

# Assessment of the Likelihood of rate of *Mycoplasma hyopneumoniae* Lateral transmission



The screenshot shows the top navigation bar of the University of Minnesota website with the logo and the slogan "Driven to Discover". A search bar is located in the top right corner. Below the navigation bar is a large image of piglets. On the left side of the image is a logo featuring a pig silhouette on a globe. The main heading reads "Allen D. Leman Swine Conference". Below this heading is a table with the following information:

Allen D. Leman Swine Conference	ALLEN D. LEMAN SWINE CONFERENCE	612 624 4972	E-mail
Allen D. Leman	September 16–19, 2017	Program Partners	
Preconference Program	Saint Paul RiverCentre		

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# Veterinary Consultants



## SVC Research Team



- Research Areas:
- Health
  - Nutrition
  - Genetics
  - Facilities
  - Management



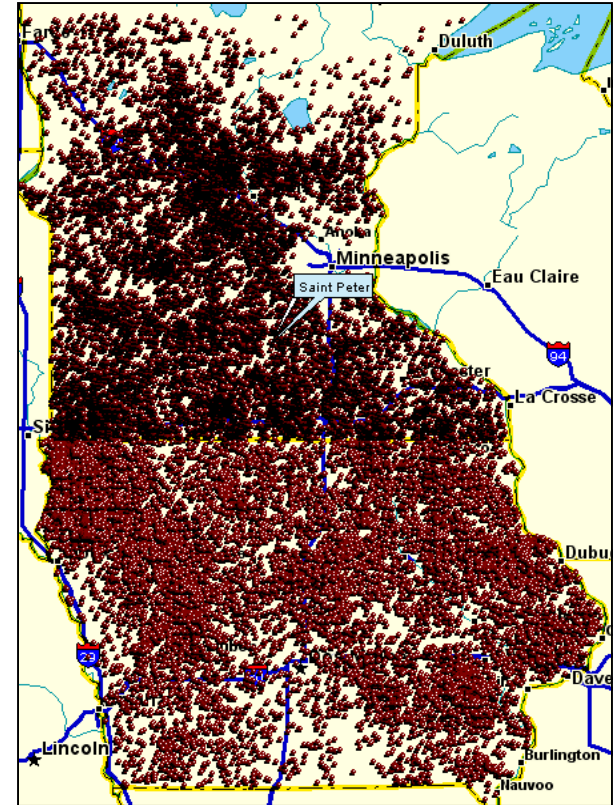
# Overview

- Back ground of Mycoplasma in Finishing herds
- Objectives of study
  - Lateral transmission
- Preliminary data
- Conclusions
- Implications



# Finish Sites PRRS Status

- 100 sites
- Southern MN and Northern IA
- All negative pigs at placement



Building Type		(All)	
Count of Site		Total	Percent
PRRS+/-			
	0	52	54.2%
	1	44	45.8%
Grand Total		96	100.0%

Yeske unpublished research, BI PRRS research grant

# Background

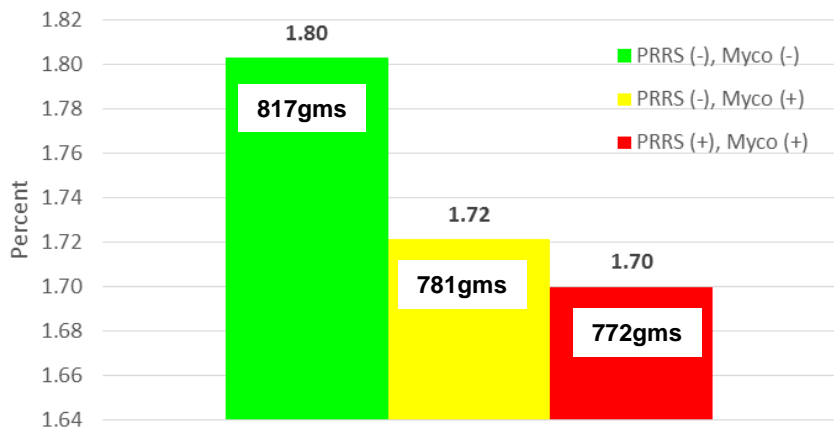
- Economic losses are associated
  - Reduced average daily gain
  - Decreased feed efficiency
  - Increased medication costs.
  - Estimates
    - (7 years of closeout data over 7 million pigs)
      - \$3.61 per head
      - \$98.72 per sow



