CANADIAN AGRICULTURAL PARTNERSHIP

NOVA SCOTIA DEPARTMENT OF AGRICULTURE

Dairy Production Manual

A Guide for 4-H Leaders and Beginning Farmers

NOVA SCOTIA

Canada

Dairy Production Manual
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Disclaimer

This manual is intended to be a resource that provides educational information for 4-H leaders and people who are interested in raising livestock. It covers topics such as breeds, husbandry, nutrition, health, safety, and business.

This manual's appendix includes a section that outlines topics and activities for 4-H meetings. The content included in this guide is meant for reference only.

Readers who require additional information, specific regulations, or more details are asked to contact the Nova Scotia Department of Agriculture Regional offices for assistance: https://novascotia.ca/agri/programs-and-services/regional-services/

While steps have been taken to ensure the content in this booklet is accurate, recommendations, guidelines, and regulations may change at any time. Authority rests with the relevant regulatory body.

Thank You

Special thanks to the following for preparing, reviewing, and permitting industry-specific sections to be used in this collective resource:

- Brian Cameron, General Manager, Dairy Farmers of Nova Scotia
- Nancy Douglas, proAction®
- Karen Clark, On-Farm Program Manager and Sustainability Advisor, Dairy Farmers of Canada
- Michelle Linington, Holstein Canada
- Adele Veinot, Antigonish Veterinary Clinic
- Dan Mosley, Dairy Specialist, Perennia

Introduction

Cattle are large ruminant animals that were first domesticated around 10,500 years ago from the wild Aurochs cattle (Bos primigenius). Domestication is thought to have occurred in two areas simultaneously: the Near East, and the area that is now Pakistan. The word “cattle” originally meant movable personal property, as cattle were often used as money or in the barter system. It is thought that owning cattle is the oldest form of wealth. Cattle historically, and today, are used mainly for their food products (milk and meat), leather, and, in developing counties, for draft power. As cattle were bred and developed for various uses, distinct breeds were formed. Some breeds specialized in producing dairy products, while others specialized in producing beef. Today, it is estimated there are over 1,000 breeds of cattle worldwide.

Dairy is a strong and viable industry in Canada. The country has over 10,500 dairy farms with the average herd size of approximately 70 cows. Ninety-eight per cent of dairy farms in Canada are family owned and operated, and there are dairy farms in every Canadian province. Dairy farming contributes significantly to Canadian agriculture. Based on farm cash receipts, the dairy industry ranks second to the red meat sector. The dairy sector is a supply-managed system, meaning it is based on controlled domestic production, administered pricing, and import controls. Canadian dairy products are recognized for their variety and high quality. The industry is strongly committed to animal welfare and environmental sustainability. The Canadian dairy industry is recognized worldwide for the superior genetic quality of its cattle and is a leader in innovative genetic technologies in breeding and production.

