Northern NY Agricultural Development Program
2017 Project Report

Development of a Calf Health Risk Assessment Tool for Northern New York Dairy Farms

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- Sara Bull, CCE Clinton County
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- Dairy producers across Northern New York

Background:
Calf health and respiratory disease continue to challenge to Northern New York dairy producers. Calf respiratory disease is associated with decreased average daily gain, increased age at first calving, decreased milk production in first lactation and increased culling in the first 30 days. All of these factors lead to an increase cost of production and decreased revenue. With the increasing cost of production and decreasing margins, there is continued interest and need to cost effectively raise healthy productive calves for the future milking herd.

The foundational work for developing a second-party calf management practices and pre-weaned calf health on individual farms began in June 2015 and is the foundation for this 2017 project. In June 2015, a total of 437 pre-weaned calves were evaluated on 29 dairy farms across Northern New York (NNY) revealed the following data:
- respiratory scores averaged 2.466 with a range of 0 to 9
- 13.33% of calves evaluated scored greater than 5, indicating they have a respiratory challenge and should be treated. This was slightly greater than the national average.

- respiratory illness in pre-weaned calves ranged from 0 to 50% on a farm basis, in NNY (mean 11.05%)
- 44.82% of farms having no respiratory illness (based on score), and
- 10.32% of farms having 30 to 50% of evaluated calves exhibiting signs of respiratory illness.

A follow-up study, funded by the Northern New York Agricultural Development Program, in the winter of 2016 evaluated 426 calves in 27 facilities and observed that 14.54% of calves evaluated scored > 5, indicating they had a respiratory challenge and should be treated. This was greater than that observed in the summer of 2015. Prevalence of respiratory illness among calves ranged from 0 to 46% on a farm basis (mean 15.01%), with eight farms having no respiratory illness, and six farms having 30 to 46% of evaluated calves exhibiting signs of respiratory illness.

Calf health score was impacted by housing type, bedding, number of calves in a pen, ammonia concentration in pen, temperature and wind chill in the pen.

Calves housed in hutches had greater health scores as compared to those in group pens (3.92 vs 2.185, respectively); however, calves in individual pens did not differ in health scores from their counterparts (mean health score =3.34).

As calf numbers/pen increased to more than 5 calves per pen the calf health score increased. Other risk factors included poor body condition score (BCS), housing system, bedding, number of calves per pen, ammonia concentration (in the pen), nesting score, temperature, wind chill, and humidity.

The data collect from the 2015 and 2016-initiated, and still-in-progress, calf housing evaluation studies suggests that respiratory illness and general calf management continue to be a challenge on NNY dairy farms. Additionally, many farms report not knowing where to focus their time on calf management, or what areas of calf management need assistance.

The primary goal of this 2017 project was to use current local data to develop a calf risk assessment tool for implementation on local farms and create action plans for producers that outline key areas of calf management that would have the greatest impact on calf health specific to their farm. A decrease in calf mortality and morbidity rates is the long-term goal of this work.

Methods:

Development of Calf Health & Management Assessment Tool:

- Data collected from 2012–2016 NNYADP-funded projects that focused on calf management were reviewed to determine what management factors have the greatest impact on calf health in NNY.

On-Farm Implementation:

- Twenty NNY dairy farms were evaluated using the Calf Health & Management Risk Assessment tool.
- Potential calf management areas evaluated included:
    - Maternity pen management
    - Colostrum management
    - Pre-weaned nutrition
    - Pre-weaned preventative health management
    - Calf health
    - Calf housing & environment
- Evaluations may include:
    - Body condition, lameness, hygiene and hock/knee scoring of dry cows and calves
    - Testing colostrum and/or milk for bacterial content prior to feeding
    - Testing feeding equipment for bacterial content
    - Testing calves for passive transfer
    - Stocking density
    - Review of current protocols and record.
    - Measurement of temperature, humidity and airflow
- Farms received an action plan developed specifically for them based on the farm evaluation.

Follow-Up

- Farms received a follow-up evaluation at least once, three to nine months after the initial visit.
- All farms that participated received a report that included the impact of management changes to specific areas of calf rearing, as well as additional action plans if needed.

Statistical analysis

- Initial evaluation and follow-up data were evaluated to determine the impact of management changes based on assessment tool recommendations as well as to continue to monitor trends in calf rearing across NNY.

Results:

Evaluations are conducted by Extension educators trained to properly enter data into a database. The data is analyzed to determine risk areas and develop a report for reducing those risk areas. The report with data is delivered to the farmer to show trends on that farm and how it may compare to other farms in the region. (Collective data is presented confidentially without identification of individual farms.) Farms are re-evaluated every 3-6 months depending on the risk or request for re-evaluation. A list of best management practices serves as initial guidance for producers.

A total of 949 calves were evaluated on 20 farms across NNY between February and December 2017. Utilizing the same evaluation criteria. All farms had at least two evaluations, with 16 farms having four evaluations to determine seasonal weather impact.

Prevalence of respiratory illness ranged from 0 to 50% of pre-weaned calves per farm, with an average of 12.5% across all farms. This is slightly lower than the 15% observed in 2016, demonstrating that this continued research is valuable to farmers and having a positive impact. Unfortunately, 15% of individual calves had a respiratory challenge; this is nearly identical to the 14.5% reported in the winter of 2016, and continues to demonstrate the need for calf health evaluations, research and outreach programs.