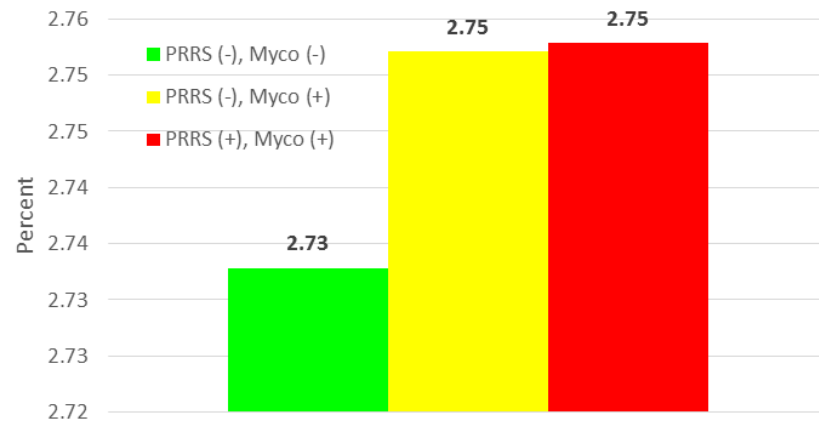
# Performance By Health Status

## Finishing Average Daily Gain

Average Daily Gain by Health Status



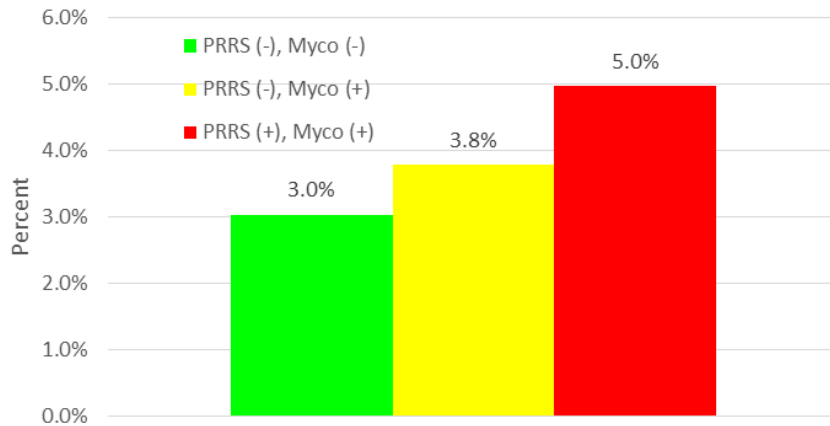
Feed Conversion by Health Status



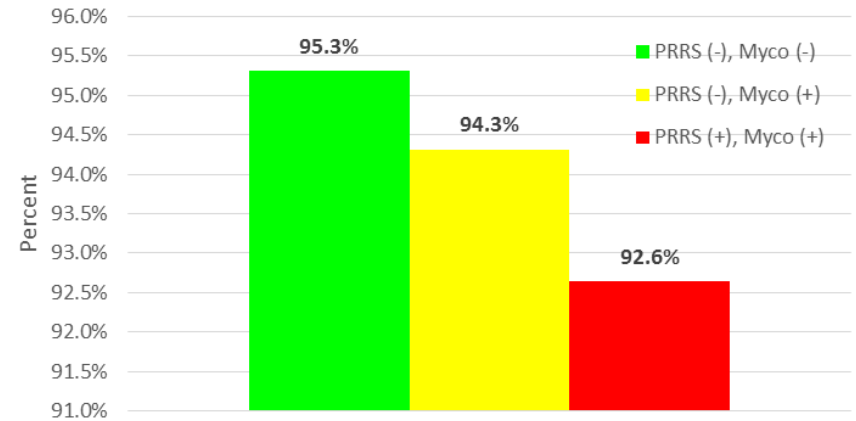
# Performance By Health Status

## Finishing Mortality

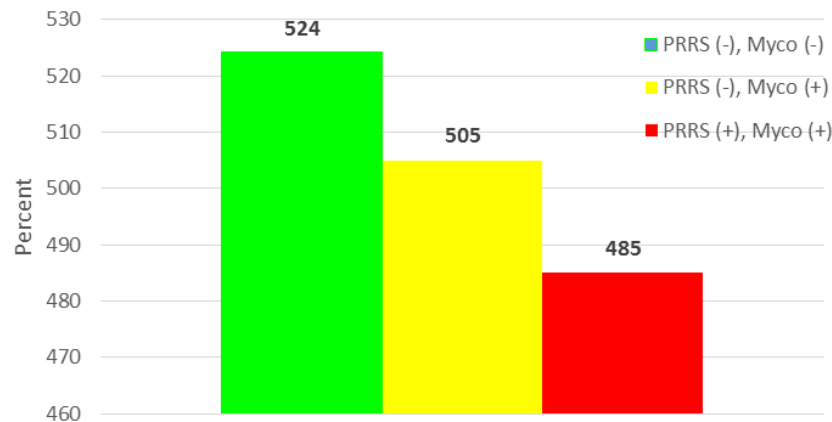
### Mortality by Health Status



### Percent Marketed by Health Status



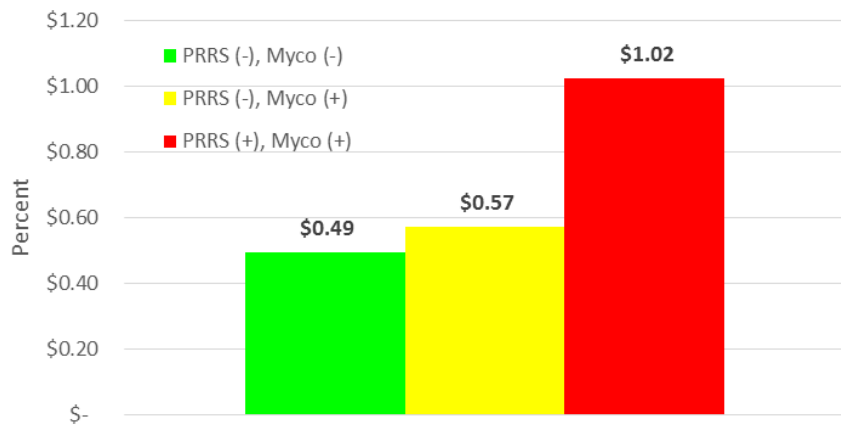
### #'s per SqFt by Health Status



# Performance By Health Status

## Finishing Medication Cost

Med Cost by Health Status



Feed Med Cost by Health Status





# Cost of Mycoplasma in Finishing 2007- 2014

<b>Grow Finish Performance Opportunity</b>		<b>Per Pig</b>
<b>Treatments savings / Total</b>	<b>\$ 14,750</b>	<b>\$ 0.54</b>
<b>Total Dead Pigs</b>	<b>236</b>	
<b>Cost of Mortality</b>	<b>\$ 36,993</b>	<b>\$ 1.35</b>
<b>Reduced number of culls (head)</b>	<b>54</b>	
