

Proceedings for the annual
**I-29 Moo University Winter
Workshop Series**



Prosperity of Dairy Calves and Heifers

January 6-10, 2020

In collaboration with



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Program Agenda 2020

Agenda will be repeated at each location

- 9:30 a.m. Registration & Refreshments | Visit Sponsors
- 10:00 a.m. Topic: "Why animal welfare is essential for the animal, the producer, and the consumer"
- 10:30 a.m. Roundtable discussions regarding animal welfare perspectives and its effect on the animal, the producer and the consumer.
- 11:00 a.m. Topic: Incorporation of pain mitigation protocols as part of your Best Management Practices (BMP's) as you disbud calves.
- 11:30 p.m. Roundtable Discussion of farms BMP' s in regards to disbudding of calves
- 12:00 p.m. Lunch & Midwest Dairy Checkoff Updates | Sponsor Updates
- 1:15 p.m. Topic: Resource Update of Incorporation of Calf Care & Handling SOP's
- 1:30 p.m. Topic: "Two heads are better than one: Benefits of pair or group rearing of calves".
- 2:00 p.m. Roundtable Discussion or your farms calf rearing practices and the pro's and con's of each.
- 2:30 p.m. Hot Wash & Wrap-up
- 2:45 p.m. Adjourn

Workshop Locations 2020

January 6th – Perham, MN; The Cactus – 43521 Fort Thunder Road

In partnership with Minnesota Milk's Dairy Management Workshops and Midwest Dairy's District 3 & 4 meetings.

January 7th – Brookings, SD; Swiftel Center – 824 32nd Ave.

In partnership with South Dakota's Midwest Dairy – Checkoff Update Meeting

January 8th – Pipestone, MN; Pipestone Systems—1801 Forman Drive

In Partnership with Minnesota Milk's Dairy Management Workshops and Midwest Dairy – Checkoff Update Meeting

***Facilities sponsored by Pipestone Veterinary Services**

January 9th – Orange City, IA; Sioux County Extension Office—400 Central Ave. NW

In Partnership with Iowa's Midwest Dairy – Checkoff Update Meeting

January 10th – Wayne, NE; Wayne State College, Student Center Niobrara Room—E 14th St.

In Partnership with Nebraska's Midwest Dairy – Checkoff Update Meeting

I-29 Moo University Faculty Members

Iowa State University

Jennifer Bentley

Extension Dairy Specialist

Phone: 563-382-2949; Email: jbentley@iastate.edu

Jennifer Bentley is a Dairy Field Specialist for ISU Extension and Outreach in NE Iowa. Her base office is in Decorah, Iowa and she currently works and develops educational programming with producers in 10 surrounding counties. Jennifer grew up on a dairy farm in North Central Iowa, where the 3rd and 4th generation family is operating the dairy farm today. She earned her Bachelor of Science Degree in Dairy Science and Masters of Agriculture Degree both from Iowa State University. She works closely with dairy producers, providing them with information regarding facility design, calf management, and overall dairy herd management. She enjoys educating the public about modern dairy practices and plays an integral role in telling the Iowa Dairy Story, a program to educate consumers about the importance of the dairy industry in Iowa. Jennifer is married and has 2 children Owen (13) and Addison (11).



Fred Hall

Northwest Iowa Extension Dairy Specialist

Phone: 712-737-4230; Email: fredhall@iastate.edu

Hall joined Iowa State University Extension in January 2017 as the dairy specialist for Northwest Iowa. He served as the Chickasaw County Extension Director for Iowa State University Extension from 2005 to July of 2009. Hall was the county lead on the Iowa Emergency Management Agency agricultural disaster team and served on the Iowa Extension Dairy Team. Hall is married to Sharon Lee and has two sons. Conor is a graduate of Iowa State University, served in the U.S. Marine Corps and is currently in law school at the University of Iowa. Cameron is a graduate of Iowa State University in Global Resource Systems and is currently the manager of the Poultry Research Center at Iowa State University. The family lives south of Orange City and are active Milking Shorthorn breeders and beekeepers.



Leo Timms

Extension Dairy Specialist

Phone: 515-294-4522; Email: ltimms@iastate.edu

Leo Timms is a Morrill Professor of Animal Science / Veterinary Diagnostics and Production Animal Medicine and Extension Dairy Specialist at Iowa State University. Leo was reared in NE PA and worked on his brother-in-laws 40 cow dairy. Leo received his BS degrees in Animal Science and Agricultural Engineering from Cornell University in 1978. Following 3 years as a herdsman on a 400-cow dairy in western NY, he returned to school and received a M.S. in 1982 and a Ph.D. in 1984 in Dairy Science from the University of Wisconsin-Madison. He joined the Animal Science faculty at Iowa State in 1984. He has fostered many extension educational opportunities, many jointly with agri-business, and has conducted over 7000 individual farm troubleshooting visits and consultations. Leo co-developed the Dairy Production Medicine rotation at the College of Veterinary Medicine in 1984 and has also developed courses in lactation biology, dairy troubleshooting, and distance education classes in nutrition, facilities, and biosecurity. Leo's research has focused on mastitis prevention and therapy, milk quality, reproductive management tools, accuracy of milk component measurements, dairy housing, comfort and welfare, and using dairy records. Leo is married (37 years) and has 4 children Rob (35), Sam (33), Sadie (22) and Josh (19)



South Dakota State University

Heidi Carroll

Extension Livestock Stewardship Field Specialist & State BQA Coordinator
Phone: 605-688-6623; Email: Heidi.carroll@sdstate.edu

After working in various aspects of the livestock industries across South Dakota and even Beijing, China, Heidi has promoted responsible animal care and safe food products. She has a Masters Degree in animal science with an emphasis in ruminant nutrition. She handles a wide variety of topics concerning animal well-being and perceptions of livestock care practices
Expertise: Low-stress livestock handling and behavior; Quality assurance trainer for BQA, BQAT, PQA, TQA, and SSQA; Consumer perceptions of livestock husbandry practices



Tracey Erickson

Extension Dairy Field Specialist
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After developing a passion for dairy while growing up on a diversified dairy, livestock and crops farm in eastern South Dakota, Tracey continues to be involved with farming today with her husband and in-laws. With a double major in Dairy Production and Manufacturing, as well as a Masters in Human Resource Management, most of her career has been spent serving dairy producers and the agricultural community through SDSU Extension focusing on Human Resource Management and Safety Protocols, Quality Assurance Programs and Dairy / Livestock development and profitability.

Expertise: Dairy production, Human Resource Management, Farm Safety Training Programs, Dairy & Livestock Nutrition, and Quality Assurance Trainer.



Maristela Rovai

Assistant Professor/Extension Dairy Specialist
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Dr. Rovai is a Veterinarian from Brazil with a MSc & PhD degree in Veterinary with emphasis in Animal Science (UAB-Spain). She had postdoc positions in USA (UW-Madison and E. (Kika) de la Garza American Institute for Goat Research-Langston University) and Europe (TUM in Germany and UAB-Spain) working in animal science with emphasis in mammary gland physiology and ruminant management. Dr. Rovai's research activity has involved studies on the area of milk ability in dairy ruminants (goat, sheep, camels and cows), with a strong focus on milking technology, milk quality improvement, mastitis impact on technological properties of milk and cheese. Dr. Rovai has published more than 45 scientific and extension papers and has mentored graduate students in pursuing either their Master or PhD degree in Animal Science.

Currently, she is an Assistant Professor / Extension Dairy Specialist at the Department of Dairy and Food Science at the South Dakota State University in Brookings, SD. Dr. Rovai's main responsibilities are to develop Extension programs for improvement of milk quality and assist dairy producers and industry personnel on workforce development and best production practices. She is also coordinating a program called "Semillas" – the Spanish word for seeds - designed to help Latino youth of dairy workers within the region to embrace their heritage and gain a sense of community while understanding the Dairy Industry. Dr. Rovai has the ability to assist dairy producers on developing farm protocols, educational trainings, which include hands on and assisting with farm employee meetings.

