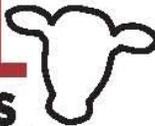


Building the Foundation 2016

Dairy and Veal Healthy Calf Conference



Organized and hosted by:

VEAL 
**Farmers
of Ontario**

your calf care partners

Supported and sponsored by:



Tuesday November 29th, 2016

Arden Park Hotel, Stratford, ON and Online Webinar

Thursday December 1st, 2016

Maxville & District Sports Complex, Maxville, ON

got colostrum?

It's no secret — feeding 4 litres of good quality colostrum within 30 minutes of birth can have a dramatic and lifelong impact on calf health. Feeding colostrum to all your calves can boost their immunity the way Mother Nature intended. Colostrum has been proven to reduce death loss and improve calf health simply by building a solid foundation. It may take a little bit of effort but it's money in your pocket at the end of the day!

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Off to a healthy start
naturally!

Building the Foundation

Dairy and Veal Healthy Calf Conference **2016**

WELCOME

Dear Conference Participants,

Thank you for your attendance at our seventh biennial Building the Foundation: Dairy and Veal Healthy Calf Conference. Maximizing calf health, through effective management, is fundamental to building healthy and productive herds for dairy, veal and dairy-beef producers. Animal care is a top priority for Veal Farmers of Ontario (VFO) and we are pleased to extend our healthy calf promotion to producers, veterinarians and industry partners again this year.

Through new research projects, innovation and education, VFO continues to work with producers to find solutions to their on-farm issues and improve calf health in the province. The 2016 Healthy Calf Conference has been designed to provide relevant and timely information that will help with problems you may be experiencing right now, like challenges with calf health, or even help adapt to new regulations, such as those around antibiotic use. As a launching pad of new resources, not only does it keep your farm business up to date on current industry trends and issues to be aware of, but it will offer you the opportunity to network with your fellow producers, and allow you to ask questions of the experts as you learn about the newest recommendations on how to manage your calves.

This year, in addition to our Stratford and Maxville locations, we are offering a webinar option to producers unable to attend in person, held simultaneously with our Stratford conference. It is our goal to reach as many dairy, veal and dairy-beef producers as possible with our healthy calf promotion.

The 2016 Healthy Calf Conference boasts an impressive program, featuring some of the most respected experts in the field of calf management, including Ireland's Dr. John Mee, who will be discussing newborn calf care, and Dr. Dave Renaud, one of Ontario's own up and coming leaders in calf care, who will share more about his current research on assessing calf health and provide an update on *Salmonella* Dublin, an emerging and destructive pathogen that has been detected in the province. On behalf of VFO, I would like to sincerely thank our speakers who have taken time out of their busy schedules to share their expertise with us.

Thank you as well to all of our industry partners who have so graciously provided sponsorship and support for this important educational event. Without them, this event would not be possible. The tradeshow features many exhibitors that can help you with the latest technology, from feeding to traceability, and incorporate new research on your farm. Along with your herd veterinarian, these farm advisors can help you adapt new recommendations to your own management and barn style. I hope that each of you take time to speak with the many representatives present in our tradeshow to discuss their line-up of products and to thank them for their generous support of the 2016 Healthy Calf Conference.

On behalf of the VFO Board and staff, welcome to the seventh biennial Healthy Calf Conference. As your gift for attending, please take home a 3.7 litre Calf-Tel bottle when you leave today. All calves, regardless of whether they are heifers or bulls, need four litres of colostrum within six hours of birth, and this new, larger, bottle can make that easier. A special thank you to Farmers Pharmacy, for co-sponsoring this initiative with VFO.

Sincerely,



Brian Keunen,
Chair

For more information about Veal Farmers of Ontario contact the office at 519-824-2942 or visit ontarioveal.on.ca.
For information on raising calves and additional calf resources, visit calfcare.ca





Building the Foundation

Dairy and Veal Healthy Calf Conference **2016**

The Building the Foundation Dairy and Veal Healthy Calf Conference would like to thank the following sponsors and industry partners for their generous support.

TITLE



PLATINUM



GOLD



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FLORADALE FEED MILL LIMITED
Finest in feeds and service for over 50 years!



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CALF BOTTLES



REFRESHMENTS



TRADESHOW



Building the Foundation

Dairy and Veal Healthy Calf Conference **2016**

AGENDA

Tuesday November 29th, 2016

Arden Park Hotel, Stratford, ON and Online Webinar

Thursday December 1st, 2016

Maxville & District Sports Complex, Maxville, ON

- 9:00 am** **Registration and Tradeshow Open**
- 9:30 am** **Welcome and Opening Remarks**
- 9:30 am** **Doubling calf weights by weaning**
Brian Keunen, Mapleview Agri Ltd.
- 9:45 am** **Frameworks, action plans, regulatory changes and your role in antibiotic stewardship**
Dr. Dave Leger DVM M.Sc, Public Health Agency of Canada
- 10:15 am** **Assessing calf health**
Dr. Dave Renaud DVM, University of Guelph
- 10:45 am** **Starting calves for the dairy-beef market – off to a healthy start!**
Dr. Amy Stanton Ph.D, Next Generation Dairy Consulting
- 11:15 am** ***Salmonella* Dublin; what producers need to know**
Dr. Dave Renaud DVM, University of Guelph
- 11:45 am** **Social media - why for agriculture?**
Kristen Kelderman, Grober Nutrition
- 12:00 pm** **LUNCH AND TRADESHOW**
- 1:15 pm** **What's new in calf resources?**
Kendra Keels, Veal Farmers of Ontario
- 1:30 pm** **Newborn calf care – can we do better?**
Dr. John Mee MVB, MVM, Ph.D, Dip ECBHM, MRCVS,
Teagasc - Department of Animal and Bioscience Research, Ireland
- 2:30 pm** **Success with streamlined protocols**
Rose Keunen, Henro Dairy Farms
- 3:00 pm** **Wrap up and Adjourn**

Doubling calf weights by weaning



*Brian Keunen
Mapleview Agri Ltd.*

Brian is a graduate of the University of Guelph with a B.Sc. (Agr) and an M.Sc. He was raised on a dairy farm and has been a milk and grain-fed veal producer since 2002. He produces around 3,000 grain-fed veal each year. He is the current Chair of Veal Farmers of Ontario (VFO) and a Director with the Canadian Veal Association. He is also a member of the Veal Cattle Code of Practice Development Committee through the National Farm Animal Care Council. In 2005, Brian established Mapleview Agri Ltd. which manufactures milk replacers for livestock. Improving calf nutrition has been an integral part of his research over the last ten years, conducting many on farm studies constantly looking for the optimal feeding program to improve the health and welfare of calves while maximizing growth during the milk feeding period.

Building the Foundation

Dairy and Veal Healthy
Calf Conference **2016**

Frameworks, action plans, regulatory changes and your role in antibiotic stewardship



*Dr. Dave Leger DVM M.Sc
Public Health Agency of Canada*

Dr. Leger graduated from the Ontario Veterinary College (OVC) in 1983. After graduation, he worked in mixed rural practice for 16 years with a focus on dairy production medicine. He was a participant in the first Dairy Health Management Certificate Program, held in 1990 to 1991. In 1999 he returned to the University of Guelph, Department of Population Medicine, for a Master of Science in epidemiology. His graduate research was on antimicrobial use and resistance in Ontario free stall dairy herds. From 2001 to 2002, he held the Antimicrobial Resistance and Biotechnology Specialist position in the Livestock Technology Branch of the Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). In 2002 he joined the Laboratory for Foodborne Zoonoses, Health Canada (now the Public Health Agency of Canada) as a veterinary epidemiologist with the Canadian Integrated Program for Antimicrobial Resistance Surveillance (CIPARS). He currently leads the Antimicrobial Use Working Group and Farm Surveillance component of CIPARS.

Building the Foundation

Dairy and Veal Healthy
Calf Conference **2016**

Frameworks, action plans, regulatory changes and your role in antibiotic stewardship

Dave Léger DVM MSc
Canadian Integrated Program for Antimicrobial Resistance Surveillance
Public Health Agency of Canada



Presentation Outline



- **What antibiotics and why these ones?**
 - Categories of importance
 - Antimicrobial use (AMU) in cattle
 - Bovine antimicrobial resistance (AMR) - CIPARS
- **“Sweeping changes...”**
 - Federal Action Plan
 - Mitigating AMR risk – VDD initiatives
 - Context: Timeline of AMU/AMR initiatives
- **Your pieces in the Stewardship Puzzle**

Disclaimer!



Does antibiotic residue avoidance = antimicrobial resistance avoidance?

Antimicrobial Residue

- **Chemical hazard** - Antimicrobial drug or metabolite present in the meat or milk from an animal
- Withdrawal period: Antimicrobial residue < MRL

Antimicrobial Resistance

- **Microbial hazard** - Resistant bacteria/genes are isolated from the meat or milk of an animal
- Dissemination of resistant bacteria/genes continues beyond the residue withdrawal period

What antibiotics?

Categories of importance to human medicine*

1. **Category I: Very High Importance**
 - Ceftiofur, Enrofloxacin, Colistin
2. **Category II: High Importance**
 - Penicillin G, Tylosin, Lincomycin, Trimethoprim-sulfadoxine, Tulathromycin, Ampicillin, Streptomycin, Virginiamycin, Tilmicosin, Phenoxymethyl penicillin, Amoxicillin, Erythromycin, Tyvalosin
3. **Category III: Medium Importance**
 - Chlortetracycline, Oxytetracycline, Tetracycline hydrochloride, Sulfonamides, Tiamulin, Neomycin, Spectinomycin, Florfenicol, Bacitracin
4. **Category IV: Low Importance**
 - Salinomycin, Bambergmycin

* VDD: Veterinary Drug Directorate, Health Canada
http://www.hc-sc.gc.ca/dhp-mps/consultation/vet/consultations/amr_ram_hum-med_e.html

What antibiotics? Medically Important Antimicrobials (MIAs)

Categories of importance to human medicine*

1. **Category I: Very High Importance**
 - Ceftiofur, Enrofloxacin, Colistin
2. **Category II: High Importance**
 - Penicillin G, Tylosin, Lincomycin, Trimethoprim-sulfadoxine, Tulathromycin, Ampicillin, Streptomycin, Virginiamycin, Tilmicosin, Phenoxymethyl penicillin, Amoxicillin, Erythromycin, Tyvalosin
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 - Salinomycin, Bambergmycin

MEDICALLY IMPORTANT

* VDD: Veterinary Drug Directorate, Health Canada
http://www.hc-sc.gc.ca/dhp-mps/consultation/vet/consultations/amr_ram_hum-med_e.html

What antibiotics? AMU in AB feedlot beef¹

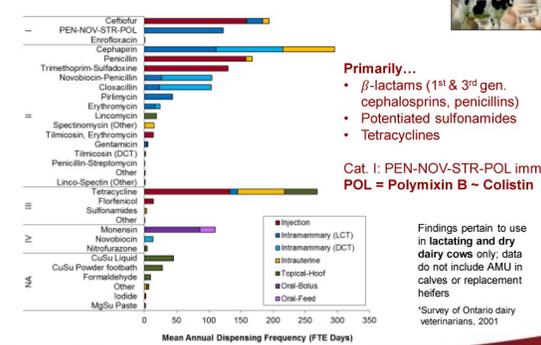


Antimicrobial by Route of Administration	Antimicrobial Class	VDD Category	Primary Reason for Use
Injection			
Ceftiofur	Beta-lactam	I	BRD Treatment
Enrofloxacin	Quinolone	I	Relapse BRD Tx
Florfenicol	Phenicol	II	BRD Treatment
Tilmicosin	Macrolide	II	BRD Prev/Tx
Tulathromycin	Macrolide	II	BRD Prev/Tx
Tylosin	Macrolide	II	Implant Site Abscess Prev.
Trimethoprim-sulfadoxine	Sulfonamide	II	BRD Treatment
Oxytetracycline	Tetracycline	III	BRD Prev/Tx
In-Feed			
Tylosin	Macrolide	II	Liver Abscess Prev.
Chlortetracycline	Tetracycline	III	Liver Abscess Prev. Histophilosis Prev.