<b>Cull opportunity \$</b>	<b>\$ 4,245</b>	<b>\$ 0.16</b>
<b>Cost of Performance</b>		
<b>Cost ADG</b>	<b>\$ 30,006</b>	<b>\$ 1.10</b>
<b>Cost F/G</b>	<b>\$ 12,728</b>	<b>\$ 0.46</b>
	<b>Total Finisher</b>	<b>\$ 98,722</b>
<b>Whole Herd Opportunity Cost Impact</b>		
	<b>Total (Finisher)</b>	<b>\$ 98,722</b>
	<b>Cost per Sow</b>	<b>\$ 98.72</b>



# ROI 2007-2014 Data

<b>Cost of the program Herd Closure</b>	<b>\$</b>	<b>7,500</b>
<b>Savings per month for Myco Elimination per sow Closure</b>	<b>\$</b>	<b>10,149</b>
<b>Savings from Myco Elimination</b>	<b>\$</b>	<b>420,173</b>
<b>ROI (the first year to) 1</b>		<b>16</b>
<b>Savings from Myco Elimination</b>	<b>\$</b>	<b>420,173</b>
<b>ROI to 1</b>		<b>56</b>
<b>Cost of the program Herd Medication</b>	<b>\$</b>	<b>30,000</b>
<b>ROI (the first year to) 1</b>		<b>4</b>
<b>Savings from Myco Elimination</b>	<b>\$</b>	<b>182,887</b>
<b>ROI to 1</b>		<b>6</b>