Expertise: Lactation Physiology and Milk Quality; Employee Educational Training; Speaks fluent Spanish, English and Portuguese.



University of Minnesota

Jim Salfer

Extension Educator-Dairy

Phone: 320-203-6093; Email: salfe001@umn.edu

Jim Salfer is a Regional Extension Educator – with University of Minnesota Extension. Jim has served in his present position for 22 years. Before that he managed a feed department, was a dairy nutritionist, a district sales manager for an AI company and managed a dairy farm. Jim has been involved on farm research projects studying robotic milking systems and automatic calf feeders. The focus of his education program has been to help farmers and other industry professionals understand the major factors driving dairy farm profitability and develop management strategies to improve profitability.



Emily Wilmes

Extension Educator-Livestock

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Emily grew up on her family's dairy farm near Le Sueur, Minnesota. She works for University of Minnesota Extension as an Extension Educator in Stearns, Benton, and Morrison counties. Her programming focuses on dairy, beef, and farm business topics, and her favorite topics to work with are milk quality/mastitis management and farm safety & health. She has a BS in Animal Science and a Masters in Agricultural Education from the University of Minnesota.



University of Nebraska

Kim Clark

Dairy Extension Educator

Phone: 402-472-6065; Email: kimclark@unl.edu

Kim Clark is a dairy extension educator at the University of Nebraska-Lincoln (UNL) in the Animal Science Department since 2015. Clark earned both her B.S. degree in Animal Science and her M.Ag. Degree in Animal Science and Agricultural Economics with a minor in Agriculture Leadership from the University of Nebraska-Lincoln. Since 2016, Clark has served as chair/co-chair for I-29 Moo University, a five-state dairy extension consortium. Additionally, she also serves as the coordinator for the Nebraska Dairy Ambassador Program. Clark's expertise includes calf care and animal welfare. She is PAACO certified is a National Dairy FARM auditor.



Robert Tigner

Agricultural Systems Economist Educator

Phone: 308-696-6734; Email: Robert.tigner@unl.edu

Tigner was born and raised on a small dairy farm near Fort Dodge Iowa. Tigner joined the US Navy in 1975 and served on active duty and reserve duty for 14 years. He operated a dairy farm near Fennimore WI before starting an Extension career. Tigner earned a Bachelor of Science degree from Iowa State University's Animal Science department majoring in Dairy Science. His Master of Science degree is from the University of Wisconsin-Platteville in Agricultural Industries. Tigner is currently the Area Agricultural Systems Economics Educator. Tigner's educational specialty includes crop marketing, computer decision aids, computer accounting, farm women's financial and risk management education, crop cost and farmland leasing, farm transition and succession, employee management and farm bills as they are passed.



I-29 Moo University Winter Workshop Speakers

Dr. Jennifer Van Os, Assistant Professor and Extension Specialist –Animal Welfare, University of Wisconsin-Madison. Dr. Van Os’ research focuses on understanding, evaluating, and improving the welfare of dairy animals from a biological perspective. The goal of her extension program will be to promote best practices in management and housing to help the dairy industry adapt as our scientific knowledge about animal welfare continues to grow. For more information, visit the Dairy Animal Welfare site at <https://dairyanimalwelfare.org/>



Dr. Patrick Gorden is a 1993 graduate of Iowa State University’s College of Veterinary Medicine. After graduation, he spent seven years in a mixed animal practice in Platteville, WI primarily doing dairy work. In 2000, he joined Dairy Veterinary Services (DVS), a 100% dairy practice in Chandler, AZ serving clientele with herds ranging from 400-9000 cows. In 2007, Dr. Gorden joined the faculty at ISU’s College Veterinary Medicine. He is currently a Clinical Professor, specializing in dairy production medicine, for the Department of Veterinary Diagnostic and Production Animal Medicine (VDPAM). In May 2010, he was appointed as Director of Food Supply Veterinary Medicine for VDPAM. He currently splits his time between providing clinical service to dairy clients, teaching dairy production medicine to veterinary students, participating in collaborative research, and departmental administration. In academia, his areas of expertise include milk quality, milking equipment performance, prevention of drug residues in milk and dairy beef, and the biology of drug metabolism in the health compromised cow. In 2017, he received his PhD, undertaking research on drug metabolism and antimicrobial resistance in disease challenged animals. Dr. Gorden is board certified by the American Board of Veterinary Practitioners in Dairy Practice and the American College of Veterinary Clinical Pharmacology. He is the current vice president of the American Association of Bovine Practitioners.



Jennifer Bentley is a Dairy Field Specialist for ISU Extension and Outreach in NE Iowa. Her base office is in Decorah, Iowa and she currently works and develops educational programming with producers in 10 surrounding counties. Jennifer grew up on a dairy farm in North Central Iowa, where the 3rd and 4th generation family is operating the dairy farm today. She earned her Bachelor of Science Degree in Dairy Science and Masters of Agriculture Degree both from Iowa State University. She works closely with dairy producers, providing them with information regarding facility design, calf management, and overall dairy herd management. She enjoys educating the public about modern dairy practices and plays an integral role in telling the Iowa Dairy Story, a program to educate consumers about the importance of the dairy industry in Iowa. Jennifer is married and has 2 children Owen (13) and Addison (11).



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Bronze Sponsors





I-29 Moo University 2020 Winter Workshop Series

ROUNDTABLE DISCUSSION GUIDE

- Each group should consist of 4-6 people.
- The groups will discuss the six questions on the Roundtable Discussion worksheet
- You may or may not be able to address all six questions in the allotted time, and that is okay.
- Each group needs to select a recorder
 - The group will write comments and ideas of the group for each question on the Post-it sheets. Sheet and markers are provided.
- Each group needs to select a presenter
 - The presenter will bring forward to the whole audience 1-2 key ideas or thoughts discussed by the group.
- The Roundtable discussion will be 30 minutes in length
 - The first 20 minutes will be small group conversation to discuss each question.
 - Discuss as many questions as time allows. Some groups will discuss 2 or 3 questions in the 20 minutes, while other groups may discuss all six questions.
 - Record key ideas on the post-it sheets provided.
 - During the last 10 minutes of the time, we will ask each group to summarize and present 1-2 key ideas or thoughts talked about during the small group 20 minute discussion.
- We will have each group hang their post-it sheets on the walls for everyone to review.
- Don't forget to write down your ideas and thoughts on the discussion worksheet in your booklet. There is a worksheet after each topic presented.

Why animal welfare is essential for the animal, the producer, and the consumer

Jennifer Van Os

Assistant Professor & Extension Specialist - Animal Welfare

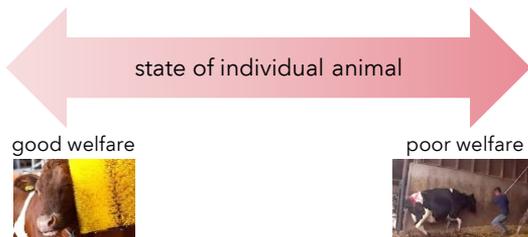


Animal welfare: critical for the **social license** to continue producing food in the future



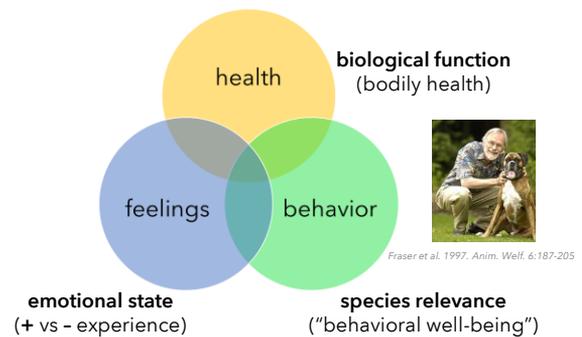
Animal welfare science is a “mandated science”: driven by not only basic discovery, but also by societal interest

What is animal welfare?