Key management practices that have a positive impact on calf health:

- Colostrum management
    - Administer clean, quality colostrum within the first 3 hours of life; follow-up with a second feeding within 6 hours, for total consumption >1 gallon within 12 hours.
    - Evaluate passive transfer rates to determine if calves are getting adequate colostrum. This allows for producers to determine if the current colostrum protocol is working or if changes are needed.
    - Multiple farms made changes to their colostrum protocol after evaluating passive transfer. The majority of these farms were not feeding an adequate volume to the calves. One farm realized they were feeding poor quality colostrum, and have now started using a refractometer and are only feeding colostrum with a Brix reading >22%.
- Nutrition
    - Regardless of source (milk replacer, whole milk, pasteurized milk), all calves need to be fed a diet to meet their energy and protein needs. The amount fed likely needs to be adjusted based on age, season and growth goals.
    - Calves should be fed in age order, with youngest calves being fed first.
- Cleanliness
    - Calves are not born with a fully developed immune system. Any bacteria that are consumed impacts calf health.
    - All feeding equipment should be rinsed with lukewarm water to remove as much organic matter as possible, then placed in wash water with soap and chlorine that stays above 120º F. Wash by brushing all equipment surfaces. Rinse in an acid solution. Let dry completely.
    - Cleanliness was a challenge on more than 60% of the participating farms during the first assessment. All farms updated cleaning protocols; samples during subsequent evaluations feel within recommended range.
- Written protocols, with proper employee training and implementation
    - Written protocols are the first step of employee training for detection of calfhood illnesses.
    - Written protocols for calves should include:
        - Colostrum management
        - Pre-weaned calf nutrition/feeding
        - Routine management of pre-weaned calves
            - Dehorning
            - Identification

        - Vaccination plan
        - Calf health protocols should include disease identification. It is important for everyone with animal care responsibilities to have the same classification system. Treatment protocol should address:
        - How should the animal be treated and with what?
        - What is the duration of treatment?
        - Record keeping: Treatment records need to be kept for all classes of animals on a dairy farm; including animal ID, reason for treatment, drug administered, amount administered, route (IV, IM…), date, duration of treatment, withdrawal times and who administered the drug.
- Availability of water, regardless of season and age of animal.
- Use of calf jackets during colder weather
- Calf housing
    - All calves should be housed in a clean, dry facility and protected from the wind and/or drafts.
    - Calves housed in group pens are at a greater risk of respiratory illness.
- Management strategies to reduce risk of respiratory illness should be in place.
        - Maintain a small age gap between calves within a pen ($\leq$ 7 days).
        - House calves in groups < 8.

Conclusions/Outcomes/Impacts:

Overall, calf health continues to be a challenge on NNY dairy farms. **A high incidence rate of respiratory illness in calves exists across NNY. Many, but not all, farms struggle with respiratory issues in calves born when temperatures fall below zero. This often was related to the calorie intake of calves. For some farms, changes in incidence rates were due to protocol drift, changes in employees, or changes in the nutrient source, e.g., milk, milk replacer.**

Continued evaluation of calf health and individualized management reports are beneficial to monitor change across NNY as well as provide recommendations to improve calf health across NNY. **Producers can pay for the analysis of samples of blood, milk, colostrum, milk replacer and swabs from feeding equipment to drive risk assessment.**

Development of a calf health database allows for the monitoring of calf health trends on individual farms as well as across the region. Using the calf health tool and routinely entering data into the database allows for regional Extension educators and dairy producers to monitor calf health. This tracking allows producers to continually evaluate management changes.

Development of this database enables tracking of trends in calf health across Northern New York as well as on an individual farm basis with individual calf health reports and related calf management recommendations.

Every farm that participated in the 2017 evaluation project made calf management changes. Using individual farm data allowed for identification of a change that may have been missed without historical farm data to evaluate. Some farms have used the historical data to adjust management strategies during a specific time period. Many farms adjusted the caloric intake in winter calves and continued to feed water (even in freezing temperatures). These farms did not have the calf health challenges they had in past years.

The calf health evaluation tool is currently in paper format and can be conducted as a second party evaluation by Kimberley Morrill, Lindsay Ferlito, Alyssa Couse, and Sara Bull. This evaluation tool requires training prior to conducting the on-farm assessments; it is available to current Ag educators in NNY.

Digital refractometers used to evaluate colostrum quality, blood proteins, milk total solids, and hydration status of calves were purchased for this project. Farmers interested in sampling for protocol evaluation may contact Kimberley Morrill, Ph.D. at CCE St. Lawrence County, 315-379-9192, to borrow the materials.

Future needs were identified as:

- continue follow-up with farmers on calf health and feeding protocols; continue on-farm evaluations.

- increase number of participating farms. Many farms do not currently enter calf health or treatment data into on-farm record system, which provide a method to evaluate on-farm calf health trends. Encourage entering calf health data into DC305 or similar herd management software.

- make this a self-sustaining program. The last few years we have had research funding to cover the costs of equipment, bacterial analysis and time. Continuing to be able to offer this service would be very beneficial, but due to the current dairy industry we cannot ask producers to pay for these services. Options to fund this program for future use include grants or developing a producer fee schedule.

Outreach:

- Each participating farm received individualized reports after the on-farm evaluations. Many farms reached out for additional resources or one-on-one training.
- Calf management workshops were held in Clinton and Jefferson counties in February 2017; an additional three (Franklin, St. Lawrence and Lewis counties) were held in February 2018; reaching more than 100 people.
- Multiple newsletter articles were written in regards to calf health and management.

Next Steps:

Continue calf evaluations with dairy producers. More follow up is needed to evaluate individual farm rates of respiratory illness and incidence of scours throughout changing seasons and management practices.

Data from this project continues to be analyzed for bacterial counts in bedding samples and on feeding equipment, likely a risk factor for calfhood illness.

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For More Information:

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