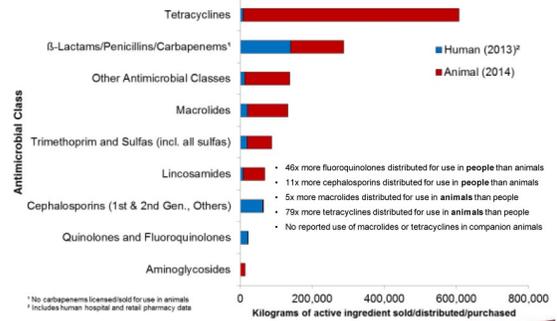
BRD = Bovine Respiratory Disease; Tx = Treatment; Prev. = Prevention

¹Modified from N. R. Noyes, K. M. Benedict, S. P. Dow, C. L. Waldner, R. J. Reid-Smith, C. W. Booker, T. A. McAllister, and P. S. Morby. Modeling considerations in the analysis of associations between antimicrobial use and resistance in beef feedlot cattle. *Epidemiology and Infection*, 2016.

What? Dispensing frequencies by Ontario dairy vets¹



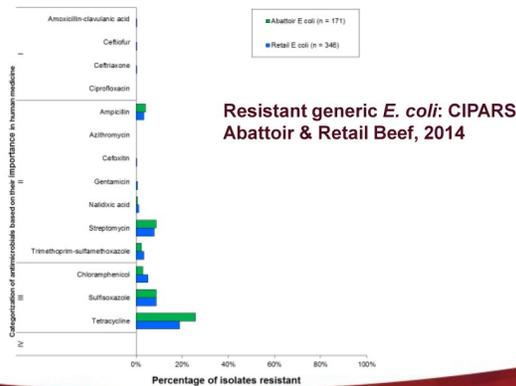
CIPARS: Antimicrobial Sales/Distribution data



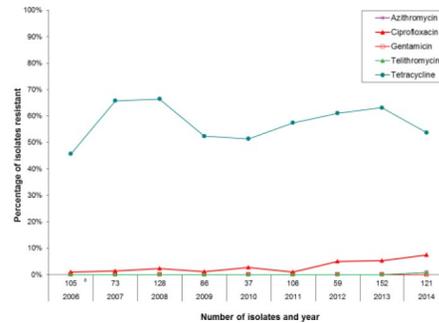
Canadian bovine antimicrobial use data

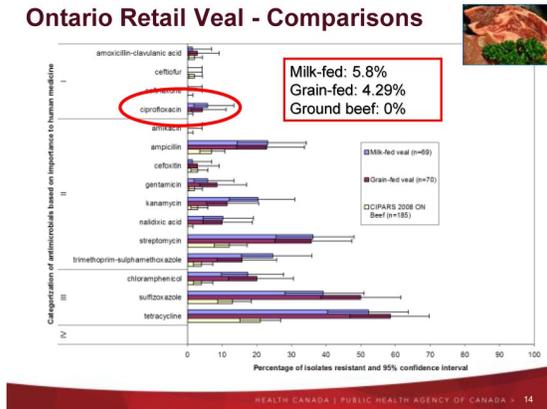
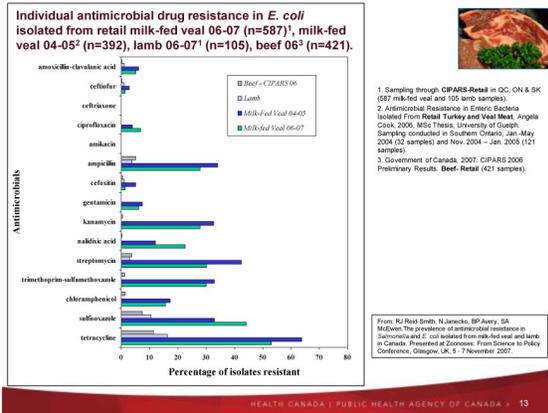
- V. Saini, J.T. McClure, D. Léger, S. Dufour, A.G. Sheldon, D.T. Scholl, H.W. Barkema. **Antimicrobial use on Canadian dairy farms.** J. Dairy Science. 2012 March; Vol. 95, Issue 3, p1209–1221
- Léger DF, Newby NC, Reid-Smith R, Anderson N, Pearl DL, Lissemore KD, Kelton DF. **Antimicrobial dispensing by Ontario dairy veterinarians.** Can Vet J. 2015 Jul; 56(7):723-9.
- N. R. Noyes, K. M. Benedict, S. P. Gow, C.L. Waldner, R. J. Reid Smith, C. W. Booker, T. A. McAllister, and P. S. Morley. **Modeling considerations in the analysis of associations between antimicrobial use and resistance in beef feedlot cattle.** Epidemiology and Infection, in press.
- No AMU data available for veal

Antimicrobial Resistance Concerns



Temporal variations in resistant *Campylobacter* isolates: CIPARS Abattoir beef, 2006-2014





References

1. Cook A, Reid-Smith RJ, Irwin RJ, McEwen SA, Young V, Ribble C. **Antimicrobial resistance in Campylobacter, Salmonella, and Escherichia coli isolated from retail grain-fed veal meat from Southern Ontario, Canada.** Journal of Food Protection, 74 (8): 1245-1251. 2011.
2. Cook A, Reid-Smith RJ, Irwin RJ, McEwen SA, Young V, Butt K, Ribble C. **Antimicrobial resistance in Escherichia coli isolated from retail milk-fed veal meat from Southern Ontario, Canada.** Journal of Food Protection, 74 (8): 1328-1333. 2011.

Co-selection and cross-resistance

Tammy M. Platt, Guy H. Loneragan, H. Morgan Scott, Bo Norby, Daniel U. Thomson, Michel S. Brown, Samuel E. Ives, Mindy M. Brashears. (2008) **Antimicrobial susceptibility of enteric bacteria recovered from feedlot cattle administered chlortetracycline in feed.** American Journal of Veterinary Research. 69:8, 988-996

- **Conclusions and Clinical Relevance**—Exposure to chlortetracycline was associated with a temporary increase in the likelihood of recovering resistant bacteria. Exposure to chlortetracycline decreased the likelihood of recovering ceftiofur-resistant *E. coli* isolates, even though isolates were coreistant to tetracycline. These findings warrant further investigation.

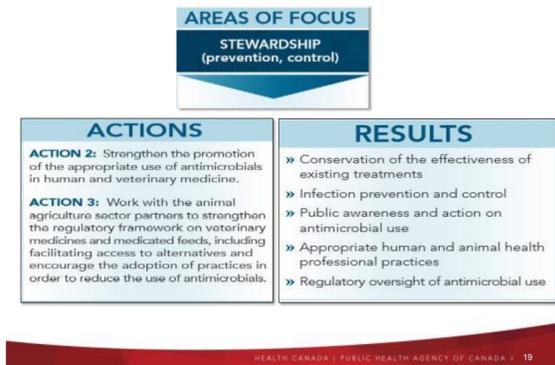


October 26, 2015
 Re: Federal government initiatives

Sweeping changes to antimicrobial prescribing practices in progress
 Wide-sweeping changes to antimicrobial prescribing practices in food animals are in progress for late 2016. What do these changes mean to veterinarians in Ontario?

Federal Framework to address AMR/AMU in Canada

GOAL To protect Canadians from the health risks related to antimicrobial resistance			PARTNERS +Public Health Agency of Canada +Health Canada +Canadian Food Inspection Agency +Agriculture and Agri-Food Canada +Canadian Institutes of Health Research
AREAS OF FOCUS			
SURVEILLANCE (monitoring)	STEWARDSHIP (prevention, control)	INNOVATION (new methods, tools)	
ACTION 1: Establish and strengthen surveillance systems to identify new threats or changing patterns in antimicrobial resistance and use in human and animal settings.	ACTION 2: Strengthen the promotion of the appropriate use of antimicrobials in human and veterinary medicine. ACTION 3: Work with the animal agriculture sector partners to strengthen the regulatory framework on veterinary medicines and medicated feeds, including facilitating access to alternatives and encourage the adoption of practices in order to reduce the use of antimicrobials.	ACTION 4: Promote innovation through funding collaborative research and development efforts on antimicrobial resistance both domestically and internationally.	
RESULTS			
<ul style="list-style-type: none"> Detection of new trends and threats Development of new strategies Monitoring the effectiveness of public health actions 	<ul style="list-style-type: none"> Conservation of the effectiveness of existing treatments Infection prevention and control Public awareness and action on antimicrobial use Appropriate human and animal health professional practices Regulatory oversight of antimicrobial use 	<ul style="list-style-type: none"> Research in food safety, prevention of resistance, current and new threats New methods and tools to combat antimicrobial resistance: antibiotic, diagnostics, novel therapies. 	