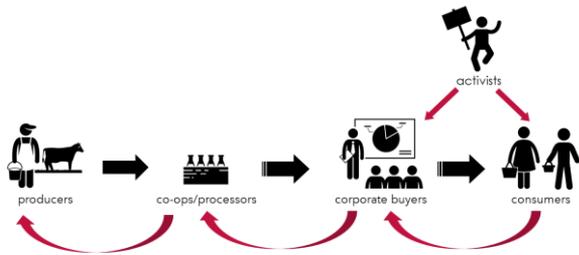


animal welfare science looks at the state of the animal
→ it's **outcome** based

What is important for animal welfare?



How are expectations for farm animal care being determined in the US?



A word about animal rights activists...

- The dairy industry should maintain a high bar and seek to encourage **best practices**
- *This isn't about appeasing activists*
- It's about addressing stakeholder expectations and maintaining consumer confidence
- We want to stay in business for the long haul

Industry-led dairy animal care programs

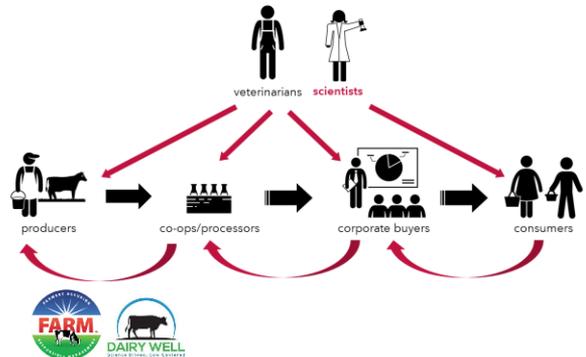
- National Milk Producers Federation: Farmers Assuring Responsible Management (FARM) → 98% of US milk supply (ISO certified)



- Dairy Well program and audit for farms selling directly to Dean Foods (PAACO certified)



Animal welfare science plays a key role



FARM Program: stated goals

Assure consumers and customers that dairy farmers care for their animals, workforce, and land in a humane and ethical manner

- ✓ Framework & foundation for on-farm animal care
- ✓ Snapshot of farm management practices
 - Does not *eliminate* threats to consumer trust
- ✓ Focus on outcomes, science based
- ✓ Facility & size neutral
- ✓ Create a culture of continuous improvement
 - Does not *ensure* a culture
 - Does not guarantee best management practices are followed
- ✓ Requires producer monitoring, oversight, active participation on farm
 - Does not replace supervision & management of employees

Audits for humane slaughter in US federally inspected beef plants

- Percent of cattle properly stunned (insensible with single captive bolt shot):
 - 1996: 30% of plants able to stun $\geq 95\%$ of cattle using only one shot
 - 1999: 90% of plants met target
 - 2015: 100% of plants met target (average 99.7%, all above 98%, most at 100%)



Measures of animal welfare

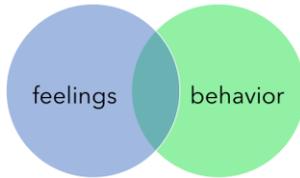
	Outcome based	Input based
Characteristics of:	animal	environment
Provides info about:	animal's state	risk factors & opportunities
	direct	<u>indirect</u>

Audits for humane slaughter in US federally inspected beef plants

- Percent of cattle properly stunned (insensible with single captive bolt shot):
 - 1996: 30% of plants able to stun $\geq 95\%$ of cattle using only one shot
 - 1999: 90% of plants met target
 - 2015: 100% of plants met target (average 99.7%, all above 98%, most at 100%)
- Other **outcome**-based measures: vocalizations, slips, falls
- **Input**-based measure: electric prod use by workers



Outcome-based measures



- ✓ Research = yes, many techniques
- ? On farm = challenging / indirect

Input-based measures



FARM 4.0:
Expectations for pain control
(Dr. Gordon's talk)

Input-based measures



theDairylandInitiative.vetmed.wisc.edu

Outcome-based measures



- ✓ Injuries (lesions / swelling)
- ✓ Thin cows (body condition score)
- ✓ Hygiene (cleanliness score)
- ✓ **Lameness** (gait score)

Lameness: a major concern

Identified by all dairy stakeholder groups as the most important issue

- High prevalence combined with long duration
- Impairs production
- Results in culling
- Bad for public perception



Cardoso et al. 2016. J. Dairy Sci. 99:1663-1671; Ventura et al. 2015. J. Agric. Environ. Ethics 28: 109-126; von Keyserlingk et al. 2013. J. Dairy Sci. 96:5405-5425



Locomotion Score 1 = Sound
Animal has normal posture and a normal gait.



Locomotion Score 2 = Moderate Lameness
Stands well but is noted to favor a limb when walking.



Locomotion Score 3 = Severe Lameness
Severe lameness is defined as an animal either unable to move, or able to move, but barely able to bear weight on the affected limb. Signs may also include back arch, poor body condition, head bob and an inability to flex the lower leg joints. This cow is sore on her left rear leg, favoring it both standing and walking.

Outcome-based scoring to identify lame cows



Thresholds for acceptable prevalence

Program targets for severe lameness:

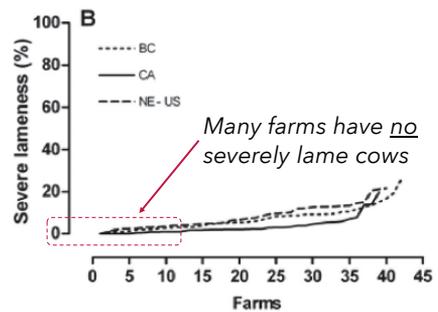
- proAction (Canada): <10%
- FARM: <5%
- Dairy Well: ≤1%

US/Canada population prevalence in literature:
average < 3% to 8% in most studies



Van Ok et al. 2018; Adams et al. 2017; Cook et al. 2016; King et al. 2016; Westin et al. 2016; von Keyserlingk et al. 2012; Espejo et al. 2004

Peer comparison shows what's possible



von Keyserlingk et al. 2012. J. Dairy Sci. 95:7399-7408



FARM 4.0 animal observations

	Signs of neglect*	Hygiene	BCS	Lameness	Hocks, knees	Broken tails
Target		<10%	<1%	<5%	<5%	<5%
Lactating cows	x	x	x	x	x	x
Pre-weaned calves	x	x	x			
Post-weaned heifers	x	x	x			
Pre-fresh cows & heifers, dry cows	x	x				
Hospital pen	x					

*All down, emaciated, severely lame, or catastrophically injured cows getting treatment; food, water, and shade provided to all cattle

Animal welfare: farm-size neutral

- Review of 150 papers that measured animal-welfare indicators
- No consistent relationship (negative or positive) between farm size and animal welfare outcomes

Robbins et al., 2016. Invited review: Farm size and animal welfare. *J Anim Sci* 94:5439-5455.

FARM 4.0 animal sampling taskforce

Goal: generate a meaningful, robust sample for each animal-based measure in each age class of cattle assessed



Van Os et al., 2018. *J Dairy Sci* 101:1495-1504. Van Os et al., 2019. *J Dairy Sci* 102:8290-8304.

Why the new approach to sampling?

Before: sample size formulas → on larger farms, sample more cattle (capped at 96), but represent smaller % of the herd

Pros:

1. Statistically supported
2. Saves labor on large herds (instead of sampling same % of animals on small and large herds)

Cons:

1. Number of animals sampled on small farms can be quite small. Calculated prevalence can swing a lot based on just a few animals.
2. Potentially confusing to evaluators

Van Os et al., 2018. *J Dairy Sci* 101:1495-1504. Van Os et al., 2019. *J Dairy Sci* 102:8290-8304.

Why the new approach to sampling?