Section 1: Selecting an Animal

Breeds of Cows

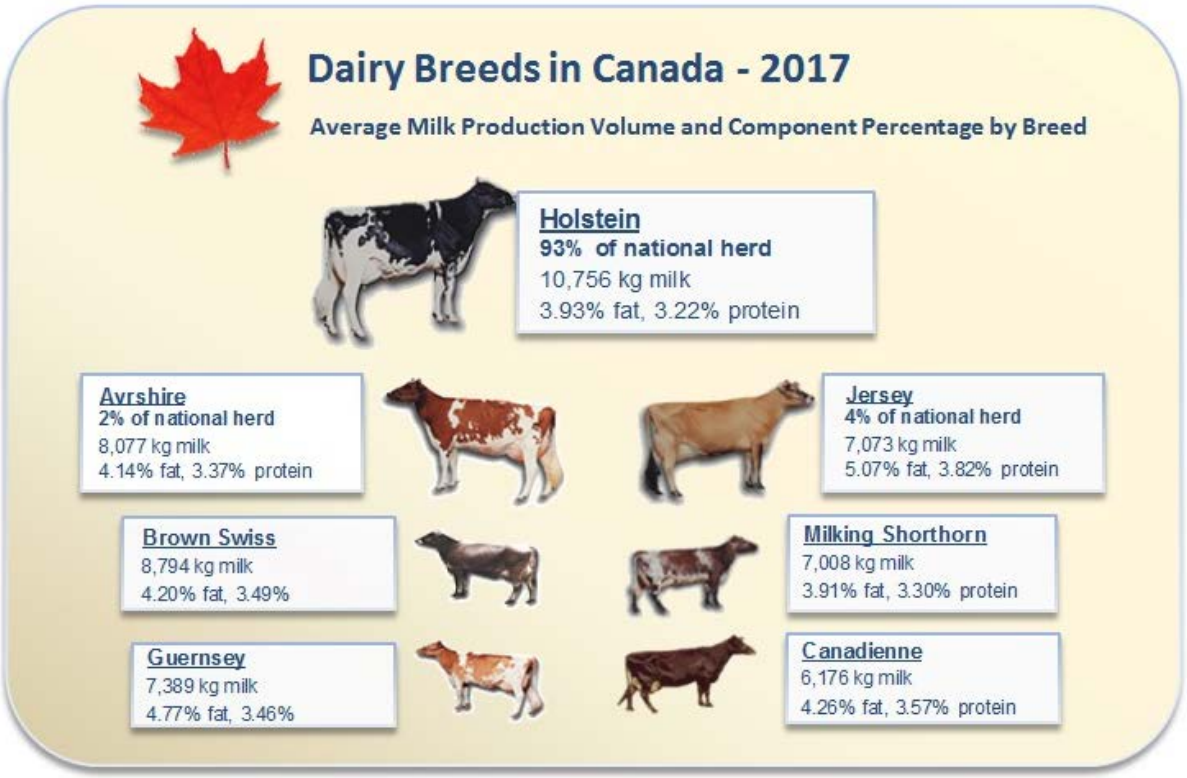


Image Copyright: Holstein Canada

Holstein

Holsteins are usually black and white. Fully grown Holsteins weigh 625 kg (1,377 lbs.) on average. Of all breeds, Holsteins give the most milk, fat, and protein.

Jersey

Jerseys are one of the smallest dairy breeds. They weigh 400–500 kg (881–1,102 lbs.) and are light brown. Some Jersey cows may have white spots too. These little cows pack a big butterfat and protein punch!

Milking Shorthorn

Milking shorthorns are red, white, and brownish.

Ayrshires

Ayrshires are a little smaller than Holsteins and have red and white markings.

Guernseys

Guernseys are about the same size as Ayrshires. They can be recognized by their light brown or red markings and white patches.

