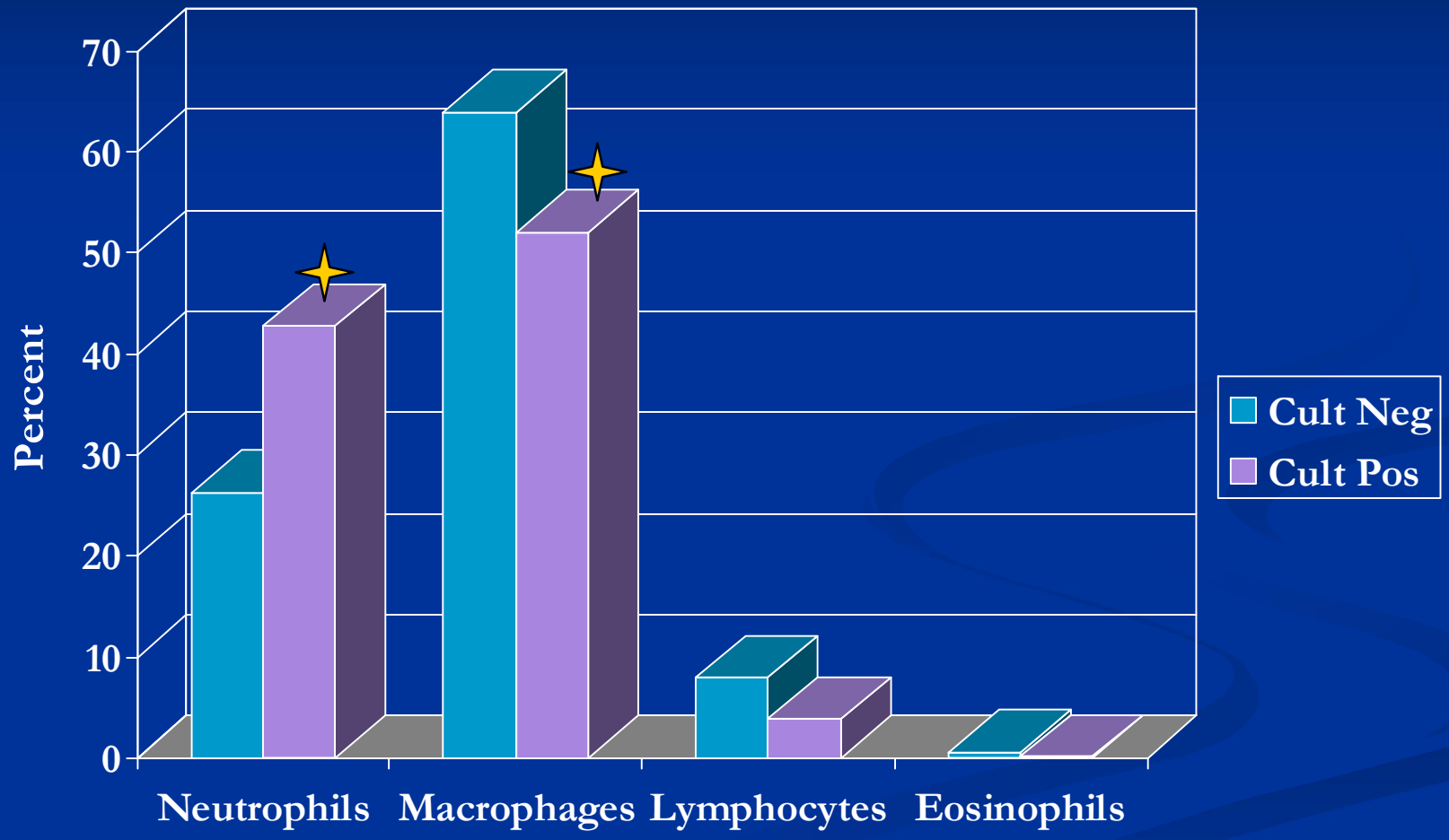
- 18 isolates from 17 calves

Respiratory Score > 4

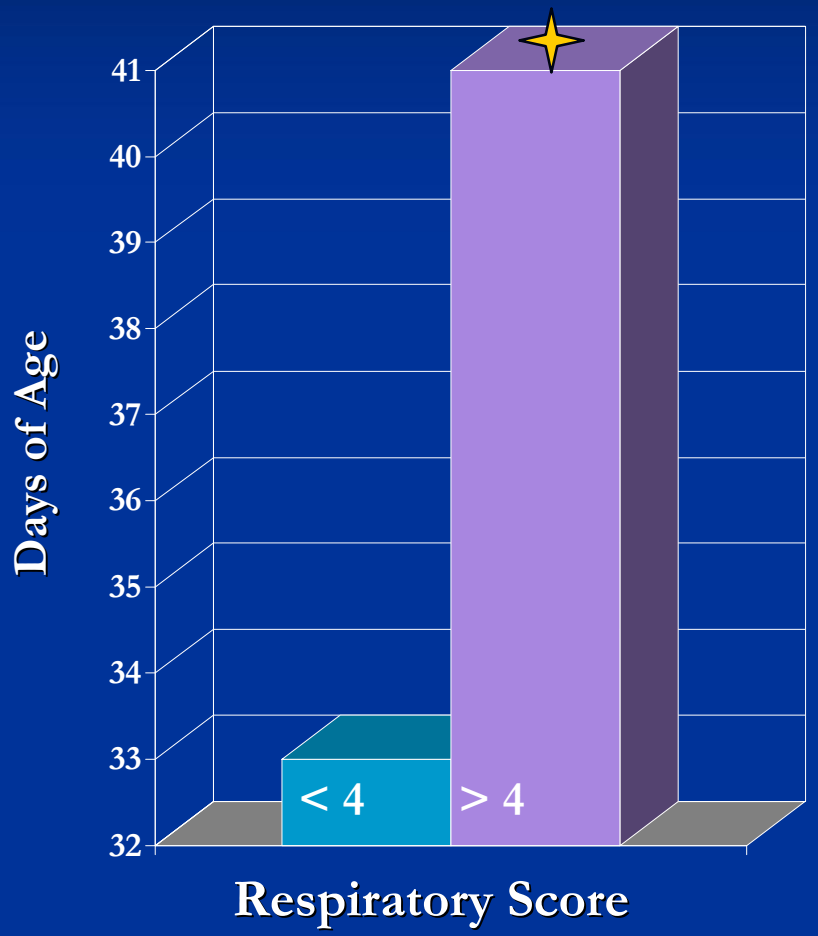
- *Arcano. pyogenes* (3)
- *Past. multocida* (17)
- *Mann. haemolytica* (2)
- *Pseudomonas sp.* (1)
- *Mycoplasma bovis* (2)
- *Myco. bovirhinus* (1)