Health Canada's efforts to Strengthen Canada's Regulatory Framework for Veterinary Antimicrobials

Veterinary Drugs Directorate
 Health Products and Foods Branch

June 23, 2016



Antimicrobial Resistance (AMR) in a veterinary drugs context

- **Antimicrobial use** – including the inappropriate use/overuse in humans, **animals** and plants – is leading to increases in the emergence and spread of AMR
- **AMR risk from animals** is one face of a multi-faceted problem
 - Globally, an estimated 70% - 80% of all antimicrobial drugs are used in food-producing animals
 - Although Health Canada authorizes veterinary drugs for sale, their **use** falls under the "practice of veterinary medicine" (Provincial jurisdiction)
 - Multiple jurisdictions, including federal, P/T and municipal governments, industry and stakeholders all have a role to play

Antimicrobial Resistance (AMR) in a veterinary drugs context

- **Multiple federal initiatives are underway on both the human and veterinary sides of AMR in a coordinated manner ("One Health" approach):**
 - Federal Framework (2014) and Action Plan (2015), HC Notice of Intent in CGI (2015), OAG report & HC commitments (2015), ongoing engagement with stakeholders
 - Current Drug Regulations do not provide appropriate controls.
 - Proposed policy and regulatory initiatives aimed at strengthening prudent use of Medically-Important Antimicrobials (MIAs) in animals

Snapshot – VDD's AMR Initiatives Underway

These initiatives are interconnected and mutually supportive:

- 1) Removing growth promotion claims from pre-2004 approved medically-important antimicrobials (MIAs)
 - *policy approach*
- 2) Increasing veterinary oversight over all MIAs (pre-2004 approved)
 - *policy and existing regulatory tools*
- 3) Increasing oversight on importation of veterinary drugs (Own Use Importation) and active pharmaceutical ingredients (APIs)
 - *new regulatory proposal*
- 4) Facilitating access to low risk veterinary health products as additional tools for the maintenance of animal health and welfare
 - *new regulatory proposal and existing policy tools*
- 5) Mandatory reporting of sales volume from manufacturers and importers to support antimicrobial use surveillance
 - *new regulatory proposal*

VDD, Health Canada: Mitigating AMR Risks - Stewardship Pillar

In summary: The goal is to promote prudent use of medically-important antimicrobial drugs in food animal production

Multi-Pronged Strategy

- Continued pre- and post-market evaluation of new veterinary antimicrobial drugs (since 2003)
- Appropriate labelling information
- AMR related warnings on certain product labels
- Phasing out of growth promotion and/or production claims of medically-important antimicrobials
- Veterinary oversight of antimicrobial use in food animals
- Strengthening the regulatory framework for veterinary drugs, including increasing oversight on importation
- Collaboration with partners and relevant stakeholders
- International alignment

Next Steps

- Continue moving forward with the multipronged strategy to address AMR in veterinary drugs context
 - Critical that all planned initiatives roll out concurrently
- Regulatory proposal to be published in the Canada Gazette, Part I in early July 2016
- Continued engagement with all stakeholders given complexity of the issue
- Securing strong F/P/T engagement as a critical component of the Pan-Canadian framework
- Work underway on implementation details and guidance, incorporating feedback received

VDD's initiatives roll up to just one piece of this complex puzzle...



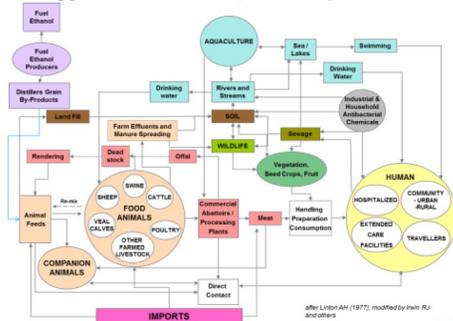
International initiatives



Commonalities

- Increased antimicrobial use surveillance at farm level
- Prescription required for all antimicrobials
- Restriction of third generation cephalosporins
- Restriction of fluoroquinolones
- Restriction/elimination of growth promotion (and preventative) uses
- Targeted reductions in antimicrobial use

Ecology of AMU-AMR; A complex issue!



Stewardship: A multi-pronged approach



What can you do as a vet or producer?

- Antimicrobial stewardship: Professional management to reduce resistance selection and to **preserve the efficacy** of antimicrobial agents:
 - 5Rs: **R**esponsibility, **R**eduction, **R**efinement, **R**eplacement, **R**eview
- J. Scott Weese, Stephen W. Page, and John E. Prescott. Antimicrobial Stewardship in Animals. In: S. Giguère, J.F. Prescott, P.M. Dowling eds. Antimicrobial Therapy in Veterinary Medicine 0P. Ed. Ames Iowa: John Wiley & Sons, Inc., 2013:117-132.
- Reduce need for AMU through husbandry/management
 - Cow/calf environment: Calf comfort/stress, nutrition, facility design
 - Infection control (hygiene) and maximizing immunity (colostrum and vaccination)
- Benefits of a “valid” VCPR
 - Support Quality Assurance/OFFS programs re: handling and use of drugs
 - Drug inventory management
 - Develop understanding of the elements of good stewardship practices
 - Diagnostic and treatment protocols
 - Provide complete prescription information at the point of dispensing
- Identify information gaps
 - What information do you need to monitor and implement stewardship practices?
 - e.g., Need for clinical trials focused on mitigating/reducing AMU/AMR

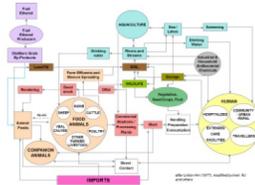
Stewardship: A multi-pronged approach



- ✓ Preservation of antimicrobials for animal and human health
- ✓ Consumer confidence... “Social License”
- ✓ Maintenance of trade relationships??

Summary: It's complicated!!!

- Antimicrobial resistance is a complex issue
- Medically important AMDs are used in bovine medicine
- Legislation alone will not improve AMU and AMR
- No magic bullet, a multi-pronged approach is essential
- The preservation of antimicrobial efficacy depends on all users of antimicrobials playing their role in completing the “stewardship puzzle”



Contact Information



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CIPARS Website: www.phac-aspc.gc.ca/cipars-picra/index-eng.php
www.phac-aspc.gc.ca/cipars-picra/index-fra.php

Thank you for your attention!

Assessing calf health



*Dr. Dave Renaud DVM
University of Guelph*

Dr. Renaud is a Ph.D candidate in the Department of Population Medicine at OVC. Upon completion of his DVM from OVC, he worked as a bovine veterinarian for a mixed animal clinic located in southwestern Ontario with a special interest in calf and udder health. During his time in practice, he developed a specific interest in the health and welfare of dairy calves while working with a large veal operation. He continues to be involved with the practice focusing on herd health and preventative medicine. He is also a committee member involved in the development of the new Veal Cattle Code of Practice and on the Animal Care Committee for a research corporation. His Ph.D project is focused on examining causes of calf morbidity and mortality in the Ontario dairy and veal industries. He hopes to determine why some calves become sick while others thrive. This information can then be used by producers to improve calf health by adjusting management strategies.

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Assessing Calf Health

Dave Renaud
Dairy and Veal Healthy
Calf Conference



Outline

- Why do we need to assess calf health?
- When do we need to assess calf health?
- How do we assess calf health?
 - At Parturition
 - On Farm
 - At arrival to a veal or dairy beef facility
 - Overall calf herd health on farm



Assessing Calf Health

- Needs to be
 - Standardized
 - Done the same way every time
 - Timely
 - Done at the right time and provide correct interventions



At Parturition

- Why?
 - Parturition is one of the most hazardous and traumatic events in the life of a calf
- Impacts of dystocia
 - Internal injuries such as bleeding and fractures
 - Impaired breathing and inadequate supply of oxygen to oxygen dependent organs
 - Impaired ability to thermoregulate
- All create a newborn calf with poor vitality



Dystocia

- Short term consequences
 - High perinatal mortality
 - Lower passive immunity transfer⁸
 - Higher pre-weaned mortality⁸
 - Higher indicators of physiological stress⁸
- Long term consequences
 - Impact on milk production
 - 703 kg reduction in 305-d milk yield in veterinary assisted calves compared with non assisted calves⁹



⁸Eaglen, 2011
⁹Barrier, 2012



Assessing Calf Health at Parturition

- Visual appearance of tongue and head
- Responsiveness to straw in nasal cavity
- Mucus membrane color
- Heart and Respiratory Rate
- Decreased ability to perform tasks at birth³
 - Time to sternal recumbency
 - 5 minutes
 - Attempt to stand
 - 10 minutes
 - Standing
 - 60 minutes
 - Suckle response

University of Guelph - Calf Vitality Score Sheet

Item	Score	Weight	Weighted Score
Visual appearance of tongue and head	1-4	1	1-4
Responsiveness to straw in nasal cavity	1-4	1	1-4
Mucus membrane color	1-4	1	1-4
Heart and Respiratory Rate	1-4	1	1-4
Decreased ability to perform tasks at birth ³	1-4	1	1-4
Total Score			5-20

³Mee, 2008
⁴Murray, 2014



Calves with Poor Vigor



- Warm calf
 - Heat lamp
 - Cover in straw or put on calf jacket
- Use of NSAID (Meloxicam)⁴
 - Improved Vigor and suckling reflex
 - Improved pre-weaning weight gain and health
- Feed colostrum ASAP
 - Consider using esophageal tube feeder if won't suckle
 - Gives necessary immunoglobulins
 - Will provide thermal support and calories



⁴Murray, 2014



On Farm



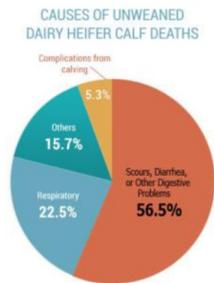
- Why
 - Important to detect diseases early to prevent short term and long term consequences
 - Get better results with less mortality!
 - Diseases have different long-term impacts
- When
 - Twice daily
 - Special focus at periods of highest risk
 - Pre-weaning
 - When have decline in colostrum immunity



Diarrhea



- Short term impact
 - Highest cause of mortality <30 days of age⁵
 - Responsible for 7.5% of mortalities in milk-fed veal facility⁶



⁵NAHMS, 2007
⁶Pardon, 2012



Diarrhea



- Long Term Impact
 - Reduction in growth rate by 18% if case during first 60 days of age
 - Increased risk of being sold prior to weaning⁸
 - Increased age at first calving⁸
 - Lower first lactation corrected milk⁹
- Economic cost
 - \$33.46 per pre-weaned calf per year¹⁰



⁸Walter-Toews, 1986
⁹Svensson and Hultgren, 2008
¹⁰Bendali, 1999



Pneumonia



- Short term Impact
 - Highest cause of death in Holstein dairy calves >30 days of age⁵
 - Highest cause of death in milk-fed veal
- Long Term Impact
 - Reduction in growth rate by 4kg if case in first 60 days of age
 - Increased age at first calving
 - Increased risk of dystocia at first calving
- Economic cost
 - \$25-81 per case due to long term impact⁷



⁵NAHMS, 2007
⁶Pardon, 2012
⁷van der Fels-Klerx, 2001



Umbilical Infection



- Third most common cause of calf mortality
- Caused by bacterial invasion of umbilical cord
 - Can result in septicemia leading to organ failure, meningitis and severe arthritis
- Impact on growth
 - 9 kg reduction in growth if umbilical infection diagnosed and treated in first 90 days¹¹



¹¹Virtala, 1996



Impact of Disease



- All 3 of the most common diseases can have significant impact on long-term growth
- Also associated with costs involving treatment and labor
- Early detection of disease
 - Reduces long-term impact
 - Reduces mortality



How to Assess Calf Health?