Because the goal is to provide meaningful, robust data:

- ✓ We now evaluate **all** animals in each of the target age classes on smaller farms
- ✓ On larger farms, the sample is capped at 100 animals per age class

This way, we get a complete, accurate snapshot of smaller farms. The results would no longer potentially show wide variation based on leaving out a few animals.



Van Os et al., 2018. J Dairy Sci 101:1495-1504. Van Os et al., 2019. J Dairy Sci 102:8290-8304.

New requirements for evaluators

Goal: generate a meaningful, robust sample

2nd party evaluators must:

- ✓ have 5+ years of education + on-farm industry experience
- ✓ provide credentials + 3 references
- ✓ be tech savvy & physically able to conduct evals on farm
- ✓ go through application process
- ✓ interview by phone
- ✓ attend in-person training and pass test
- ✓ re-certify + be shadowed by a trainer annually



New expectations for on-farm personnel

Animal welfare is the responsibility of everyone interacting with and providing care to the animals

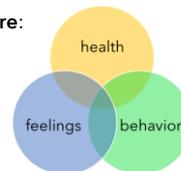
Annual continuing education must be documented for all on-farm personnel (employees + family members)



(see Jennifer Bentley's talk for some resources)

Take-home messages

➤ **Animal welfare:**



➤ **Goal:** continuous improvement toward meeting stakeholder expectations

➤ **Scientific research** can help advance discussions around expectations for animal care



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Animal care includes providing dairy cattle with opportunities for important behaviors

Jennifer Van Os for *Progressive Dairy*

As long as a cow or calf is healthy and productive, she has good well-being, right?

No, not necessarily.

An animal's welfare – how well she is faring – also includes how she's feeling. For the animal, feeling well has to do with more than her bodily health. Is she feeling poorly due to pain, fear or frustration, or is she experiencing positive, rewarding feelings?

One factor that can affect how an animal feels is her "behavioral well-being," meaning: Does she have appropriate opportunities to perform important behaviors for her species? The opportunity to perform a wide range of natural behaviors is something that's inherently important for cattle welfare. In many instances, providing behavioral opportunities to our dairy cattle can also lead us to win-win situations through improved

cattle performance or productivity, consumer perception, or both.

Grooming brushes for cattle of all ages

Providing cattle of all ages with brushes to use for grooming is an example of a behavioral outlet that can create multiple wins for a dairy operation.

In the last few years, it's become increasingly popular for dairy producers to buy brushes for their adult cows (**Photo 1**). Many producers have told me they decided to invest in brushes mainly to improve cattle hygiene – they like seeing clean cows, which benefits the dairy operation.

However, brushes also improve behavioral well-being. A recent Canadian study found that lactating cows would put forth great effort – pushing heavy gates – to gain access to a rotating mechanical brush. This

tells us that a brush is an important resource to them. Consumers can easily recognize how much cows enjoy using the brushes when they watch a YouTube video or tour a dairy farm. This example highlights an opportunity for producers to showcase to the public how we care for our cows by providing them with outlets for important behaviors.

Grooming is an important natural behavior that cattle begin showing very early in life. Some companies now offer rotating mechanical brushes specifically designed for youngstock. A recent New Zealand study with 2-week-old calves found they used these brushes daily.

What about providing simple, nonrotating brushes for grooming? We asked this question in a study we recently conducted at the University of British Columbia in Canada. We mounted 10-inch deck scrub brushes



Jennifer Van Os

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from the hardware store on the walls of group pens for post-weaning heifers, who had never seen brushes before. When the heifers were first moved to the new pens, it took them less than four minutes on average to begin using the brushes – and some approached them after only eight seconds! This told us that young cattle willingly use simple options for grooming. Our University of Wisconsin (UW) heifer-raising facility in Marshfield, Wisconsin, now provides these simple brushes for our animals (**Photo 2**).

The way we house and manage dairy cattle affects not only their productivity and health, but also whether they have appropriate outlets for important behaviors and how they feel as a result.

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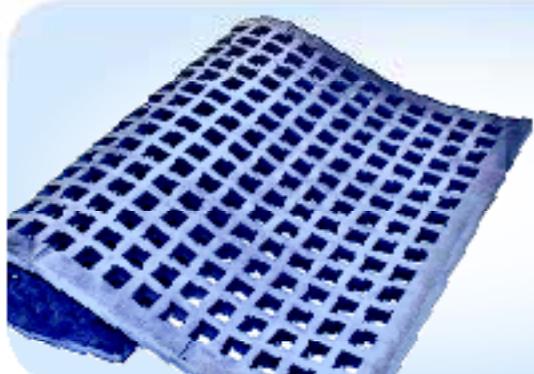


FutureCoat

Calf and Cow Brushes

48" and 24" brush options proven innovation that works to provide comfort and better performance with your cows

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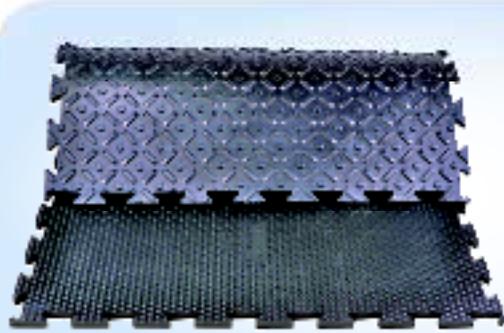


Agri-Sand Saver

Agri-Sand Saver Rubber Mat

Supports hooves and better lying position while minimizing sand waste and maximizing sand efficiency

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Agri-Comfort, a division of Headquartered in Sidney, Nebraska

Photo by Ellie Van Os.



Pre-weaned dairy heifers are housed in pairs at the University of British Columbia Dairy Education and Research Centre in Agassiz, British Columbia.

Photo by Nancy Esser, superintendent, Marshfield Agricultural Research Station.



Weaned dairy heifers are given wall-mounted, 10-inch deck scrub brushes at the University of Wisconsin heifer-raising facility in Marshfield, Wisconsin.

Social companionship for calves pre-weaning

Housing calves with social partners pre-weaning is another example where addressing a behavioral need can create multiple wins for dairy producers.

In the last decade, several studies have demonstrated that – when managed well – raising pre-weaned calves in pairs or small groups has many benefits for both calf welfare and performance. Housing calves in groups requires an increase in total space, which allows for the expression of a wider range of natural behaviors, including playing. Having social contact early in life helps calves learn about appropriate social interactions with others of their species and also improves their cognitive development. For example, calves raised with social companions show better flexibility and adaptability to change, including a greater willingness to try new feeds such as hay and total mixed ration (TMR). This translates into better

resilience to weaning stress.

Across a dozen studies, socially raised calves outperform single calves in terms of either solid feed intake (by 0.25 to 1 pound per day pre-weaning or 0.75 to 2.5 pounds per day post-weaning), bodyweight at weaning (by 5 to 9 pounds), average daily gain (by 0.25 pounds) or a combination of these measures. This performance boost is especially apparent when pair or group raising is combined with higher milk allowances. Solid feed intake before weaning is important for stimulating rumen function, and better early life growth translates to earlier onset of puberty and higher milk production at maturity.

The many upsides of pair or group raising have been demonstrated in study after study, but some producers have voiced reservations about the potential for calves to engage in cross-sucking on each other's teats, navels or ears. Cross-sucking is an undesirable expression of calves' strong natural motivation to suckle. Providing



A cow uses a rotating mechanical brush at the University of British Columbia Dairy Education and Research Centre in Agassiz, British Columbia, Canada.

more appropriate outlets for suckling behavior can reduce the incidence of cross-sucking. Strategies include feeding milk through a teat (such as a bottle, teat bucket or automatic feeder) instead of an open bucket, or providing “dummy” or “dry” teats. These objects need to remain accessible to the calves for at least 20 minutes after each milk meal. Cross-sucking has also been observed to increase right after weaning, presumably in response to a drop in energy intake during this stressful transition. Calves who are better established on solid feed before weaning show less of a drop in intake, so step-down weaning, particularly when based on starter intake rather than calf age, can help reduce cross-sucking.