# Longevity of Negative Herds

Removed Farms Contaminated with Positive Gilts

	Herd Closure	Medication	Total
Number of Sows	118388	47450	165938
Number of Herds	42	20	62
Percent Negative at 1 year	95%	58%	85%
Percent Negative to date	84%	53%	78%
Herds Negative	36	10	47
Average Months negative	55	38	52
Average herd Size	2819	2373	2676
Years Negative	4.6	3.2	4.3



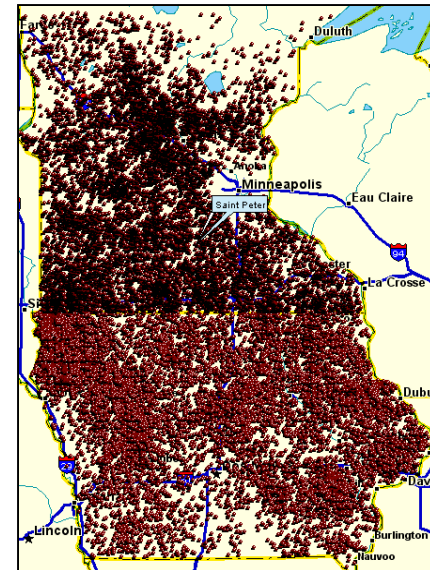
# Objectives

- Determine the incidence rate of lateral infections in finishing phase.
- Risk factors that increased their risk of site being laterally infected with *Mycoplasma hyopneumoniae*.



# Materials and Methods

- Identify Finishing sites in Pig Dense areas
  - Flows of *M. hyopneumoniae* negative pigs
    - Test sow farms to verify status
      - 30 sows IDEXX ELISA in the last 6 months
        - » If not testing the herds
- Sites run on all in all out basis
  - Completely emptied
  - Washed and disinfected prior to refilling site
- 50 sites



# Materials and Methods

- 2 Seasons (50 sites each)
  - Pigs Marketed in Summer / Fall
    - Born in winter / Spring months
  - Pigs Marketed in Winter / Spring
    - Born in Summer / Fall months



# Materials and Methods

- Determine the *Mycoplasma hyopneumoniae* status of site just prior to marketing the site
  - Randomly select pigs from each air space
    - 30 total samples per site
      - Mycoplasma IDEXX test used for initial screen
        - » If S/P ratios greater than 1.5 site is positive
        - » If S/P ratios less than 1.5 further testing
          - » More than 3 positives
            - » Retest the site using Laryngeal swabs and Mycoplasma PCR
- Questionnaire for risk factors
- Performance data

### **Mycoplasma Risk Assessment (Finishing sites)**

How many pigs are on this finishing site? \_\_\_\_\_

How many barns are on this site? \_\_\_\_\_

What is the age range of the pigs on this site? \_\_\_\_\_

What is the layout of finisher or wean-to-finish buildings on site?

- a. All finisher buildings have a single room
- b. Combination of multiple room and single room buildings
- c. All finisher buildings have multiple rooms

Typical occurrence of respiratory disease (not associated with PRRS) in finisher phase at this site in last two years

- a. Occurs in 8-10 groups (greater than 80%)
- b. Occurs in 5-7 out of 10 groups (50-79%)
- c. Occurs in 2-4 out of 10 groups (20-49%)
- d. Occurs in 0-1 out of 10 groups (0-19%)

How far away is the closest site? < .5 miles    1-2 miles    >2miles

How many sites are within 2 miles of this site? 1 or less    1-3    >3

Is the current clinical condition known for this site?    Yes    No

If yes, have tissue samples been taken for this site?    Yes    No

If yes, did tissue samples confirm Mycoplasma infection?    Yes    No

If no, is coughing present within the site?    Yes    No

Is the site positive for any other diseases?    PRRS    PCV2    IAV    Other    Unknown