- Recognizing sick calves requires training and experience
 - Work with your veterinarian to create and implement a protocol/screening tool to use
 - Often subtle changes
 - At back of pen or at feed trough not eating
 - Reduction in drinking speed or grain consumption
- Use of effective tools such as technology can help find sick calves sooner



Health Scoring App



- Developed by University of Wisconsin
- Enter scores for each calf examined
- Aids in identifying when calves are sick and require treatment



Health Scoring App



- Screens for health issues in specific systems
 - Respiratory system
 - Attitude
 - Nasal discharge
 - Ocular discharge
 - Cough
 - Ear and head position
 - Temperature
 - Digestive system
 - Attitude
 - Fecal Score
 - Temperature
 - Navel ill
 - Navel score
 - Attitude
 - Temperature



Health Scoring App



- Tabulates into three categories following algorithm
 - No Disease
 - Recheck
 - Treatable



Pneumonia



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

¹³McGuirk, 2014

Pneumonia

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
--------	-------------------------	-------------------------	------------------------------

¹³McGuirk, 2014

Pneumonia

Farm Name: _____
Date: _____

Calf Respiratory Scoring Chart

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

¹³McGuirk, 2014

Diarrhea

2

3

- Fecal score
 - Score of 2 and 3 abnormal
- Attitude
 - Look for signs of depression as may identify dehydration
- Dehydration level
 - Skin tent
 - Attitude
 - Eye recession
- Temperature

Levels of Dehydration

Dehydration	Attitude	Eyeball recession	Skin tent
<5%	Normal	None	<1
6-8% (mild)	Slightly depressed	2-4 mm	1-2
8-10% (moderate)	Depressed	4-6 mm	2-5
10-12% (severe)	Comatose	6-8 mm	5-10
>12%	Comatose/dead	8-12 mm	>10

¹⁴Smith, 2009

Navel-ill

- Palpate navel
 - Score 2 and 3 abnormal
- Temperature
- Attitude
 - Depression indicates septicemia

Score 0	Score 1	Score 2	Score 3
Normal	Slightly enlarged, not warm or painful	Slightly enlarged, with slight pain, heat or moisture	Enlarged with pain, heat or malodorous discharge

Putting it all Together

Clinical Parameter	Pain and Discomfort			
	0	1	2	3
Nasal Discharge	Normal	Small amount of unilateral, frothy discharge	Increased volume or mucous nature	Profuse, frothy, mucopurulent nasal discharge
Ocular Discharge	Normal	Mild ocular discharge	Moderate to severe	Heavy ocular discharge
Ear Position	Normal	Ear flicking	Slightly retracted or droop	Markedly retracted or held over ear drop
Cough Score	0-1 cough	2-3 cough	4-5 cough	6-7 cough
Temperature	37.6-38.2°C	38.3-39.0°C	39.1-39.9°C	>40.0°C
Feces	Normal	Slightly enlarged, not warm or painful	Slightly enlarged with slight pain or moisture	Enlarged with pain, heat or malodorous discharge
Navel	Normal	Slightly enlarged, not warm or painful	Slightly enlarged with slight pain or moisture	Enlarged with pain, heat or malodorous discharge
Jaundice	Normal	Slightly enlarged, not warm or painful	Slightly enlarged with slight pain or moisture	Enlarged with pain, heat or malodorous discharge



Robotic Milk Feeders



- Automatic calf feeders are able to closely monitor feeding behavior of pre-weaned calves
 - Use measures such as drinking speed, number of visits, and total daily consumption
- Using information provided, able to identify calves that require further examination
 - Don't need robotic feeder to monitor drinking speed and appetite



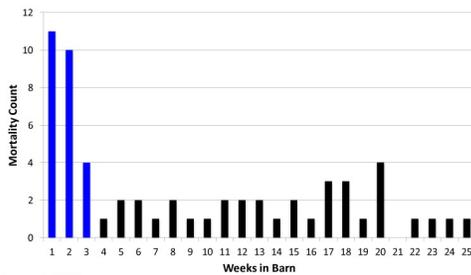
On Arrival/Leaving Dairy Farm



- Dairy beef and veal operations rely on dairy producers to provide the necessary care for newborn dairy feeder calves
- On arrival to the dairy feeder calf facility is an opportunity to identify high-risk calves immediately



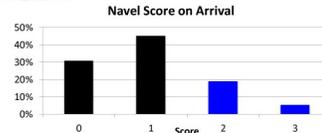
Why On Arrival?



Renaud, 2016



Navel Score



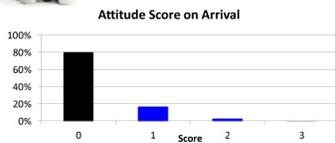
- Navel score of 3
 - Associated with a 4.4 times greater odds of mortality in first 21 days



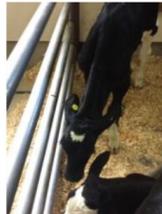
Renaud, 2016



Attitude Score



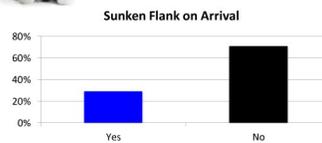
- Dull
 - 2 times more likely to die in the first 21 days after arrival



Renaud, 2016



Sunken Flank



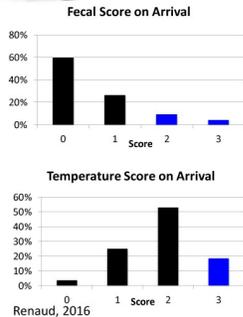
- Sunken Flank
 - 2.8 times more likely to die in the first 21 days



Renaud, 2016



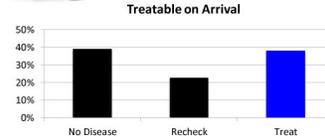
Fecal Score and Temperature



- Fecal Score
 - No association with mortality
- >39.5
 - No association with mortality



Treatable



- If identified as treatable by the Health scoring app
 - 2 times more likely to die in the first 21 days



Renaud, 2016



Assessing Calves on Arrival



- Approximately 38% of calves abnormal at arrival
 - Navel score and fecal score form the largest portion
- Navel, attitude, and flank
 - May be important to evaluate on arrival
- Rectal temperature and fecal score
 - May not be important indicators of health on arrival
- Calf Health Scorer App shows promise to identify high risk calves



Assessing Calf Herd Health



- Look at areas that make biggest impact
 - Colostrum management
 - Diseases
 - Growth
 - Nutrition



Why Assess Calf Herd Health?



- Mortality and morbidity continue to be high
 - 7.6% perinatal mortality risk³
 - 7.5% pre-weaning mortality risk in heifers born alive⁴
 - 23% and 21.9% of calves treated for diarrhea and pneumonia in first 3 months of age, respectively⁵
- Failure of passive transfer remains an unresolved issue
 - 37.1% FPT in Ontario study on 111 herds⁶

³Van Rooy, 2007
⁴NAHMS, 2007
⁵Windeyer, 2014
⁶Trotz-Williams, 2008



Goals for Calf Herd Health



- Colostrum Management
 - Total Protein
 - Collect blood from calves that are 1 to 7 days of age
 - Use refractometer to determine
 - Cutpoint of 5.2 g/dL
 - Alarm level >20%
 - Colostrum quality
 - Collect colostrum samples and test with brix refractometer
 - Feed colostrum if >22%





Goals for Calf Herd Health



- Morbidity
 - Pneumonia treatment <15%
 - Diarrhea treatment <20%
- Mortality
 - At parturition <5%
 - Birth to weaning <5%
 - Weaning to freshening <1%



Assessing Calf Herd Health



- Work with your veterinarian to develop a calf herd health program
 - Work on target levels for each group of heifers
 - Monitor growth too
 - Create protocols and training programs



Take Home Messages



- Important to have standardized and timely assessment of calf health
- Dystocia and diseases have both short and long term consequences on the calf
 - Important to identify at risk calves early!
 - Many effective tools to aid in this
- Assess calf herd health
- Work with your veterinarian



Thanks for Listening!

Starting calves for the dairy-beef market – off to a healthy start!



*Dr. Amy Stanton Ph.D
Next Generation Dairy Consulting*

Dr. Stanton received her Ph.D from the University of Guelph in Epidemiology and Animal Welfare. Her Ph.D examined the impact of management practices on the health and welfare of dairy calves. Between 2012 and 2015, she split her time as the Animal Well-being Specialist for the University of Wisconsin-Extension and as an Assistant Professor in the Department of Dairy Science at the University of Wisconsin-Madison. Since then she has returned to Ontario, where she acts as a calf management consultant. Starting calves for the dairy beef industry may be new to some and old hat for others. It is important that the calves are started right and protocols are set to achieve maximum performance especially when it comes to painful practices like castration and dehorning.

Building the Foundation

Dairy and Veal Healthy
Calf Conference **2016**

Starting calves for the dairy beef industry

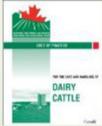
Dr. Amy Stanton, BSc(Agr), PhD
Next Generation Dairy Consulting

- ## Outline
- What is Dairy Beef?
 - Starting right
 - Procedures
 - Pain control
- 

- ## Dairy Beef
- Primarily Holstein Bulls
 - Some Jersey X Beef crosses
 - Look for genetics that prevent yellowing
 - Raise to 12 to 14 months
 - Cautions : Temperament, slower growth, fragility (maybe)

- ## Start them Right
- Good colostrum program
 - Vaccine
 - Successful Passive Transfer Premium
 - Brix Refractometer
 - Check Navels
 - Reduce transportation and mixing stress
- 

- ## Dehorning and Castration
- Benefits of dairy beef
 - Easy handling
 - Procedures done easily at earlier age
 - Reduces or eliminates impacts on ADG
 - Reduces pain associated with procedures

- ## Pain Management **
- Sedative (Xylazine)
 - Local Anesthetic (2% Lidocaine) ~\$ 0.25
 - Non-steroidal Anti-inflammatory
 - Metacam cost ~ \$ 1.75 -2.00
 - Banamine cost (2 shots) ~ \$ 1.70
- 
- *** Required by Canadian Codes of Practice

Horn Removal

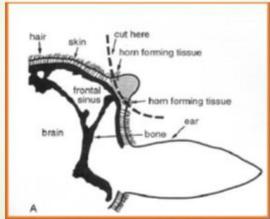


Image courtesy of Slideshare.net

Disbud versus Dehorn



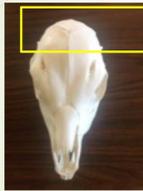
1-3 days old



2-4 months old

Image courtesy of UW-Extension

Disbud versus Dehorn



1-3 days old



2-4 months old

Image courtesy of UW-Extension

Dehorning/Disbudding

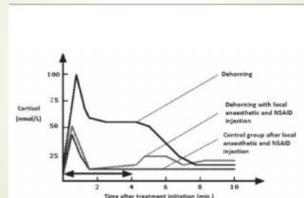
- Stop horn bud growth
- Caustic paste or hot iron
- Recommend use of pain control
- May be performed by veterinarian or trained lay person

Which calf was given Lidocaine?