Increasing behavioral opportunities is good for the animal, the farm and the consumer

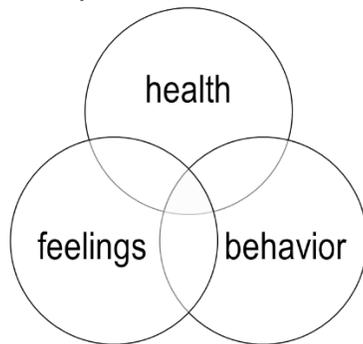
The way we house and manage dairy cattle affects not only their

productivity and health, but also whether they have appropriate outlets for important behaviors and how they feel as a result. Grooming is an important natural behavior for dairy cattle of all ages. Adult cows will expend considerable effort for the opportunity to use rotating mechanical brushes, and young heifers willingly use both rotating and simple brushes. For calves, social companionship before weaning has many benefits for their development and performance. Calves have a strong motivation to suckle and providing appropriate outlets can reduce undesirable forms of this behavior. These examples show how increasing behavioral opportunities can often benefit cattle performance directly while also improving animal welfare and demonstrating our commitment to animal care to the public. 🐄

This article originally appeared in the PD Extra newsletter.

I-29 Moo University 2019 Winter Workshop Series: Prosperity of Dairy Calves
ROUNDTABLE DISCUSSION: Animal Welfare: Producer & Consumer Perspectives

*1. How is maximizing animal welfare, **influencing management practices** within your dairy business?*



*a. What are some **strengths** of current management in regards to each of the 3 overlapping aspects of animal welfare?*

*b. What are some **challenges** of current management in regards to each of the 3 areas?*

*2. What changes can I or should I make in the **near future in regards to each area?***

3. How familiar are you with the FARM program expectations? Are you ready for your next evaluation?

Additional Notes:

Pain Management on Dairy Farms

I-29 Moo University 2019 Winter Workshop Series

January 2020

Patrick J. Gorden, DVM, PhD
DABVP – Dairy; DACVCP



Food Supply Veterinary Medicine
Veterinary Diagnostic and Production Animal Medicine
Iowa State University



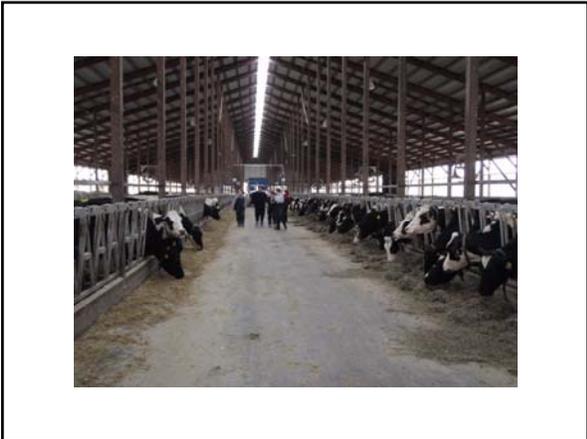
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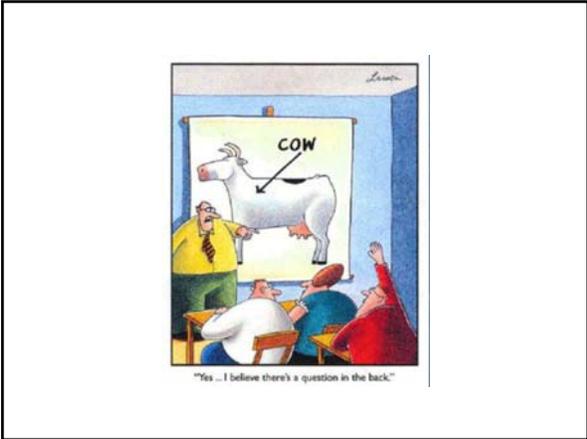
Science with Practice.



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Action Levels

- Immediate Action
- Mandatory Corrective Action Plan (MCAP)
- Continuous Improvement Plan (CIP)



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Mandatory Corrective Actions

- Standard must be met in 9 months
- Veterinarian Involvement:
 - VCPR agreement signed annually
 - Written Herd Health Plan
- Pre-weaned Calf Practices/Protocols including:
 - Disbudding calves prior to eight (8) weeks of age
 - Feed and water access by day 3 of age
 - Calf movement
 - Colostrum, milk/milk replacer, feed, and water procedures

Mandatory Corrective Actions

- Non-Ambulatory Animal Practices/Protocols
 - Movement
 - Provision for medical care
 - Feed/water/protection from weather, ambulatory animals, and predators
- Euthanasia Practices/Protocols
 - Criteria for animals to be euthanized
 - Technique approved by AABP/AVMA
 - Provision for appropriate carcass disposal

Continuous Improvement Plan (CIP)

- Standard met in 3 years or less
- Animal Observation Benchmarks
 - BC Score – 99% BCS 2+
 - Hock/Knee – 95% score 2 or less
 - Locomotion – 95% score 2 or less
 - Broken tails – 95%+ - no broken tails – all age classes



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Continuous Improvement Plan (CIP)

- Pain management practice/protocol – Disbudding
 - Expected to be used, regardless of method used to disbud
 - Producer expected to work with veterinarian to determine appropriate pain mitigation strategy
- Permanent drug treatment records maintained for review by veterinarian of record
- Signed Cow Care Agreement – Family members with animal care responsibilities
 - Continuing animal care and handling education
 - Job Specific:
 - Pre-weaned calves
 - Non-ambulatory animals
 - Euthanasia
 - Determination of transport fitness

Applying Stewardship Through Protocols



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Legal Options for Dehorning Pain Control

• **What is labeled for pain control associated with disbudding/dehorning in cattle?**

- Nothing!
- What is the only labeled drug from pain control in cattle?

• **Does that make pain control illegal?**

- Not always
- Animal Drug Use Clarification Act (AMDUCA) allows extra-label drug use, with controls
- Extra-label drug use is not always illegal



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AABP GUIDELINES



ESTABLISHING AND MAINTAINING THE VETERINARIAN-CLIENT-PATIENT RELATIONSHIP IN BOVINE PRACTICE

The veterinarian-client-patient relationship (VCPR) is an integral part of proper drug use on cattle operations. State and federal codified VCPRs regulate the practice of veterinary medicine legislatively. This document describes non-regulatory management practices endorsed by the American Association of Bovine Practitioners (AABP) as general guidelines for its members to refer to during their course of practice.

- Veterinarian(s) of record.
- Veterinarian oversight.
- Written agreement.
- Relationships with other vets/consultants.
- Prescription drugs.
- VFD drugs.
- Protocols.
- Treatment records.
- Medical records.

Principles of HACCP

- Principle 1: Conduct a Hazard Analysis
- Principle 2: Determine Critical Control Points
- Principle 3: Establish the Critical Limits
- Principle 4: Establish Monitoring Procedures
- Principle 5: Establish Corrective Actions
- Principle 6: Establish Verification Procedures
- Principle 7: Establish Record-Keeping Procedures

HAACP Based Approach Medical Treatments



Source: www.foodarmor.com

Treatment Protocols

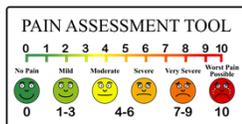
- Comprehensive protocols include:
 - Case definition
 - Objective evaluation of severity
 - Medically sound treatment that can be achieved by pertinent farm personnel & other veterinarians.
 - Evaluation of success or need to retreat
 - Appropriate withdrawal times or testing strategies (ELDU and every day)



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Evaluating outcomes

- Use an objective metric to determine success/failure of our pain control
 - What do we use in animals?