Brown Swiss

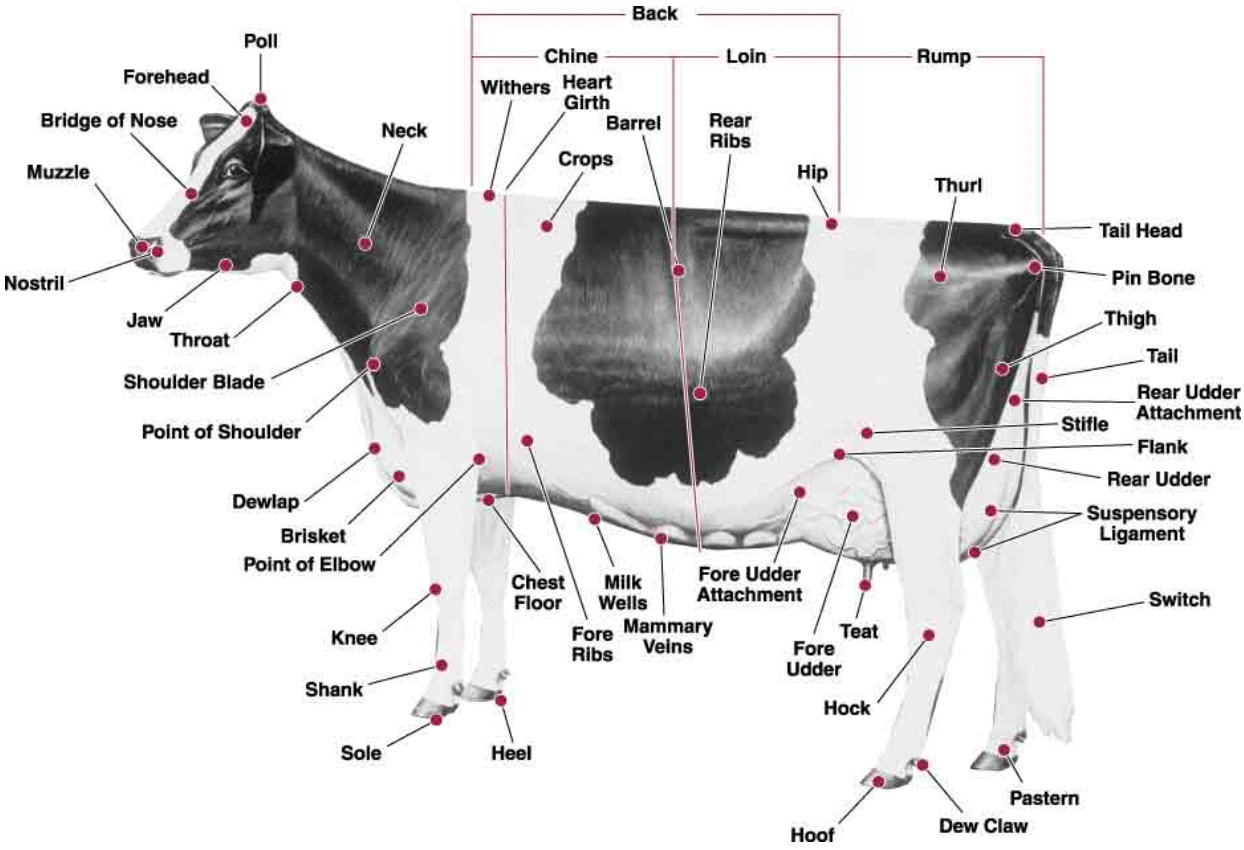
Brown Swiss are the same size as Holsteins.

Production

One of the biggest factors in selecting a calf is its potential to produce milk. A calf may look great with respect to conformation, but if you are planning to keep it in a herd, then production is important as well.

Conformation

Conformation is the rating of a cow's body type. When judging calf conformation, it is important to know the parts of the cow and what the ideals for different breeds look like. Desirable physical characteristics result in healthier and more productive animals that will last longer in the herd. This will allow you to be more successful in your business.



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Dairy Cow Scorecard for Conformation

	Perfect Score
Mammary system	**42**
Dairy strength	**20**
Feet and legs	**28**
Rump	**10**
	TOTAL ------/100

Dairy Calf and Heifer Scorecard for Conformation

	Perfect Score
Dairy strength	**40**
Feet and legs	**40**
Rump	**20**
	TOTAL ------/100

Dairy Cow Scorecard

Perfect Score

Mammary System 42

- ☐ Soft, high, wide and strongly attached, with good teat length and placement
- ☐ Healthy udders that are resistant to breakdown
- ☐ Easy to milk with effective milk letdown and milk-out
- ☐ Capacious udders for high milk volumes
- ☐ Ligament strength and udder attachment to keep udder free from contamination

Dairy Strength 20

- ☐ Well-sprung, open ribs that angle to the rear and have adequate width
- ☐ Adequate capacity for the consumption of a high forage diet
- ☐ Sustains proper body condition with high milk output
- ☐ Healthier cow with room for vital organs to operate