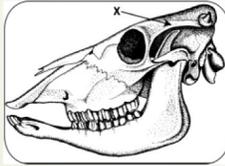


Used with permission, courtesy of Dr. Suzanne Millman

Why Non-steroidal Anti-inflammatory



Lidocaine Administration

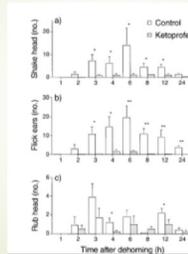


<http://www.omafr.gov.on.ca/english/livestock/dairy/facts/09-003.htm>

Tips for Lidocaine Use In Dehorning

- Do in batches
- Lidocaine takes approximately 3-5 minutes to freeze
- Step 1) Restrain 3 or 4 calves,
- Step 2) give Lidocaine to all
- Step 3) Dehorn in order

Why Non-Steroidal Anti-Inflammatory



Faulkner and Weary, 2000

Caustic Paste

- Chemical Burn
- Minimal Restraint Needed
 - Sooner the better (low calf co-ordination)
- Calf must be isolated
 - No one licks it or rubs it off – eyes or udders
- Calf must stay dry
- Risk of incomplete disbudding

Tips for Pain Control with Caustic Paste

- Do not inject Lidocaine around horn bud
 - Increases pain

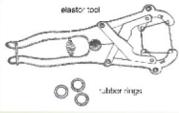
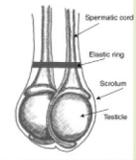
Castration

Castration

- Must use pain control
 - Anesthetics, sedatives, analgesics
- Options: Rubber ring (Elastor), Burdizzo, Surgical
- Earlier performed, smaller injury
- Less feed problems

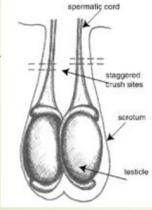
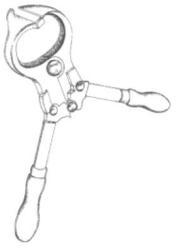
Elastor

- Calf must be < 1 weeks

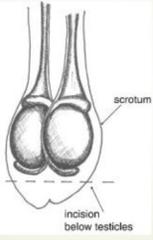



Emasculatome Burdizzo Clamp

- 1 month and older

Surgical Castration



Take Home

- Painful procedures best done at a young age
- Inexpensive options available to control pain
- Increases ease of handling

Thank you & Questions?

Salmonella Dublin; what producers need to know



*Dr. Dave Renaud DVM
University of Guelph*

A new threat has been found in Ontario – recent tests have revealed Salmonella Dublin is present in Ontario herds. Dr. Renaud will give a presentation on the signs and symptoms of this emerging disease. This bacteria can cause massive devastation to a herd and is transmissible to humans as well as other species. Producers will want to pay close attention on what the signs and symptoms of this disease are to take quick action.

Building the Foundation

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Calf Conference **2016**



Salmonella Dublin What Producers Need to Know

Dave Renaud



Outline

- What is Salmonella dublin?
- Where did it come from?
- What does it look like?
- Who does it affect?
- How to treat it?
- How does it spread?
- How to diagnose it?
- How to prevent it?
- How to get rid of it?



Salmonella Dublin

- Multi-drug resistant bacterial disease that is an emerging threat in Ontario
- Predominantly affects cattle but can also cause illness in other species
 - Including humans!!
 - Drinking raw milk
 - Fecal-oral
- Resulting in high levels of morbidity and mortality on Ontario farms
 - Mostly affecting veal farms



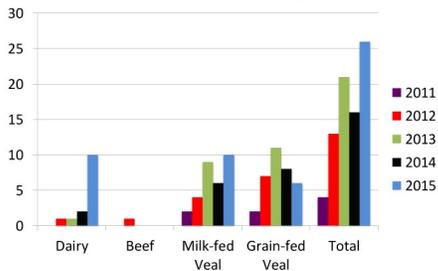
Where did it come from?

- Present in New York State for more than 2 decades
- Recently has entered Quebec with cases spread throughout the province
- First case diagnosed in Ontario during 2012
 - Immediately notifiable disease in Ontario



Status in Quebec (2015)

Confirmed Cases by Industry



Status in Quebec (2015)

- Surveillance study of 169 dairy herds
 - 8.9% of herds tested had at least one seropositive cow

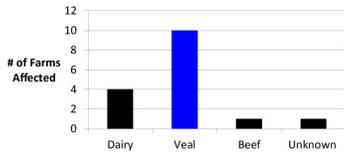




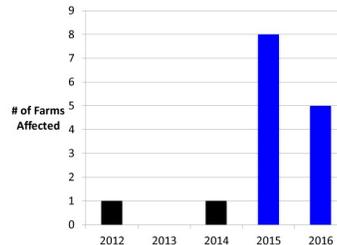
Current Status of S. Dublin in Ontario



- Present with case becoming more common
- 23 confirmed cases since 2012
 - Found on 15 herds mostly located in SW Ontario
- Most cases from veal operations



Current Status of S. Dublin in Ontario



Clinical Signs of S. Dublin



- Wide variety of clinical presentation
 - Pneumonia
 - Fever
 - Anorexia
 - Coughing
 - Nasal and ocular discharge
 - Septicemia
 - High fever or low temperature
 - Sudden onset
 - Severe depression
 - Sudden death



Clinical Signs of S. Dublin



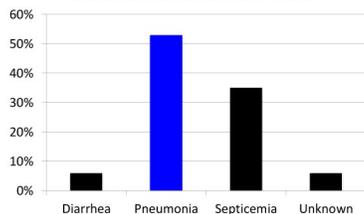
- Wide variety of presentations
 - Often presents **without diarrhea**
 - Can have abortions in pregnant mature cows
- Poor response to treatment with high levels of mortality and variable morbidity



Clinical Signs of S. Dublin



Clinical Presentation Prior to Death



Who is Affected?



- Clinical signs predominantly in young stock around **2 months of age**
 - Ranging from 1 week to 6 months of age

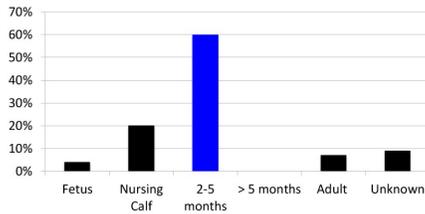




Who is Affected?



Age Distribution of S. Dublin cases



Treatment of S. Dublin



- Multi-drug resistant bacteria
 - 75% of the strains showing ampicillin, ampicillin-sulbactam, ceftiofur, and/or tetracycline resistance
 - Very poor response to treatment resulting in high levels of mortality

Specimen Type	Liver
Result	Salmonella spp. Group D
Level	4+
Ampicillin	R
Ceftiofur	R
Kanamycin	R
Spectinomycin	S
Sulfonamides	R
Tetracycline	R
Trimethoprim/Sulf	S



S. Dublin Spread



- Between farms
 - Cattle movement from farm to farm
 - Transmitted herd to herd predominantly through carriers
 - Infected yearlings or mature cattle showing no signs
 - Also spread by young calves that are infected but not showing clinical signs
 - Waterfowl and feral cats also involved in transmission and dissemination
 - Can survive up to 3 years in the environment



S. Dublin Carriers



- S. Dublin produces long term sub clinical carrier animals that remain healthy but shed S. Dublin intermittently in feces and milk
 - Important role in maintaining infections on farm
 - Heifers infected between age of 1 year and first calving as well as cows infected around time of calving most likely to become carriers!
 - Stress can lead to clinical signs in carrier animal or shedding in sub-clinically infected carrier
- Introduction of S. Dublin to a naïve herd through a carrier animal may lead to explosive outbreaks!



S. Dublin Spread



- Within farms
 - Fecal-oral transmission
 - Calves that show clinical signs are typically infected at calving
 - Feeding raw milk to calves
 - Feeding unpasteurized milk is always risky
 - Particularly true for milk fed from the hospital cows or recently fresh cows.



Diagnosing S. Dublin



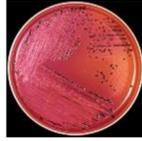
- Complicated!!
- Depends on
 - Purpose
 - Confirming disease.
 - Identifying infected herds.
 - Identifying infected carriers.
 - Age
 - Timing of Infection
 - Takes 6-12 days after infection to generate antibody response.
 - Antibodies gradually decline over 5 months after infection.



Diagnosing S. Dublin



- Confirming diagnosis
 - Post mortem
 - Bacteriology
 - Clinically affected animal
 - Inconsistently isolated from feces.
 - ELISA
 - Only available from Cornell so far...
 - Serum or milk



Diagnosing S. Dublin



- Identifying infected herds
 - Milk.
 - Bulk tank milk sample
 - Serum.
 - Multiple individual cow samples
 - High sensitivity for detection of presence of S. Dublin on herds
 - If no positives on individuals sampled likely herd negative
 - Pooled serum samples?



Diagnosing S. Dublin



- Identifying Carriers
 - Very difficult!
 - Some research suggests two negative serum tests done 60 days or more apart, quantifies animal as non-carrier
 - More research needs to be done



Control Strategies for S. Dublin



1. Reduce exposure
2. Improve immunity



Reduce Exposure



BIOSECURITY!!!!!!!!!!!!!!!!!!!!!!



Reducing Exposure



- BIOSECURITY!!
 - Maintain closed herd
 - Purchase from low-risk herds
 - Quarantine newly arrived cattle
 - Minimize stress in newly arrived cattle
 - Clean, well-sanitized maternity area
 - Avoid adult to calf contact
 - Minimize fecal contamination
 - Limit bird, rodent and waterfowl exposure
 - Disinfect and clean high risk areas



Improving Immunity



- Vaccination of calves
 - Not great evidence of efficacy and not available in Canada
- Maternal antibodies in colostrum
 - Vaccinate cows in late dry cow period
 - Increased antibody titers for calves that received colostrum from vaccinated cows
 - Vaccine not in Canada



Protecting You and Your Farms



- Remember Zoonotic
 - Wash hands!
- Between Farms
 - Change coveralls
 - Wash boots
- Calves with clinical signs resembling S. Dublin
 - Contact Herd Vet!



What Happens if my Herd is Infected?



1. Break the fecal-oral transmission link
2. Maximize host resistance and minimize exposure dose
3. Control anything in the livestock environment that can spread the organism
4. Because many infected animals are subclinical, handle all animals as if shedding
5. Implement sanitation program for cleaning of all organic matter

McGuirk, 2013



What Happens if my Herd is Infected?



6. Look for new vaccine
7. Recognize that salmonella lives for a long time in environment
8. Minimize chance for salmonella to replicate
9. Remember Zoonotic!

McGuirk, 2013



Take Home Messages



- Emerging in Ontario
- Carrier animals maintain infection
- If infected as new born calf may produce disease
- Presents with respiratory signs or septicemia at 2 months old
- Difficult to identify carriers
- Biosecurity on farm is very important to reduce exposure
- Zoonotic!



For More Information



- Several Factsheets
 - Cornell University
 - Veal Farmers of Ontario
 - University of Madison Wisconsin

Social media - why for agriculture?



Kristen Kelderman
Grober Nutrition

Growing up on her family's dairy farm, Kristen learned early on in life to appreciate the hard work, endless hours and dedicated passion that farmers practice to produce food for Canadians. She is the Digital Marketing and Communications Specialist at Grober Nutrition. With her farming roots, and creative energy she has merged her greatest passions of agriculture, digital design and people into a career. Social media is changing our communication styles rapidly, no matter if you're starting your farming career, or nearing retirement. You might text your grandkids, send photos to your vet or Snapchat your buddies from the tractor. If you're not using it, chances are you're hearing lots about it. We're great at using social media to talk to each other in ag. But how do we break our bubble? Let's talk about opportunities, the risks and the 'so what' of using social media to advocate for our industry. Go beyond sharing your story, learn how to reach out and have an online conversation about farming.