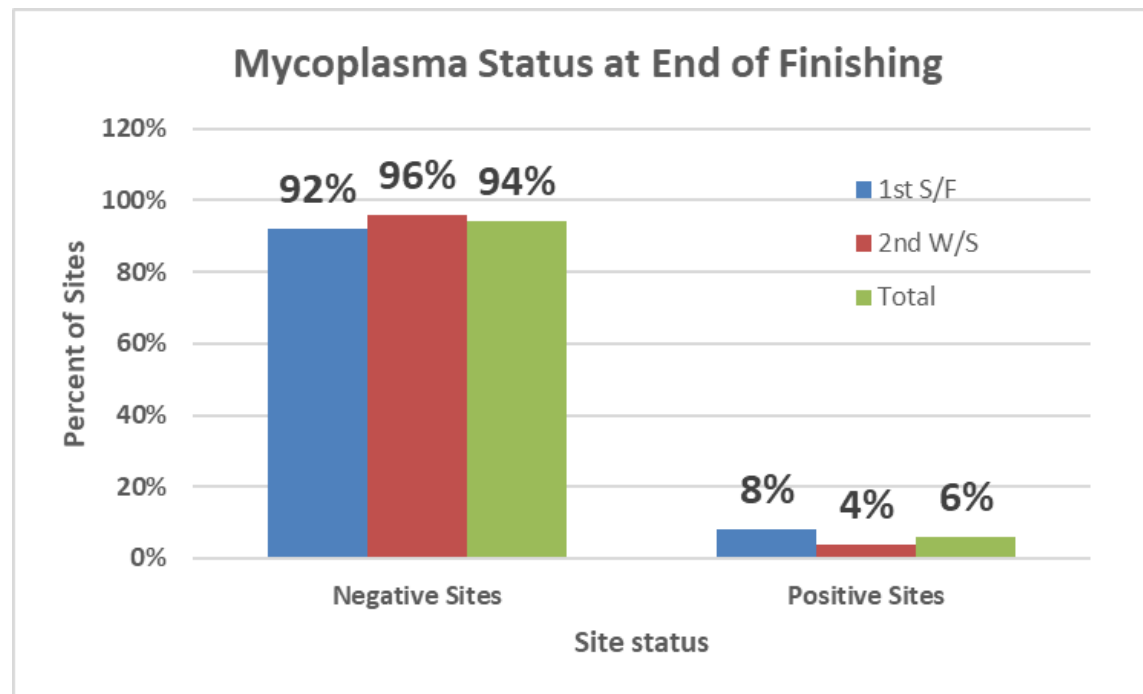


# Preliminary Results

- 50 total sites for each season of study (100 total sites)
  - 105 total sites tested but 5 marketed before retests could be done, so were dropped from the study
- 5 different production systems for each season
  - Located in Minnesota and Iowa
  - 10 per each production company per Season
    - (20 Sites total)

# Preliminary Results

- Total number of positive sites
  - 6 sites
    - (3) different production systems
      - (1) Serology (Antibody) 1%
      - (5) Laryngeal swabs (Antigen) 5%







# Unexpected Positives

- Sites with more than (3) IDEXX positives and  $<1.5$  S/P values
  - Were tested with Laryngeal swabs



# Unexpected Positives

- Test result from sites with more than (3) IDEXX positives and <math><1.5</math> values

	1st S/F	2nd W/S	Total
Antibody	1	0	1
	50	50	100
Laryngeal Swabs			
Sites Sampled	12	5	17
total Sites	50	50	100
Positive	3	2	5
Negative	9	3	12

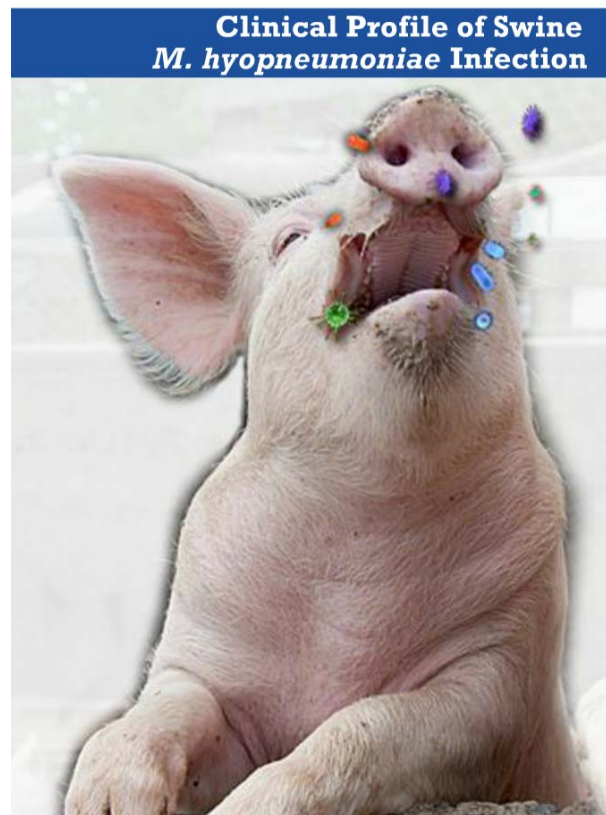
<i>Percentage</i>	1st S/F	2nd W/S	Total
Antibody	2%	0%	1%
Laryngeal Swabs			
Sites Sampled	12	5	17
total Sites	24%	10%	17%
Positive	25%	40%	29%
Negative	75%	60%	71%