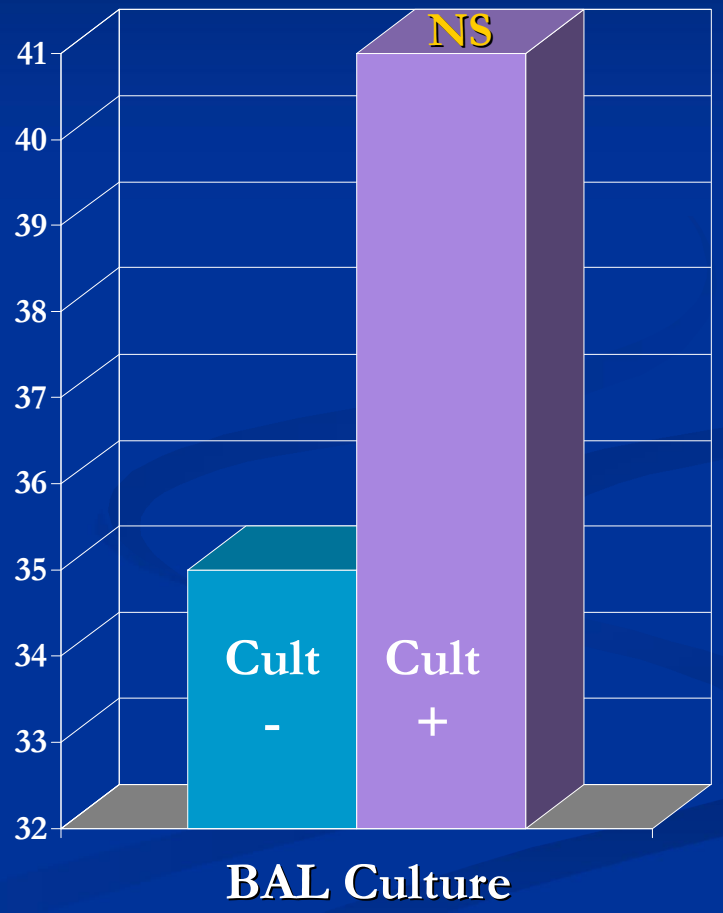
- 26 isolates from 24 calves

Lung Fluid Cells



Age Affect: Respiratory Score or BAL Culture





How Does This Help You?

How Much Respiratory Disease Is There?

Calf Respiratory Scoring Chart

Farm Name: _____

Date: _____

Calf Scores	**(Total respiratory score: 4 – watch, 5 or more – treat)**					
Animal ID	Age	Temp-erature	Nasal discharge	Cough – spontaneous or induced	Eye or ear	Total respiratory score

Calf Health Scoring Criteria

0	1	2	3
Rectal temperature			
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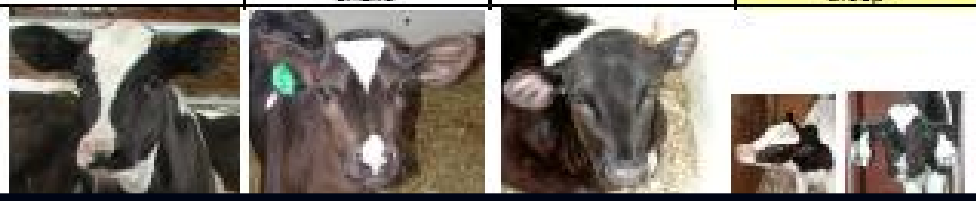
Ear scores			
Normal	Ear flick or head shake	Slight unilateral droop	Head tilt or bilateral droop



What Age Is Affected?

Calf Respiratory Scoring Chart

Farm Name: _____

Date: _____

Calf Scores	(Total respiratory score: 4 – watch, 5 or more – treat)					
Animal ID	Age	Temp-erature	Nasal discharge	Cough – spontaneous or induced	Eye or ear	Total respiratory score

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			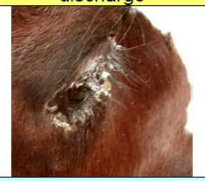
Ear scores			
Normal	Ear flick or head shake	Slight unilateral droop	Head tilt or bilateral droop
			

Distribution and Detection Rate

Calf Respiratory Scoring Chart

Farm Name: _____

Date: _____

Calf Scores		**(Total respiratory score: 4 – watch, 5 or more – treat)**				
Animal ID	Age	Temp-erature	Nasal discharge	Cough – spontaneous or induced	Eye or ear	Total respiratory score

Calf Health Scoring Criteria

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Ear scores			
Normal	Ear flick or head shake	Slight unilateral droop	Head tilt or bilateral droop
			

Animal ID	Age	Temp-erature	Nasal discharge	Cough – spontaneous or induced	Eye or ear	Total respiratory score
	Barn 1 Row 1 5 weeks					
7326		1	0	3	0	4
7426		1	0	1	2	4
7419		1	1	2	0	4
7412		3	1	0	1	4
7387		1	1	0	1	3
7367		1	0	0	2	3
	Barn 2 Row 1 4 weeks					
7459		1	1	3	0	5
7351	5/10/06	1	0	0	2	3
7363	5/12/06	1	0	0	0	1
	Barn 2 Row 2 5 weeks					
7457		1	0	0	2	3
7450		1	0	3	2	6
7443		1	0	0	0	1
7438		1	1	1	0	3
7431		1	1	2	2	6
	Barn 3 Row 1 2 weeks					
7540	1 week	1	0	0	2	3
7557		3	1	0	2	6

Is it really a post weaning problem?