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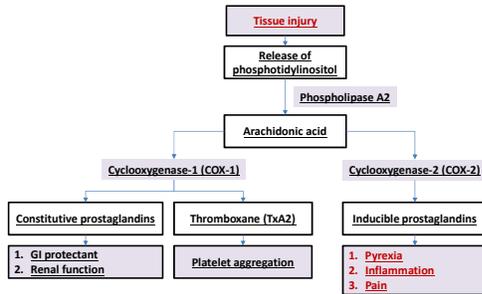
Evaluating outcomes

- What is a realistic time lag before an outcome can be determined?
 - Milk fever
 - Pain control
 - Acute
 - Chronic
 - Neuropathic pain



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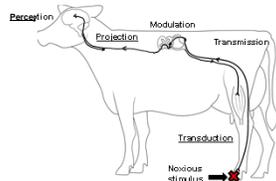
Pain Flow Chart



Slide courtesy of Rochelle Warner, DVM

Pain Transmission Pathway

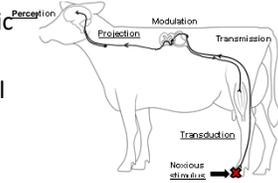
- Clinical signs (i. e. lameness, sensitivity of burn sights) is a visual manifestation of a pain response



Slide courtesy of Rochelle Warner, DVM

Pain Control Drugs

1. NSAIDs
2. Anesthetics – local
3. Anesthetics – systemic
4. Opioids – morphine, fentanyl, butorphanol
5. Gabapentin – GABA analogues
6. Steroids - dexamethasone



Multi-model approaches usually most effective

Slide courtesy of Rochelle Warner, DVM

Pain Control - Dehorning



2% Lidocaine



8.4% Sodium Bicarb



Xylazine 100 mg/mL

Pain Control for Dehorning Cornual Nerve Block



Anatomy of the cornual innervation



Palpation of the temporal ridge



Injection of local anesthetic below the ridge half-way between the lateral canthus of the eye and the horn

Source: Approaching Pain in Cattle, M. Martin, M. Kleinhenz, & H Coetzee

Pain Control - Dehorning



Meloxicam 15 mg



Flunixin Meglumine



Banamine Transdermal

AABP GUIDELINES



ESTABLISHING AND MAINTAINING THE VETERINARIAN-CLIENT-PATIENT RELATIONSHIP IN BOVINE PRACTICE

The veterinarian-client-patient relationship (VCPR) is an integral part of proper drug use on cattle operations. State and federal codified VCPRs regulate the practice of veterinary medicine legislatively. This document describes non-regulatory management practices endorsed by the American Association of Bovine Practitioners (AABP) as general guidelines for its members to refer to during their course of practice.

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- Medical records.

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Questions?
pgorden@iastate.edu



Ireland - 2016

I-29 Moo University 2019 Winter Workshop Series: Prosperity of Dairy Calves
ROUNDTABLE DISCUSSION: Disbudding Calves

1. *How are you currently disbudding calves? (Method, age, pain management)*
 - a. *What do you like about your current approach?*
 - b. *What do you dislike or find challenging about your current approach?*
2. *Are you ready and/or willing to utilize disbudding techniques that were discussed?*
 - a. *What are some advantages you see about the techniques that were discussed?*
 - b. *What might be some **challenges** of implementing these techniques on your operation?*
3. *What changes can I or should I make in the **near future in regards to this area**?*
4. *What changes can I or should I make in the **long-term**?*

Additional Notes:

Calf Management Training Videos

Videos are 3-4 minutes in length and in English and Spanish.

Flash drives and DVDs can be requested by contacting:

Kim Clark - 402.472.6065, kimclark@unl.edu

or Jenn Bentley – 563.382.2949, jbentley@iastate.edu

Videos can be viewed at: <https://mediahub.unl.edu/channels/27873>

Or <https://www.youtube.com/user/ISUExtensionDairy>

Newborn Calf Care

1. Passive Immunity
2. Processing newborn calves
3. Harvest and storage of colostrum
4. Evaluation of colostrum quality
5. Recommended colostrum feeding techniques
6. Proper use of an esophageal feeder
7. Evaluating protein absorption from colostrum

Hygiene

1. Importance of hygiene
2. Monitoring cleanliness of the calf kitchen

Low-stress handling

1. Importance of Low-Stress Handling
2. Determining flight zone & Defining Point of Balance
3. Handling newborn calves
4. Heat and cold stress
5. Transportation and moving calves

Automatic Calf Feeders

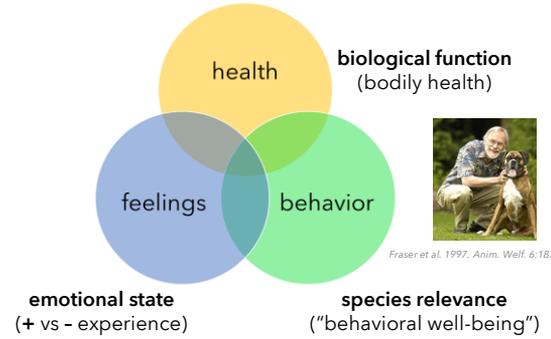
1. Automatic calf feeder management
2. Group housing facilities
3. Nutrition & health considerations
4. Cleaning and sanitation of automatic calf feeders



Two heads are better than one:
Benefits of pair or group rearing of calves

Jennifer Van Os

What is important for animal welfare?



In extensive systems, cattle are reared
in multi-age social groups



<https://www.elanco.ca/products-services/peef>

70% of US dairy calves are housed singly
through weaning USDA (2016)



UBC Animal Welfare Program

FW LATEST KNOW HOW MARKETS DISCOVER 12° Sutton

Tesco reveals reason for single-calf hutch ban

Michael Priestley
13 October 2018

More in
[Care](#) [Livestock](#)
[Youngstock management](#)

Recommended

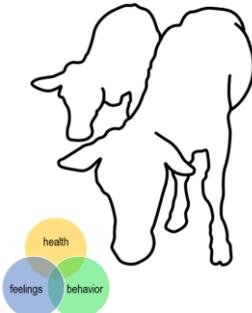


Supermarket giant Tesco has cited "latest scientific evidence" in justifying its recent requirement that all dairy calves on supplier farms are reared in pairs or groups.

The decision has met with mixed reviews, with farmers who still use single-calf hutches burdened with extra work in making their systems conform with the supermarket's revised Livestock Code of Practice.

Tesco said the change applied to Tesco Dairy Group members and followed consultation with both farmers and veterinary advisers.

WHY social housing?



Many positive outcomes:

- ✓ Play behavior
- ✓ Social development
- ✓ Cognitive / behavioral flexibility
- ✓ Adaptability to new things
- ✓ Resilience to stress
- ✓ Increased solid feed intake
- ✓ Increased weight gains
- ✓ Greater public acceptance

Cognitive and behavioral flexibility



Housed in complex multi-age groups with social contact but without ability to nurse