# Unexpected Positives

- One site had:
  - IDEXX values of 5 positives and 3 suspects but low values  $<1.5$  S/P for all values
  - 1 out of 50 (2%) PCR positive on Laryngeal swabs following serologic test
  - Retest of the site an additional time
    - Thought it could be a false positive
    - 8 positive out of 52 (15%)

# Unexpected Positives

- All positive sites had some clinical signs of cough





# Preliminary Results

- Not enough positive sites to get much on risk factors
  - Data is not complete yet
- Not enough positive sites to get much on production numbers
  - Data is not complete yet



# Conclusions

- Negative pigs placed in pig dense areas of the Midwest do get lateral transmission of *Mycoplasma hyopneumoniae*
  - Just doesn't occur very often
    - **6% of the time**
      - Much lower rate than PRRS approximately 50%
  - Most were late infections since not highly serologically positive
    - **Not as much impact on performance**

# Conclusions

- Laryngeal swabs can be used if there are unexpected positive tests with IDEXX
  - Pigs will cough if really infected
- Vaccinated pigs can be used to monitor status of sites
  - Know how the vaccine responds on the test
- Clinical signs still a good method of detection of *Mycoplasma hyopneumoniae*

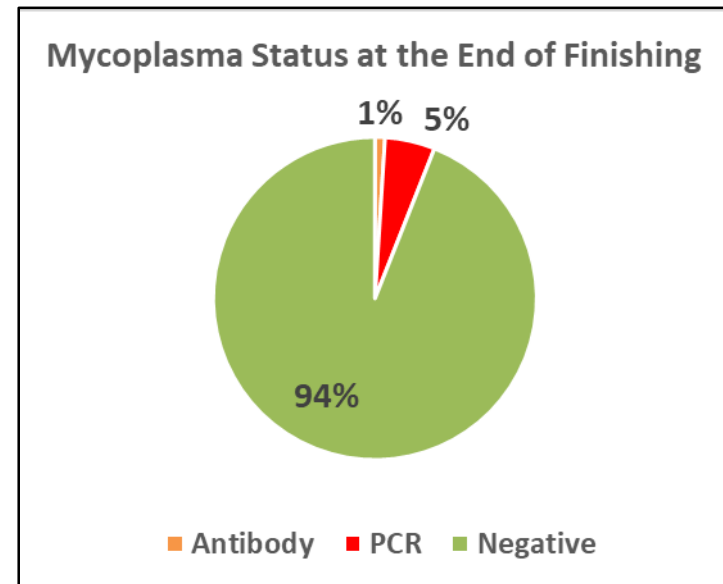
# Implications

- With a relatively low rate (6%) of lateral transmission
  - This will encourage more producers to evaluate elimination
    - Biggest concerns by producers has been will the pigs stay negative in finishing to recapture the cost and get the value
    - **Should no longer be a hurdle to elimination**
- If you have Mycoplasma problems in finishing it is most likely from the source farm of the pigs not the neighborhood



# Future Work

- Use this information in models to predict the probability of breaks to help with the decision for elimination and economic value to the herd or system



# Acknowledgements

- Boehringer Ingelheim
  - Funding of the project
    - Sample collection
    - Diagnostic testing
  - Technical support
    - Jana Morgan DVM
    - Eduardo Fano DVM, PhD
- SVC
  - Clients
    - Allow testing of pigs and sites
    - Collecting samples
  - Vets
    - Recruiting herds for the study
    - Helping collect samples
  - Staff
    - Processing samples and paper work



# Summary



# It's Possible

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