ID	Age	Temp	Nasal dischg	Cough	Eye or ear	Score
2-3	4 wk	2	1	2	0	5
2-10	4 wk	2	0	2	1	5
2-20	4 wk	3	2	0	0	5
2-30	4 wk	2	1	0	0	3
2-40	4 wk	2	2	2	1	7
2-50	4 wk	1	2	3	0	6
2-60	4 wk	2	0	0	0	2

What is an Effective Treatment? Sample 6 untreated calves.

- Nasal Swabs

For antibiotic protocols

- Bronchoalveolar lavage (BAL collection)

To characterize disease, agents and protocols

Nasal Swab Results

Antibiotic	Past mult	Mann haem	Hist somn
Amp/Amo			ant
Ceftiofur	Sensitive	Sensitive	Sensitive
Enrofloxacin	Sensitive	Sensitive	Sensitive
Florfenicol	Sensitive	Sensitive	Sensitive
Spectino	Sensitive	Sensitive	Incomplete
Tetracycl	Resistant	Resistant	Incomplete
TMS		itive	Sensitive
Tilmicosin	Sensitive	Sensitive	Sensitive
Tulathro	Sensitive	Sensitive	Sensitive

If < 3/6 have Mycoplasma bovis in nasal swab

Age limit < 2 weeks

Farm Example

- 1700 cow Holstein commercial dairy
- Indoor calf housing with high incidence of respiratory disease
  - Multiple ventilation adjustments
  - Positive pressure system introduced in 2007
  - Extremely high aerosolized bacterial counts
- Detection is not yet at goal of 85%
- Apparent treatment failures
  - Detection
  - Doses
  - Protocol follow through

Respiratory Scoring

- 45% of calves are 5 points or higher
- Only 10% of high scoring calves have been treated within previous 7 days
- Preventive Draxxin at 2-3 weeks of age

BAL Cultures 6 Calves: *P. multocida* and *M. bovis*

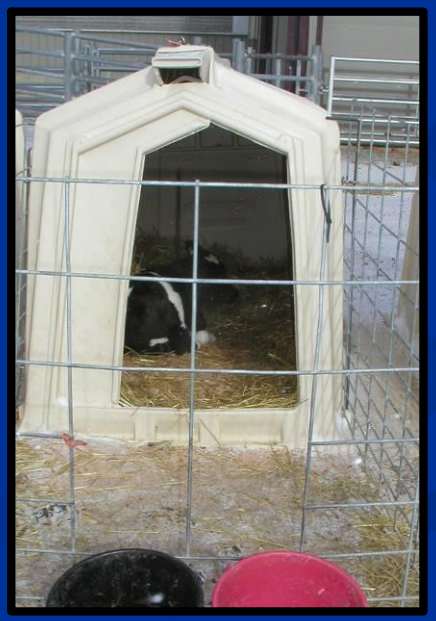
- ***Effective antibiotics***
  - Ampicillin
  - Ceftiofur
  - Spectinomycin

Adjust for Mycoplasma bovis

- ***Ineffective antibiotics***
  - Florfenicol
  - Tulathromycin
  - Tylosin
  - TMS
  - Tilmicosin
  - Neomycin
  - Gentamicin
  - Chlortetracycline