Building the Foundation

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Social media - Why for ag?

GROBER KRISTEN KELDERMAN

WWW.GROBERNUTRITION.COM

What's the fit?

GROBER NUTRITION

- Communication tool to customers & way to market our superior products.

FARMERS & INDUSTRY

- Many different avenues. Tell your story. Talk to the public.



HOW CAN WE DO BETTER?



Where is your fit?

What do you bring to the table?

- Are you funny?
- Practical? day-to-day?
- Politically savvy?
- Technical?
- Emotions?
- Good at debating or positioning issues?



CONNECT ON SHARED VALUES



PRACTICAL & TECHNICAL - CONNECT ON SHARED VALUES

erica.d.429



1,953 views

erica.d.429 If one or two calves in a group pen are showing obvious signs of pneumonia, there are likely another 8-10 more in that same group with an early stage of infection. We house the 3-6 month old calves in group pens of 8-14, meaning that even if just 2-3 in that group are obviously sick, the rest are likely to just be starting to get sick. While we do everything we can to prevent pneumonia in the first place, when one or two calves do end up sick, it can quickly cause an outbreak. Lung lesions are commonly found on animals that never even had obvious signs of pneumonia, the damage can happen even in the very early stages of illness. But what can you do about stopping the spread of full blown pneumonia, requiring treatment with antibiotics and anti-inflammatories, from making it's way through the entire group or even barn? They are vaccinated while in this barn,



CONNECT ON SHARED VALUES - FAMILY & EMOTIONS



dairysecretary



cowfarmer, guernseydairymama and 37 others
dairysecretary Family is a huge part of our life on the farm. Our farm is entirely family run - we don't employ any outside help in our day to day operations. Our little guys work right alongside us on a daily basis and their love of working around



High Heels and Canola Fields
An open letter to my future farmers, Jennings (4) and Copeland (1),

How do we make your message matter & take it farther?

We tend to follow our friends & stay in our comfort zone



how do we solve this?



Build an outside of ag tribe!

Maybe easier said than done. But hear me out!



*what's a tribe
and how do I find one?*

The good news is we already have many tribes in our lives already.

**FAMILY | WORK COLLEAGUES | SCHOOL/UNIVERSITY | FRIENDS | KIDS
VOLUNTEER GROUPS | CHURCH & COMMUNITY GROUPS | HOBBIES**



How do I build a tribe online?

It's as easy as who you follow online, who you are friends with and your followers.

Search for non-ag people, groups and companies, seek out and do some homework. And see who they follow and interact with.




Join a tribe

- Think outside of agriculture!
- Who else is online?
- Go to them!

EXAMPLES:

- Skeptics communities
- Science moms
- Fitness groups
- Insert your group here




Engage

- Share what you know.
- Comment on posts.
- Make yourself available.
- Give perspective and truth to conversations on food & farming.




Sink your teeth in!

A picture is great. BUT....

Let's get a little deeper. Make some noise. What are some of the tough things you deal with? How do things work? How are 'every day' things different on the farm? Get real.



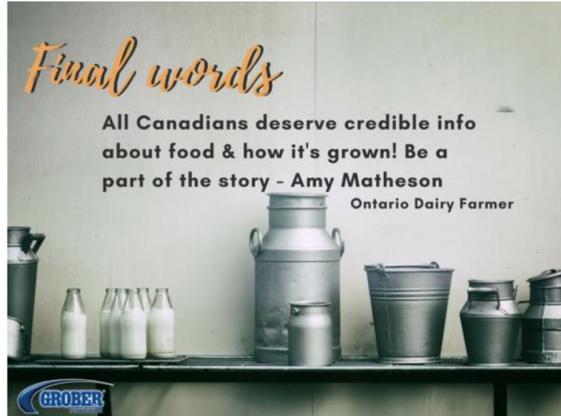
TRY SOMETHING NEW

- Put yourself out there
- Build your non-ag tribe
- Be positive. Don't be afraid to have difficult conversations
- Support each other!
- Don't be afraid to try something new, crazy, different, or otherwise!



Final words

All Canadians deserve credible info about food & how it's grown! Be a part of the story - Amy Matheson
Ontario Dairy Farmer



Thank you!



Kristen Kelderman
kkelderman@grober.com
www.GroberNutrition.com



What's new in calf resources?



Kendra Keels
Veal Farmers of Ontario

Kendra Keels has been working with Veal Farmers of Ontario since 2006, when it was the Ontario Veal Association. As the Director of Producer & Industry Development, she is involved with many aspects of calf care and the veal industry. She analyzes the veal industry and market, promotes calf health and wellbeing through education, and interacts with producers and industry partners regularly. She oversees the creation of many resources on topics ranging from calf health to getting started in the veal industry. She is a member of the Code Development Committee for the National Farm Animal Care Council's *"Code of Practice for the Care and Handling of Veal Cattle"*.

Building the Foundation

Dairy and Veal Healthy
Calf Conference **2016**

Newborn calf care – can we do better?



Dr. John Mee MVB, MVM, Ph.D, Dip ECBHM, MRCVS
Teagasc - Department of Animal and Bioscience Research, Ireland

Dr. Mee is the Principal Veterinary Research Scientist at the Irish National Dairy Research Centre. His research is carried out on commercial and research dairy farms. His current research interests include young calf management, the causes of abortion, perinatal and young calf loss, contract rearing biosecurity, dairy cow welfare, endemic infectious diseases, beef herd health, and ewe behaviour and lamb mortality. He is a founding member of the Irish national calf health committee (CalfCare). He has over 30 years' experience in research and in private and public veterinary practice working in Ireland, Australia and in New Zealand. He lectures in Irish, UK and Hungarian universities. He has spoken at conferences and workshops in some 25 countries internationally. He is Vice-Chair of the scientific committee of the World Cattle Disease Congress, 2016. His and his co-workers' research has been published in over 100 papers, book chapters and textbooks. He is a member of the Editorial Boards of five scientific journals. There's more to life than work; he enjoys running, cycling and surfing more than work!

Building the Foundation

Dairy and Veal Healthy
Calf Conference **2016**

Newborn calf care – can we do better?

John F. Mee, MVB, MVM, PhD, DipECBHM, MRCVS

Animal and Bioscience Research Department, Teagasc, Moorepark Research Centre, Fermoy, Co. Cork, Ireland,
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Abstract

Newborn calf care starts before the calf is even conceived with the management of the dam prior to breeding and continues during pregnancy. Once the calf is born, the priorities are, sequentially, to ensure it is breathing normally, and resuscitate if necessary; treat the umbilicus as necessary; feed an adequate volume of quality colostrum as soon as possible; tag the calf and remove it to a clean dry environment, with a heat source if needed. This paper outlines practical procedures to implement in each of these tasks so that we can provide better newborn calf care.

Introduction

The perinatal period (0-48h) is the most hazardous in the life of all animals. Perinatal calf mortality rates can be as high as 30% in individual dairy herds. Approximately 85% of perinatal mortality occurs within one hour of calving. Some 66% of calves which die in the perinatal period (the 'at-risk' calf), were alive at the start of calving and so much of this loss is preventable through better care of the newborn calf.

The 'at-risk' calf is defined as one that is at greater risk of ill-health or death. The risk factors associated with these calves include pre-conception causes, e.g. failure to vaccinate against a pathogen which can cause fetal death (e.g. BVD virus), gestational causes, (e.g. failure to feed adequate micronutrients) and parturient causes, (e.g. failure to supervise a prolonged calving). The outcome is a perinate that is more likely to die before or during calving, be weak after calving or to succumb to common neonatal infections.

'The Golden Hour'

The emergency medicine concept of the 'golden hour' can be applied to the intensive care of at-risk newborn calves. This term refers to the principle of rapid assessment and intervention to prevent subsequent problems. The triage approach to paediatric care of the at-risk bovine perinate in the first hour of life involves vitality assessment, resuscitation as necessary, umbilical antisepsis and colostrum feeding and calf removal. At-risk calves which may require resuscitation include those born following long calvings, difficult calvings and premature calving; this paper focuses on term calves. In order to determine the need for resuscitation, the newborn calf must be assessed immediately after birth; this demands good calving supervision. The urgency of providing critical care is underlined by the fact that some 95% of loss within the first hour after birth occurs within 5 minutes of the calf being born. Thus, resuscitation should be initiated as soon as possible and can begin even before the calf is fully delivered once the calf's thorax has emerged, e.g. in cases of 'hip-lock'. Additionally, administration of a pain relieving injection to the newborn calf after a hard calving may improve neonatal calf vigour, an underutilised therapy.

1. Vitality assessment

High risk calves can be identified (a) before birth - by the predicted likelihood of suffering from a difficult calving based on the dam, sire and calf characteristics; (b) during birth - by large limbs, swollen tongue, cyanosed muzzle and gums and poor reflexes; or (c) after birth - by absence of breathing or abnormal breathing, lying on side, flaccid musculature, abnormal heart rate, and poor leg, tongue and suck reflexes.

While numerous calf vitality scoring systems have been developed through research (Murray and Leslie, 2013), based on the original human 10-point APGAR scoring system none are widely used in practice by veterinary practitioners or by farmers. They tend to be too complex (multiple scores), require equipment not used by farmers (e.g. stethoscope), have large potential intra and inter-observer variability and have variable/unknown prognostic values for survival.

Hence there is a need for a simple, quick, practical method of assessing the risk of a newborn calf dying shortly after birth where resuscitation is indicated. Recent research indicates that of calf vitality parameters, muscle tonicity and reflex (tongue withdrawal and suck reflex) were most closely correlated with calf blood gas status (Homerovsky et al., 2016). While calf attainment of sternal recumbence within 15 minutes of birth is a good predictor of vitality (Schuijt and Taverne, 1994), calving personnel will rarely want to wait this long to make an assessment of whether the calf needs immediate resuscitation.

Useful practical indicators which can be used immediately after calf birth to indicate an immediate need for intervention include abnormal calf breathing (not breathing, gasping, abdominal breathing), poor reflex responses (eye, leg, tongue, suck stimulation) and poor muscle tone (long dark tongue, flaccid musculature), (Mee 2008).

2. Calf resuscitation

Approximately one third of calves which die in the perinatal period have partially inflated lungs. If these calves have no other injuries they may be saved by intensive care. A practical approach to management of the normal and the at-risk newborn calf is outlined in Fig. 1. Where the calf is fatally compromised, e.g. potentially lethal congenital defect, extreme prematurity or calving trauma, it should be humanely euthanized, by a veterinarian. Management of all newborn calves should include – establishment of a patent airway, establishment of a normal breathing pattern, establishment of normal circulatory function, prevention of prolonged metabolic acidosis, prevention of hypothermia, prevention of umbilical infection, prevention of failure of passive transfer (FPT), and prevention of *Mycobacterium avium* subsp. *paratuberculosis* (MAP) transmission and calf identification.