UBC Animal Welfare Program



Cognitive testing

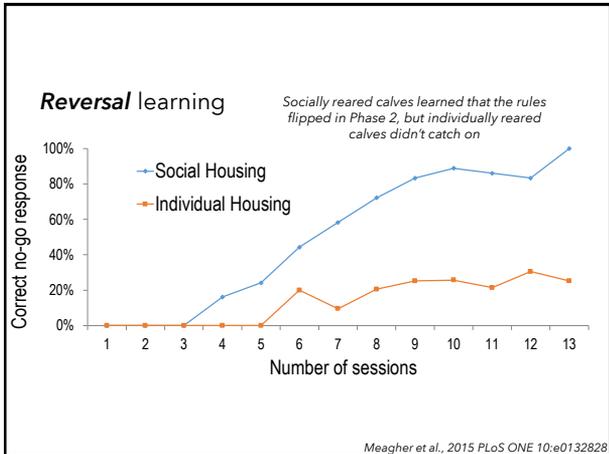
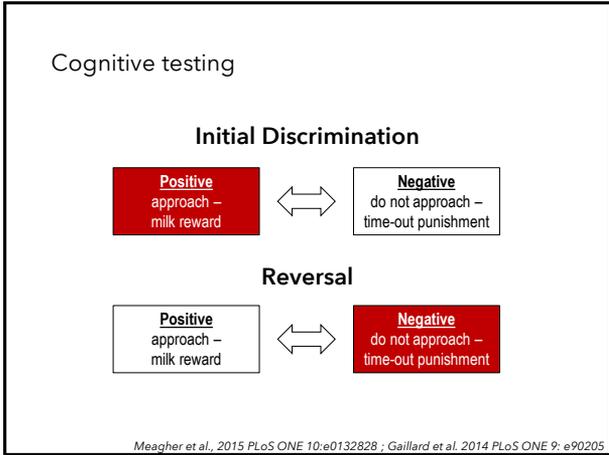
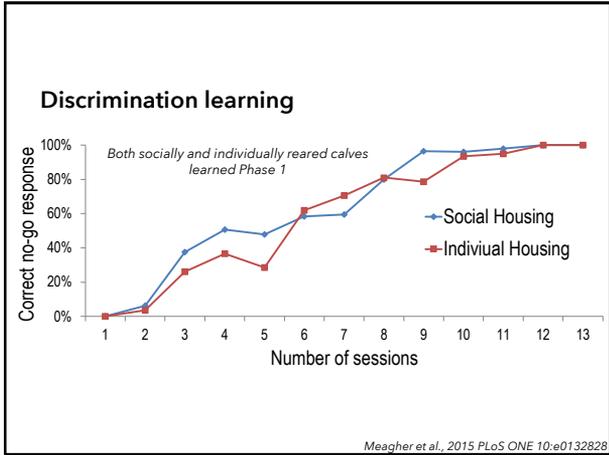
Initial Discrimination

Positive
 approach –
 milk reward

↔

Negative
 do not approach –
 time-out punishment

Meagher et al., 2015 PLoS ONE 10:e0132828 ; Gaillard et al. 2014 PLoS ONE 9: e90205



Why does cognitive development matter??

Photo: <http://udderside.blogspot.com/2012/05/graduating-to-milking-herd.html>

We expect our cows to learn a lot of new things over their lifetimes:

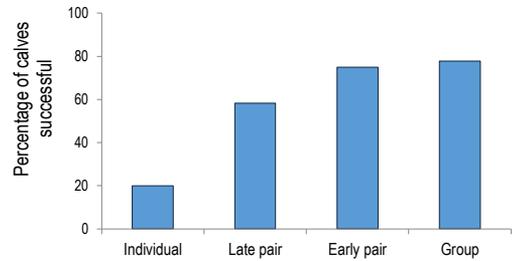
- ✓ New diets and feed items
- ✓ New social groups
- ✓ New housing elements (e.g., hutch → bedded pack → stalls; different feeding and drinking sources)
- ✓ Milking in parlors (both sides!) or AMS...

Photo: <http://udderside.blogspot.com/2012/05/graduating-to-milking-herd.html>

What type of social contact is needed?

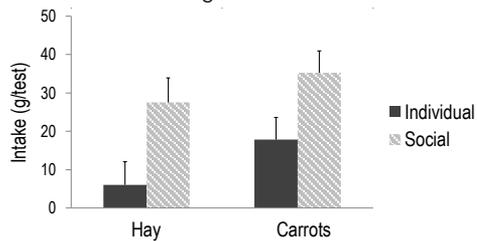


Calves **paired early** or kept in complex social groups did best on a cognitive test

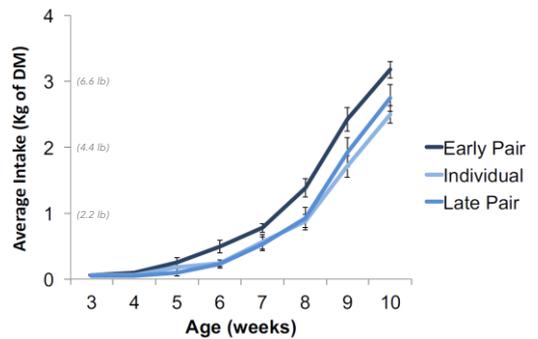


Establishing on solid feeds

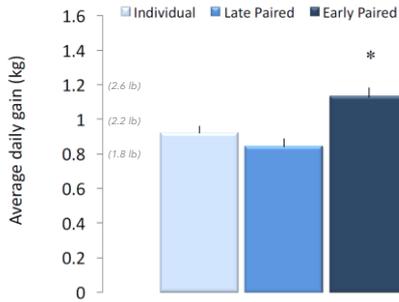
Individually reared calves are more fearful of new things, including new food items



Early-paired calves had higher solid feed intakes



... and this resulted in greater BW gains during & after weaning



Costa et al. 2015. J. Dairy Sci. 98:6381-6386

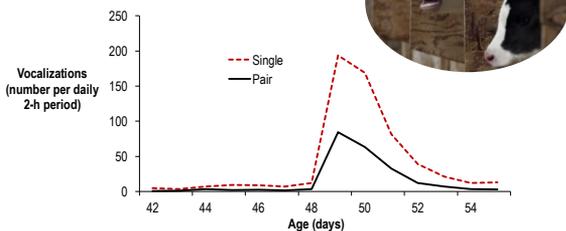


pre-weaning bodyweight gains predict future productivity, especially first-lactation milk yield

Heinrichs and Heinrichs, 2011; Soberon et al., 2012; Van De Stroet et al., 2016

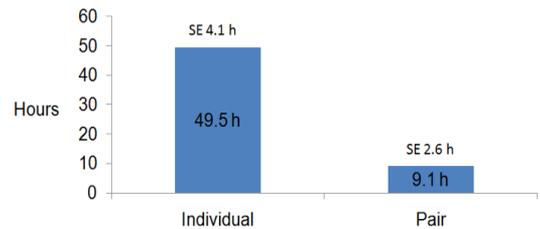
Resilience to stress

Weaning distress is reduced when calves are pair housed



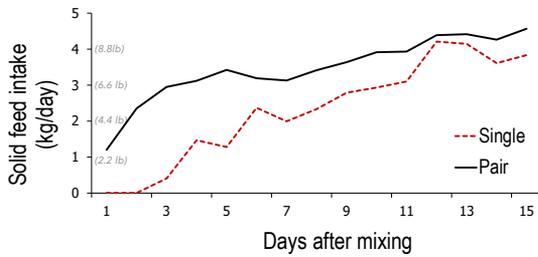
De Paula Vieira et al. 2010. J. Dairy Sci. 93: 3079-3085

Pair-housed calves start feeding sooner after mixing



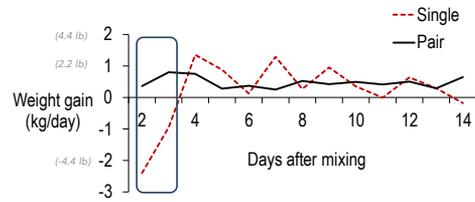
De Paula Vieira et al. 2010. J. Dairy Sci. 93: 3079-3085

...and have greater feed intake after weaning and mixing



De Paula Vieira et al. 2010. J. Dairy Sci. 93: 3079-3085

Weight gain for individually housed calves went backward in the days right after mixing



De Paula Vieira et al. 2010. J. Dairy Sci. 93: 3079-3085

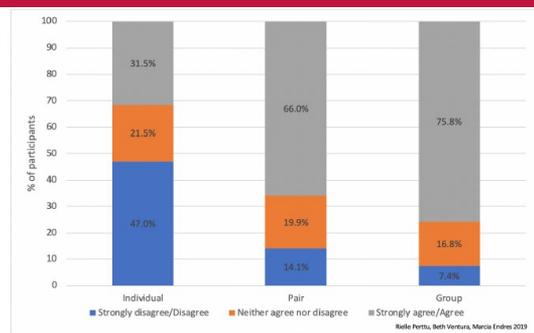
Enhanced growth performance

Studies overwhelmingly show positive effects of social housing on calf performance, especially when combined with sufficient milk/replacer-feeding levels (≥ 8 qts/day at the peak)

DMI of solid feed	+ 7	+ 7	- 0
final bodyweight	+ 6	+ 2	- 0
avg daily gain	+ 4	+ 6	- 0

Costa et al. 2016. Invited review in J. Dairy Sci. 99:2453-2467.