Feet and Legs 28

- ☐ Widely placed legs, intermediate curvature, and a steep foot with deep heel
- ☐ Greater resistance to lameness and foot diseases
- ☐ Straight-tracking locomotion with ample freedom of movement
- ☐ Mobility to get to the feed bunk, milk parlour, and for heat detection (methods of reproduction)

Rump 10

- ☐ Well-sloped, wide, and strongly anchored to back/vertebrae
- ☐ Impacts position of reproductive tract to be held high within abdominal cavity
- ☐ Improved fertility
- ☐ Better calving ease and healthy recovery following calving

TOTAL------/ 100

Holstein Cow Scorecard

Image Copyright: Holstein Canada

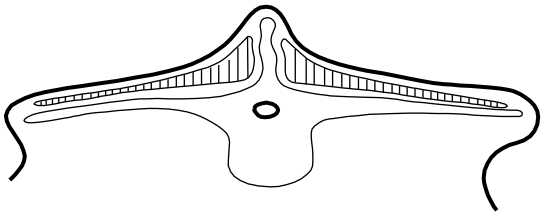
Body Condition Scoring

Body condition scoring helps you measure the amount of body fat on a cow by look and feel. Fat is an energy reserve for cows. Sometimes cows need this extra energy when they are using more energy than they are eating in feed.

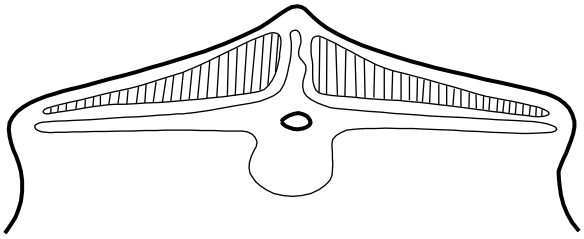
This is called “negative energy balance.” One of the most common times cows have a negative energy balance is in early lactation: they are milking more energy out than they are taking in. Cows use 1 kg (2.2 lbs.) of fat to make 7 kg (15 lbs.) of milk, so, you need to make sure the heifer or dry cow’s body has enough stored fat to produce milk in early lactation. You can rate how much fat the cow has on its body using body condition scoring. A score of one (1) is a very thin cow. A score of five (5) is a very fat cow. Dry and calving cows should have a score of 3.5 to 4.

Cows with a condition score greater than four (4) will have more health problems, such as retained placentas and calving problems. Often, these cows have a poor appetite right after calving. This means it eats less and can get ketosis and/or fat in the liver. Cows that are too fat will often go down at calving. Although they remain alert, they may never get back up.

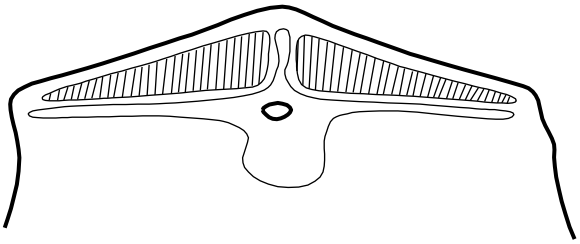
Condition Score 1
This cow is emaciated. The ends of the short ribs are sharp to the touch and together give a prominent shelf-like appearance to the loin. The individual vertebrae (spinous processes) of the backbone are prominent. The hook and pin bones are sharply defined. The thurl region and thighs are sunken and in-curving. The anal area has receded and the vulva appears prominent.



Condition Score 2
This cow is thin. The end of the short ribs can be felt but they and the individual vertebrae are less visibly prominent. The short ribs do not form as obvious an overhang or shelf effect. The hook and pin bones are prominent but the depression of the thurl region between them is less severe. The area around the anus is less sunken and the vulva less prominent.