Fig. 1. Newborn calf life support

Assess calf (immediately after birth)	
Normal calf	Weak calf
Apply umbilical antiseptis (±)	Suspend calf & manually/suction clear nasopharynx
Place calf sitting upright	Compress/expand thorax
Feed colostrum	Place calf sitting upright
Tag calf	Pour cold water in ear
Leave calf to be licked dry by dam	Stimulate nostrils/muzzle
Remove calf from dam before suckling	Use respiratory pump/stimulant drugs/ oxygen, as available
	Vigorously rub/dry off calf
	Apply umbilical antiseptis (±)
	Feed colostrum
	Tag calf
	Place calf under infra-red lamp

Establishment of a patent airway

Prior to birth the calf's lungs and trachea are normally filled with pulmonary fluid and with the larynx acting as a one-way valve, the naso-pharynx is filled with a mixture of expelled lung fluid and amniotic fluid. After the amniotic sac bursts during calving the amniotic fluid normally drains from the nasopharynx and the lung fluid either also drains out by gravity (particularly in the standing cow), or by compression in the pelvis or in the main, is resorbed by the lungs.

However, in at-risk calves, stress during calving can induce defecation of meconium into the amniotic fluid, gasping respiration and excessive inhalation of this fluid into the lungs. Thus such calves can be born with fluid-filled lungs and airways. In addition, some calves can be born in the partially intact normal or thickened amnion, hence the need to establish airway patency.

The amnion must be immediately removed from the head and the nasopharynx fluid cleared manually or by suctioning (e.g. McCulloch or Vitalograph Aspirator). The lungs and trachea can be cleared by postural drainage. Natural gravitational drainage can best be simulated by briefly (one minute maximum) suspending the calf by the hindlegs. Significant benefits have been shown, albeit in caesarean-derived calves (Uystepuyst et al., 2002). This is a controversial, though widely adopted, practice. While the majority of the drained fluid is abomasal fluid (with a minor theoretical risk of dehydration) and the abdominal viscera may theoretically briefly compress the lungs (in practice the diaphragm prevents this), no common adverse effects have been documented.

Establishment of a normal breathing pattern

While the fetus exhibits respiratory activity towards the latter stages of gestation, the onset of breathing normally occurs within 5 seconds of birth and in some cases limited lung inflation occurs during birth. A multitude of stimuli can trigger the first breath including moderate high blood carbon dioxide and reflex inhalation. Administration of corticosteroids to the dam will stimulate fetal surfactant production (e.g. in the case of elective caesarean-derived calves, but not in premature calves after birth).

However, in at-risk calves the onset of breathing and establishment of a normal respiratory pattern may be delayed or absent (in the presence of a heartbeat). Such newborn calves can have no spontaneous breathing within 5 minutes of birth, gasping or irregular breaths.

The onset of respiration can be achieved by peripheral stimulation, e.g. pouring cold water on the head, poking a straw up the nostrils or acupuncture of the muzzle or pinching of the nasal septum (inducing a gasp/sneeze reflex) or vigorous rubbing over the thorax, or by stimulating with analeptic drugs (e.g. doxapram).

Where these methods fail to elicit the onset of respiration, physical resuscitation (e.g. compression and expansion of the thorax), and positive pressure ventilation (PPV) using a respirator pump (e.g. HK, McCulloch or Ritchey calf resuscitator) or resuscitator bag (e.g. Ambu bag, palpation sleeve) or administration of oxygen (5-10 ml/min. via face mask or intranasal tube) is recommended. Where either of the latter two methods is used to inflate collapsed lungs the oesophagus needs to be occluded to prevent the pressurised air or oxygen passing into the abomasum instead of the lungs; ideally a two-person task.

Once respiration is established, maintenance of normal breathing (30-50 bpm) is facilitated by sitting the calf upright.

Establishment of normal circulatory function

It is normal for the newborn calf to have a rapid heart rate (100-150 bpm) at birth. However, in at-risk calves this may change to a low heart rate (<60 bpm). In such cases thoracic cardiac compressions should be attempted. Where the umbilical cord is intact after birth it should be left so until it naturally breaks/has to be broken as this improves

circulatory and respiratory function. In general, circulatory support is secondary to respiratory support as many calves with difficulty breathing have normal circulatory function.

Prevention of prolonged metabolic acidosis

All calves are born with a degree of combined respiratory-metabolic acidosis, the respiratory component of which abates within hours and the metabolic component, within days of birth. However, in at-risk calves this acidosis is more severe and persists for longer; this impacts heart function. While correction of respiratory acidosis is dependent upon improvement in breathing, as outlined above, correction of metabolic acidosis requires neutralisation of blood acidosis. This can be achieved by intravenous administration of sodium bicarbonate once regular breathing rhythm has been established.

Prevention of hypothermia

Newborn calves normally have a higher rectal temperature immediately after birth (38.5-39.5 °C) than adults which declines gradually in the hours after birth. However, in at-risk calves hypothermia (<37°C) may develop particularly when exposed to cold stress. For example, where the birth fluids are not licked off by the cow after calving (e.g. abandonment, maternal recumbency/death, unsupervised calvings), and/or the calf is not born into a deep straw bed (e.g. in the dry cow housing or outdoors) during inclement weather (cold, windy and wet or snow). Cold stress can lower blood oxygen tension, and increase metabolic acidosis. In such cases vigorous drying of the hair coat to remove excess fluid, prompt adequate warm colostrum feeding and placement under a radiant heat source is recommended.

Producer-adopted practices

The five most frequently practised resuscitative procedures by producers in Canada with weak calves are in descending order, nostril stimulation, calf suspension, hypothermal stimulation, resuscitation pumps and stimulant drugs (Fig 2), (Mee, 2013). The five most frequently practised resuscitative procedures by producers in the US with weak calves are in descending order, nostril stimulation, calf suspension, drying the calf, sternal placement and warming the calf (USDA, 2010).

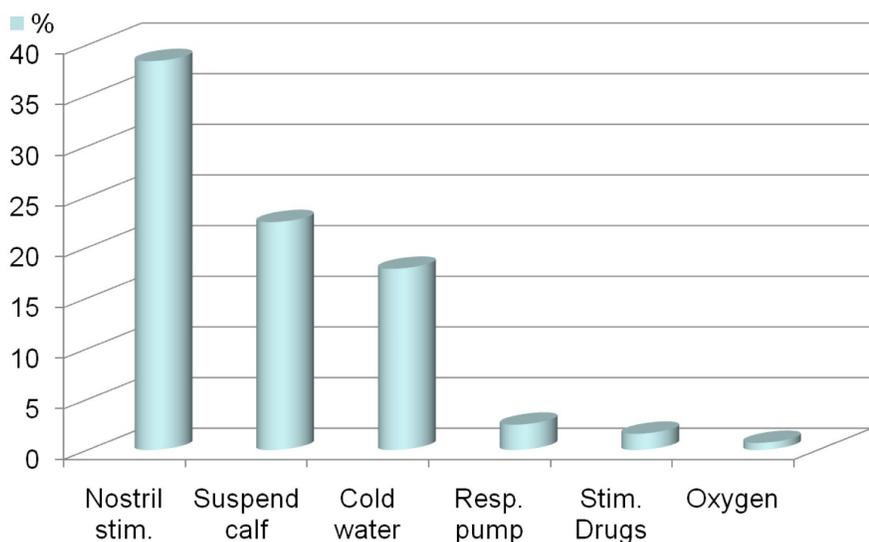


Fig 2. Resuscitation practices adopted by Canadian dairy farmers

Prognosis

The calf prognosis is dependent upon pre-existing risk factors for mortality, the extent of fetal metabolic and physical compromise and the timeliness and effectiveness of resuscitatory techniques. In general, calves with a heartbeat but breathing difficulty have a better prognosis than those with no breathing/unresponsiveness or no heartbeat or exhibiting seizure activities (e.g. abnormal eye movements, limb paddling and bawling) indicative of brain damage.

3. Umbilical care

Prevention of navel ill is based on adequate trace element supplementation of the fetal diet, good maternity pen hygiene, reducing calf residency time in unhygienic calving pens and ensuring adequate early intake of good quality colostrum. Though widely used, there are no controlled studies showing a benefit of topical iodine in reducing navel ill.

A US controlled study has found that clipping the cord and dipping it in a proprietary umbilical antiseptic reduced the incidence of navel ill when compared to not dipping (significantly) or using iodine (0.5 to 7%), (numerically), (Grover and Godden, 2011). A more recent study found no differences in cord healing between four navel antiseptics and emphasised early (<30 mins.) cord dipping (Robinson et al., 2015). If navel ill is not a problem continuance of current cord care is recommended; if it is, alter cord care and avoid possibly harmful cord application procedures.

4. Colostrum feeding

The '1,2,3 rule' applies to colostrum feeding: 1 = use first milking only in newborn calves, 2 = feed colostrum within 2 hours of birth and 3 = feed at least 3 litres (body weight-dependent; 8.5%). It is better to feed an adequate volume of colostrum by stomach tube feeder than to feed an inadequate volume by teat or bucket. Adequacy of colostrum feeding can be assessed by measuring the blood immunoglobulin status in 5 calves between 2 days and 2 weeks of age.

5. Calf removal after birth

'Snatch calving' has become recommended best practice on large dairy operations internationally whereby the calf is removed from the cow before it attempts to stand or suck, usually within 15 minutes of birth after the cow has licked it dry. This is advocated as studies have shown that maternity pens routinely contain very high total bacterial counts and the longer the calf remains in an unhygienic calving environment the greater the risk of gut, navel and lung infections.

In addition, leaving the calf to suck the cow is associated with significantly increased risk of failure of passive transfer of immunoglobulins from colostrum. Any delay in immediate removal from the cow, such as provision of sufficient time for the calf to suck considerably increases the risk of transmission of *Mycobacterium avium* subsp. *paratuberculosis*, the cause of paratuberculosis.

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Success with streamlined protocols



Rose Keunen
Henro Dairy Farms

In 1997 Henry and Rose Keunen immigrated to Canada from The Netherlands and began milking 80 cows in a new dairy facility. Prior to immigrating, She received a Master of Agricultural Business and worked as a senior agricultural account manager for Rabobank. Today, Henro Dairy Farms milks 380 cows twice daily and grow 800 acres of corn, soybeans and alfalfa. Henro Dairy Farms is well known for its exceptional technical and financial performances, and sharing information with the dairy industry. They have been the recipient of various awards and recognitions in the dairy industry, including the Gold Award for top quality milk, the largest dairy farm with the highest quality of milk across Canada, and the Premier's Award for Agri-Food Innovation Excellence in 2013. Henro Dairy Farms has also been featured over the past three years in the Dairy Farmers of Canada's nationwide multi-media campaign. She is a past member of the Dairy Advisory Committee for the University of Guelph, Ridgeway Campus and past president for the Oxford Women for the Support of Agriculture. She writes and co-writes articles for the dairy industry, is very active in local community events and has promoted dairy farming and dairy products on Rogers TV. She was also a finalist in the Trailblazer category for the RBC Canadian Women Entrepreneur Awards in 2012 and 2013.