Better public acceptance



Courtesy Rielle Perttu, Beth Ventura, Marcia Endres. 2019. University of Minnesota

One reason given for keeping calves individually is a lack of **housing facilities** for groups



Medrano-Galarza et al 2017. J. Dairy Sci. 100:6872-6884

Many options for social housing



automatic feeders



super hutch



manual feeding



paired hutches

Pair housing in hutches can be done at scale

Texas panhandle
600+ calves on milk



Van Os et al. (in preparation); Whalin et al. 2018; Wormsbecher et al. 2017; Pempek et al. 2013

Single housing more forgiving when management practices aren't ideal

- Allows for controlling & monitoring individual feeding
- Ease of handling individual calves
- Disease risks*:
 - Less calf-to-calf contact
 - Less shared aerosol
 - Less contamination of shared feeding equipment
 - Less contamination of shared bedding

*Note: individual housing with fence-line contact does **not** prevent these concerns!*



Dr. Terri Ollivett

Are you ready to move to pairs or groups?

Benchmarks to hit first:

1. Mortality (excluding stillbirths) < 5%
2. Failure of passive transfer < 5%
(if not, need to look at colostrum management)
3. Are you following best management practices?



Dr. Joao Costa
University of Kentucky

Most of the same principles for success apply to rearing individuals or groups

- ✓ colostrum protocol
- ✓ nutrition
- ✓ space, bedding
- ✓ ventilation
- ✓ sanitation + biosecurity
- ✓ all-in / all-out moves

Resource:

<https://thedairylandinitiative.vetmed.wisc.edu/>

Discouraging cross sucking

- ✓ Sufficient milk **quantity**
- ✓ Feeding milk through a **teat*** instead of open bucket
- ✓ Providing a "dummy" or dry teat*
- ✓ **Step-down weaning**, especially based on starter intake



*Slow-flow teats help by prolonging the milk meal. Teats should remain available for at least 20 minutes afterward.

Two heads are better than one!



- Social housing for pre-weaned calves → **win-win-win** for welfare, performance, public perception
- Common questions: disease risk, cross-sucking, feed competition...

→ can be managed without isolating calves, and more research is ongoing

Created by Dots
from Noun Project





Jennifer Van Os
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@AWSUWM
(Animal Welfare Science at UW-Madison)



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For dairy calves, two (or more) heads are better than one

Jennifer Van Os Published 7:18 p.m. CT Nov. 26, 2019



One way to pair calves is in adjacent hutches with shared fencing, as in a recent research study at the UW-Madison Blaine Dairy. (Photo: Van Os lab, UW-Madison)

When it comes to raising dairy calves, two – or more – heads are better than one in several ways. For the past decades, the majority of calves in the U.S. and Canada are housed singly before weaning. More and more dairy producers, however, are part of a trend toward pair or group raising.

The consensus from the research is now that pairs and small groups, when managed well, can provide clear benefits. Housing milk-fed calves with at least one social partner can be a win-win-win in terms of animal welfare, calf growth performance, and consumer perception – all of which are important for the vitality and sustainability of Wisconsin's dairy industry.

Good for the calf. Calves learn to play well with others of their kind, literally and figuratively. It's important to maintain per-calf space allowance, meaning an increase in total space for pairs or groups.

This larger space allows calves to show a wider range of natural behaviors, including playing. Having social contact early in life helps them learn appropriate social interactions and also improves their other learning abilities.

Calves raised in social groups show flexibility and adaptability to change, including a better willingness to try new feeds such as hay and TMR. This translates into improved resilience to stress and less bellowing during weaning. When regrouped after weaning, they start feeding sooner and don't show the same growth check that individually raised calves commonly do.

Good for growth performance. Across a dozen studies, calves raised in pairs or small groups outperformed single calves in one or more ways. Performance advantages were especially apparent for calves fed higher milk or replacer allowances.

- Solid feed intake: by $\frac{1}{4}$ to 1 pound per day pre-weaning and $\frac{3}{4}$ to 2.5 pounds per day post-weaning
- Body weight at weaning: by 5 to 9 pounds
- Average daily gain: by $\frac{1}{4}$ pound

Becoming established on solid feeds before weaning is important for stimulating rumen function, and better early-life growth translates to earlier onset of puberty and higher milk production at maturity.

Good for consumer acceptance. Last summer, Rielle Perttu, Beth Ventura, and Marcia Endres from the University of Minnesota surveyed over 1300 adults attending the Minnesota State Fair. They were shown photos of calves in single, pair, or small-group pens in a barn. Nearly half of the participants disapproved of individual housing, whereas only 14% of people disagreed with pair housing and only 7% disagreed with group housing.

In contrast, two thirds of participants agreed with pair housing and three quarters agreed with group pens, whereas only a third thought single housing was acceptable. Nearly all of these fair-goers consumed dairy products. This is the first study showing that social housing may be important for continued consumer acceptance of dairy production.

Social housing can be done in many ways, either in a calf barn or outdoors in hutches (photo) or super hutches. Dairy producers who have chosen to shift to social calf raising have found that changing their management sometimes comes with bumps along the way. Nonetheless, many of the principles for promoting good health outcomes are similar whether managing individuals, pairs, or groups.

The risk of respiratory disease is reduced by feeding sufficient high-quality colostrum to promote passive transfer of immunity, feeding sufficient milk or milk replacer for a high plane of nutrition, and ensuring ventilation for good air quality. Sufficient space, clean and dry bedding, good biosecurity and sanitation, limiting age differences within groups, and all-in-all-out practices are also important.

Providing appropriate outlets for suckling can reduce the rates of cross sucking. For example, by feeding milk through a teat instead of an open bucket or providing “dummy” or “dry” teats. Calves should have access to any of these for at least 20 minute after they finish a milk meal.

Regardless of pre-weaning housing, cross sucking sometimes increases directly after weaning. Calves who are better established on solid feed are less likely to cross suck, so gradual, step-down weaning based on starter intake can help.

In our lab at UW-Madison, we are doing research on solutions for cross sucking and other management questions around pair and group raising. Our goal is to help more dairy producers join the list of success stories for social raising.



Van Os is an Assistant Professor and Extension Specialist in Animal Welfare, Department of Dairy Science, University of Wisconsin-Madison

Read or Share this story: <https://www.wisfarmer.com/story/opinion/columnists/2019/11/26/social-partnering-calves-has-many-benefits/4263279002/>

Jennifer Van Os (Photo: UW Madison)



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I-29 Moo University 2019 Winter Workshop Series: Prosperity of Dairy Calves
ROUNDTABLE DISCUSSION: Group Housing and Calf SOP's

1. *How do you currently house your pre-weaned calves? (housing type, group size, age at grouping if paired or grouped)*
 - a. *What do you like about your current management? (e.g., calf health, growth performance, labor)*
 - b. *What are some challenges with your current calf management?*

2. *Are you ready to move to group or paired housing given the benchmarks discussed?*
 - a. *What are some **strengths** of current management if you wanted to move to pairs or groups (or already do)?*
 - b. *What are some **challenges** of current management if you wanted to move to pairs or groups (or already do)?*

3. *What changes can I or should I consider making in the **near future in regards to this area**?*

4. *What changes can I or should I consider making in the **long-term**?*

Additional Notes