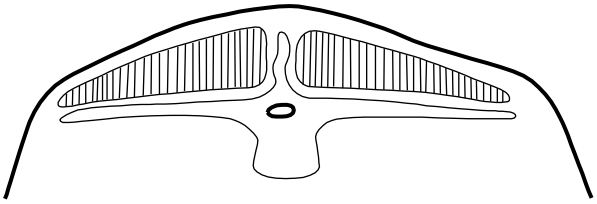


Condition Score 3
This cow is in average body condition. The short ribs can be felt when you apply slight pressure. The overhanging shelf-like appearance of these bones is gone. The backbone is a rounded ridge and hook and pin bones are round and smoother all over. The anal area is filled out but there is no evidence of fat deposit.



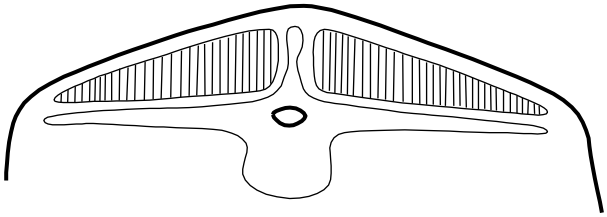
Condition Score 4

This cow is in heavy condition. You can feel the individual short ribs only by applying firm pressure. Together, they are rounded over with no shelf effect. The ridge of the backbone is flattening over the loin and rump areas and rounded over the chine. The hook bones are smoothed over and the span between hook bones over the backbone is flat. The area around the pin bones is beginning to show patches of fat deposit.



Condition Score 5

This is a fat cow. The bone structure of the topline, hook and pin bones, and the short ribs is not visible. Fat deposits around the tailbone and over the ribs are obvious. The thighs curve out, the brisket and flanks are heavy and the chine very round.



Section 2: Care and Management

Code of Practice

Canada's National Farm Animal Care Council has developed a *Code of Practice for the Care and Handling of Dairy Cattle*. The code contains recommendations for housing and management practices, as well as transportation and processing. You can find the full code at http://www.nfacc.ca/codes-of-practice/dairy-cattle.

These codes of practice are nationally developed guidelines that serve as the foundation for ensuring farm animals are looked after using sound management and welfare practices that promote animal health and well-being. Codes are used as educational tools, reference materials for regulations, and the foundation for industry animal-care assessment programs. The codes aim to provide feasible and scientifically informed approaches to meeting an animal's health and welfare needs, contributing to a sustainable and internationally competitive farming industry.

The management provided by the person(s) responsible for the daily care of the cattle has a significant influence on the animals' welfare. Those responsible should consider the following key aspects of responsible care:

- Shelter and comfort
- Feed and water to maintain health and vigour
- Social needs of cows
- Humane handling
- Disease prevention and control
- Veterinary care, diagnosis, and treatment
- Timely euthanasia of any cow not responding to treatment or is experiencing pain that is not relievable
- Emergency preparedness

Dairy producers should consider proAction® Animal Care Requirements as well. You'll learn more about proAction® later in this manual.

NOTE

For more information on humane handling and transportation guidelines, see the additional resources section at the end of this manual.

Building and Remodeling a Barn

Whether you are building a new dairy barn or have purchased an existing farm, there are some aspects that need to be considered. Remodelling can cut building costs by making an unused building usable again. However, both remodelling and building a new barn require planning and knowledge of how to create suitable housing for your herd.

Location, location, location—If you're building a new barn, or remodelling, you should consider the distance from the farmhouse, any existing dairy buildings, and drainage. You should also take ease of feeding and manure handling, security, access to utilities, and weather conditions into consideration when deciding on a location.

Current use—If you're remodelling, think hard about whether or not the building will ever be needed for its current purpose again. For example, if you are remodelling a machine shed, will you need more storage space for equipment in the coming years?

Building structure—How sound is the building? If it needs major work to its foundation, roof, or walls, it may be cheaper to build a new barn.

Ventilation—Can the building be ventilated naturally? Natural ventilation reduces moisture in the winter and heat in the summer. Buildings need to catch the wind and to be at least 15 m (16.4 yards) from trees and silos, and 23 m (25 yards) from other buildings.