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Dairy and Veal Healthy
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Success With Streamlined Protocols

Rose Keunen



Calf Barn

- Unlimited Air Volume, Without Draft
- Calves Are Protected Against Sun, Rain and Snow
- Comfortable Environment For Employees To Work In



HENRO DAIRY FARMS

Single Calf Hutch

- Multiple Ventilation Openings
- Front Feeder with Water and Pellets



Filled with Straw, Top Dressing with Sawdust



HENRO DAIRY FARMS

Group Hutch

Molded In One Piece With An Integrated Poly Skid



- Multiple Ventilation Openings

Rear Bedding Door



HENRO DAIRY FARMS

Calf Mortality

2.03 % Avg. Mortality Rate (Live birth-4 months) January - October 2016

9 calves out of the 443 live calves

- Causes:
- 3- Within 24 hours
 - 0- Diarrhea
 - 1- Secondary infections, after diarrhea
 - 2- Navel infections
 - 0- Pneumonia
 - 3- Unknown, others

HENRO DAIRY FARMS

Protocols And Training

- Training by the same person, who designed the protocols
- Monitor the trainee for a long time
- Recheck compliance with protocols
- Written SOP's
- Keep it simple
- Make it fool proof
- Consistency
- Collaboration via written communication



HENRO DAIRY FARMS

CALVES FEEDING CHART

DATE	COLOSTRUM	REGULAR MILK											
		2050A	2050B	2050C	2050D	2050E	2050F	2050G	2050H	2050I	2050J		
Oct-23	2050	2081	2106	2131	2156	2181	2206	2231	2256	2281	2306	30 : 6 : 6 : 2	1156 Pen-1
Oct-24	2051	2082	2107	2132	2157	2182	2207	2232	2257	2282	2307	30 : 6 : 6 : 2	1156 Pen-2
Oct-25	2052	2083	2108	2133	2158	2183	2208	2233	2258	2283	2308	30 : 6 : 6 : 2	1156 Pen-3
Oct-26	2053	2084	2109	2134	2159	2184	2209	2234	2259	2284	2309	30 : 6 : 6 : 2	1156 Pen-4

Colostrum

- 3 days Colostrum
- 1st Colostrum for 1st and 2nd Feeding
- Stimulate drinking

HENRO DAIRY FARMS

CALVES FEEDING CHART

DATE	COLOSTRUM	REGULAR MILK											
		2050A	2050B	2050C	2050D	2050E	2050F	2050G	2050H	2050I	2050J		
Oct-23	2050	2081	2106	2131	2156	2181	2206	2231	2256	2281	2306	30 : 6 : 6 : 2	1156 Pen-1
Oct-24	2051	2082	2107	2132	2157	2182	2207	2232	2257	2282	2307	30 : 6 : 6 : 2	1156 Pen-2
Oct-25	2052	2083	2108	2133	2158	2183	2208	2233	2258	2283	2308	30 : 6 : 6 : 2	1156 Pen-3
Oct-26	2053	2084	2109	2134	2159	2184	2209	2234	2259	2284	2309	30 : 6 : 6 : 2	1156 Pen-4

Regular Milk

- Pasteurized whole milk in morning and late afternoon
- Serving temp. 38 degrees Celsius
- Bottles washed with detergent
- Nipples disinfected with Chlorine

HENRO DAIRY FARMS

Regular Milk

Integrated Pasteurizer And Bottle Washing System



HENRO DAIRY FARMS

CALVES FEEDING CHART

DATE	COLOSTRUM	REGULAR MILK											
		2050A	2050B	2050C	2050D	2050E	2050F	2050G	2050H	2050I	2050J		
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Oct-26	2053	2084	2109	2134	2159	2184	2209	2234	2259	2284	2309	30 : 6 : 6 : 2	1156 Pen-4

Electrolyte

Who gets it?

- Playing with nipple before drinking
- Not finishing bottle
- Pauses during drinking
- Diarrhea
- Infection or cold ears
- Laying down after drinking

HENRO DAIRY FARMS

CALVES FEEDING CHART

DATE	COLOSTRUM	REGULAR MILK											
		2050A	2050B	2050C	2050D	2050E	2050F	2050G	2050H	2050I	2050J		
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Oct-26	2053	2084	2109	2134	2159	2184	2209	2234	2259	2284	2309	30 : 6 : 6 : 2	1156 Pen-4

Lunch Feeding

- H** 2.5 weeks old, half bottle milk
- F** 3.5 weeks old, full bottle milk
- W** 8.0 weeks old, full bottle of warm water

Group Hutch Milk Weaning based on Pellet intake, not age

HENRO DAIRY FARMS

Weaning Process

- Slower process is better
- One change at a time
- Weaning based on Pellet intake, not age
- All in, All out for grouping calves
- Buddy system works (even numbers)
- Ideal group size is between 4-6 calves



HENRO DAIRY FARMS

Other Important Details

- Calf blankets reduce heat loss in winter
- Change water and pellets daily
- Chopped straw reduces the occurrence of diarrhea
- Dry bedding at all time
- Fly control
- Promote water intake (insulation value, improves feed intake)
- Top quality hay



HENRO DAIRY FARMS



**Good Luck With
Taking Care Of The
Business**

HENRO DAIRY FARMS

Contact info:
HENRO DAIRY FARMS
Henry and Rose Keunen
Ph# 519 247 3348
Email: rkeunen@execulink.com

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Together we donate almost **one million litres of milk** every year to food banks in our local communities; that is over 2,500 litres of milk per day. Today the Milk Program is the single largest ongoing food donation program across the province. The OAFB serves over 375,000 individuals, including over 130,000 children, each and every month.

The milk is donated by dairy farmers, transported by the milk transporters, and processed and packaged by the dairy processors. The final product is delivered directly to food banks across the province.

WORKING TOGETHER IN OUR COMMUNITIES.

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- ★ Easy to prepare Quick Mix
- ★ Easy to use



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Calf MAX an all milk protein milk replacer specifically designed to enrich the calf raising experience. With its unique blend of milk proteins and energy source, you can expect your calves to reach their full genetic growth potential. Calf MAX provides all the milk nutrients a calf requires prior to weaning to maximize tissue and bone growth while preparing the calf for future milk production.

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- ★ An excellent choice
- ★ Unique protein matrix



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Milky Wave, the Schuurman family farm, has found the Mapleview product they are using to be, "exceptional, very palatable and mixes very well". They do an outstanding job raising calves. Believing that good calf raising is the building block for an efficient and profitable herd.

Milky Wave keeps in mind the 3 C's when raising calves:

- Colostrum** – Good quality and timely
- Consistency** – Milk replacer, temp, time
- Cleanliness** – Important in the health of the calves



NEW!

Now available with Deccox for Cocco Control!



Easy to mix



Highest quality ingredients



Optimum digestibility



For use in computer feeders or hand mixing

Tip of the Month:

Keeping feeding equipment clean reduces stress and health issues.

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- Covers all the stages of your herd replacement program

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Stalosan[®]F

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Clostridium perfringens

Cryptosporidium

and many more...



smart Technology for Healthy Calves



CalfRail for individual pens

- Up to 8 feedings / day
- Freshly prepared small portions
- Animal-specific feed quantities
- Up to 32 calves per CalfRail unit
- Flexible animal control
- Automatic cleaning



Automatic Calf Feeder

- Priority control for young calves
- Up to 120 rearing calves at 4 stations
- Rapidly trained calves
- Animal-specific feeding plans
- Integrated cleaning
- Optional parallel feeding

CalfApp & CalfCloud

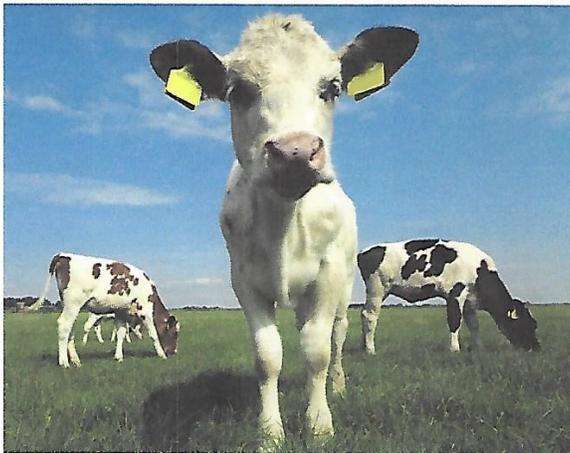
- Simple and intuitive operation
- All data at a glance 24/7
- Data backup to the CalfCloud
- Useful monitoring tool

For more information, please contact:

jan.ziemerink@foerster-technik.com Phone: 519-239-9756

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See Veal Farmer's of Ontario's "Detecting calf disease early" booklet and www.calfcare.ca for more information about colostrum and other important calf management practices.



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What if you could give your calves **long lasting**, effective pain relief...

that was also **affordable?**

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Solvvet researches, develops and manufactures products to meet the needs of veterinarians and producers from their headquarters in Calgary, Alberta.

* Calculated as days of therapy per label claim at product list price. Solvvet is a trademark of Alberta Veterinary Laboratories Ltd.



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1. Cigrang S, Huang R, Malinski TJ, Dorr PM, Tassman RK & Somerville BA. Disposition of ganithromycin in plasma, pulmonary epithelial lining fluid, bronchoalveolar cells, and lung tissue in cattle. Am. J. Vet. Res. 72(3): 326-330 (2011).

2. Based on label claims. ZACTRAN® is a registered trademark of Merial Limited. © 2013 Merial Canada Inc. All rights reserved. ZACT-13-7559-JAD-E

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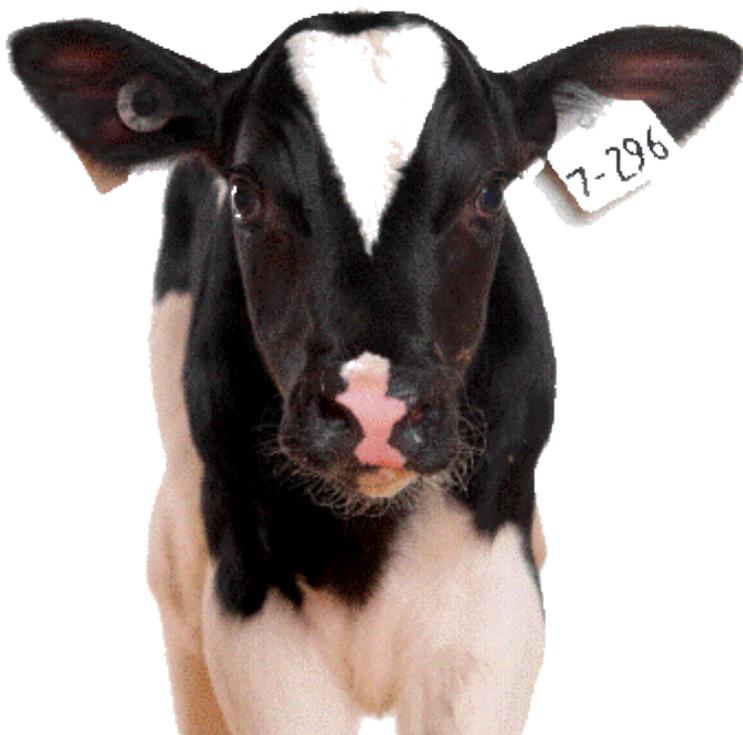
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