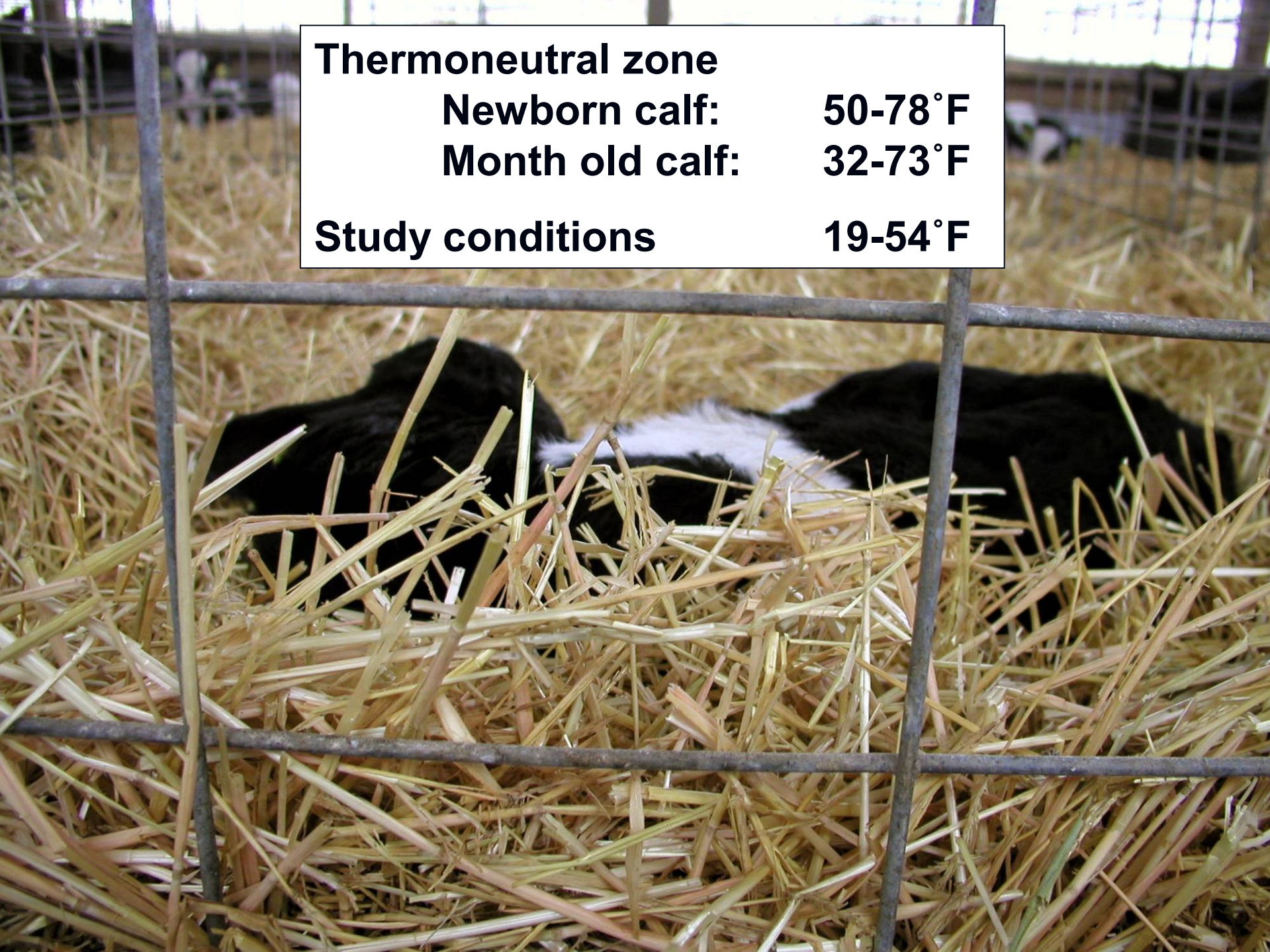
More Importantly…

- Fix the detection by screening twice a week
  - Don't need to enter pens if calves have 5 points from outside the pen scoring
- Save prophylactic Draxxin to just before calves enter the group pen



Troubleshooting

- Early detection
- Effective treatment
- Calf Housing


Thermoneutral zone
Newborn calf: 50-78˚F
Month old calf: 32-73˚F
Study conditions 19-54˚F

Overview of Dairy Calf Pneumonia

- Respiratory disease under-diagnosed and scoring system may help identify the problem in pre-weaned calves
- Ear infections are evidence of untreated pneumonia problems
- Nasal swabs can help guide treatment decisions
- Lung fluid collection is a useful tool for some herds
- Calf housing concerns must be identified and limited
- Post-weaning pneumonia can be eliminated by scoring and holding uncured pneumonia calves


Questions?