Size—Is the building and surrounding land large enough to house all your animals?

Cost—Sometimes, it is cheaper to build a new structure. Get estimates for remodelling and for building a new building for the same purpose. Assume the remodelling will cost 10 to 20 per cent more than the estimate. If the cost of remodelling is 70 to 80 per cent of the cost of a new building, it is probably better to build.

Housing

How cattle are housed can make a big difference in your farm's management as it can affect your cows' growth, health, and calving. Combined with other factors, such as feeding and health programs, housing has an important effect on a farm's operation.

The ideal calf house should have the following characteristics:

- **Economical—**Good quality, durable, and not too expensive.
- **Easy to give feed—**Contains a feed trough, clean water, and a hay rack.
- **Spacious—**Each calf needs about 1.2 x 2.4 m (3.9 x 7.8 ft.) of their own space to thrive.
- **Flexible—**Should be adaptable to changes on your farm and weather conditions.
- **Easy to clean—**Keeping calf housing clean is one of your biggest priorities, as many diseases are spread through manure. Each pen must be cleaned and disinfected before an animal moves in. Ideally, the housing should be made out of a washable plastic as wood is porous and can harbour bacteria for a long time.
- **Warm calf environment—**The temperature in a calf house should be 10°C (50° F) with less than 80 per cent humidity. A heated building with a mechanical ventilation system is great for creating a warm calf environment. The biggest drawbacks to warm calf housing are
    - heating bills
    - difficulty in keeping housing well ventilated
    - difficulty in keeping calves dry

Ventilation

Ventilation is the process of intentionally letting fresh outside air into an indoor space to control the air quality. Air quality is regulated by diluting and displacing pollutants such as dust, odours, or gases. Dust from grain, hay, and dried manure floats around in barns; this can cause respiratory problems and worsen allergies. It is important to be careful around enclosed areas containing manure as gases from manure can kill people and animals.

Along with air quality, ventilation can also control the temperature and humidity to make the space more comfortable for your calf and you. Humidity is moisture in the air. Too much of it can cause your calves' housing to become damp, which may result in sick calves. Cows are better off cool and dry versus warm and damp. Humidity can also damage milking equipment and machinery. Dairy cows naturally give off heat and moisture, so you need to make sure there is adequate ventilation to let excess heat and moisture escape the barn. Ideally, humidity levels in the barn will stay under 75 to 80 per cent.

The following are some possible ventilation options:

- **Cold environment—**All ventilation is from natural wind flow. The temperature in the barn in the winter is only a few degrees above the outside temperature. In the summer, air inlets are opened all the way for maximum cooling.

- **Warm environment—**The barn is mechanically ventilated and kept at a constant temperature through insulation.
- **Modified environment—**A combination of the above.

Free vs. Tie Stall

Free-stall Housing

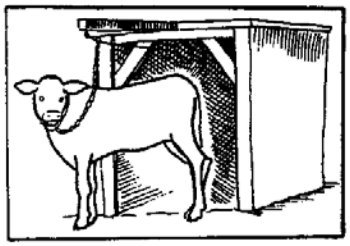
"Free stall" means the cows are not tied and can roam throughout the barn. Cows come to the parlour to be milked, then walk back out to the barn. Feeding areas are not always right in front of the cow. They are usually in an area the cow walks to, such as a feed manger.

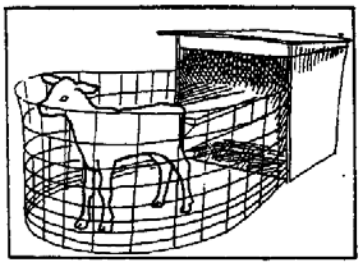
Tie-stall Housing

"Tie stall" means the cow is tied in its stall. Milking is done at each stall and the milker is brought to each cow. Feed is placed in front of the cow. Farmers can use carts or mechanical feed delivery systems to distribute the feed. Resting is done in a cow's own stall and tie-stall cows may go outside for exercise.

Some dairy experts believe cows are only making money if they're in one of three positions: milking, eating, or lying down. Cows that are lying down are comfortable and relaxed, meaning they are able to put more effort into milk production. While lying down, 30 per cent more blood passes through their udders. It takes 454 kg (1,000 lbs.) of blood passing through the udder to produce 1 kg (2.2 lbs.) of milk; therefore, the more the cows lie down, the better. To encourage your cows to lie down and relax while in the barn, they need comfortable housing. The following are some common options for bedding and stall bases.

Calf Housing



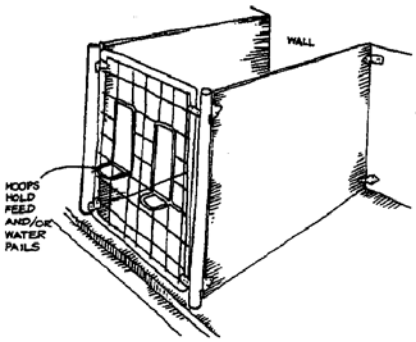


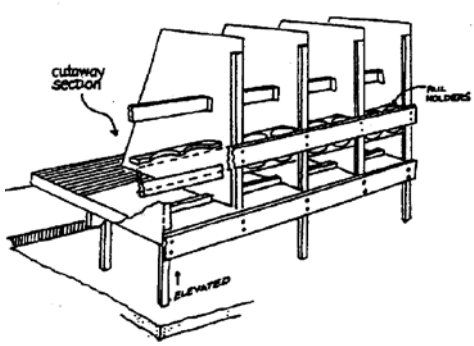
Calf Hutches (Individual or Super Hutch)

Hutches are considered a cold calf environment and are made of plywood, plastic, or fibreglass. They are usually 1.2 x 2.4 m (3.9 x 7.8 ft.) in size. A layer of sand, gravel, or crushed stone should be placed underneath the calf hutch. One or two bales of straw should be added on top to make a comfortable bed. Calf hutches are versatile because the calf is dry and protected from the weather while inside. Outside the hutch, the calf can exercise and get lots of sunlight. If the calf is halfway in and halfway out, the calf gets sunlight, but is still safe from the wind.

Calf Pens

Pens house calves inside the barn and should be 1.2 x 2.4 m (3.9 x 7.8 ft.) in size. They should have three solid sides and an open front. The open front allows fresh air in and makes it easier to feed the calf. These pens can be easily stored and taken apart when not in use.





Calf Stalls

Calf stalls take up less floor space and are more compact. This means you can fit more calves in one area and save on costs. However, stalls are no longer popular because the calf lacks freedom. Calf stalls have solid sides about 1.3 m (4.2 ft.) high, 0.9 m (2.9 ft.) wide, and 1.80 m (5.9 ft.) long.

Stall Bases

Stall Bases	Advantages	Disadvantages
Rubber/foam/gel/waterbed (installed over concrete)	• Dry • Absorbs moisture • Increase a cow's cleanliness and comfort • Provides some cushion • Increases time cow lies down	• Costly • Bacteria grows under mat • Can stretch and wear over time • Causes friction injuries to hocks and knees
Concrete	• Easy to maintain	• Uncomfortable • Can cause injuries to the cow's legs
Earth	• Good cushion • Cheap	• Hard to maintain as potholes need to be filled frequently

Bedding

Bedding	Advantages	Disadvantages
Sawdust and shavings	• Good cushion	• Grows bacteria when wet
Straw	• Readily available	• Dust can cause breathing problems • Grows bacteria when wet
Recycled paper	• Readily absorbs moisture • Breaks down quickly in liquid manure systems • Environmentally friendly	• Doesn't bounce back like other bedding • Difficult to handle and chop

Grouping Cattle

Cattle of different ages and sizes should be kept apart and housed separately because

- the space a cow requires changes as it ages and grows
- cattle at varying stages of life require different amounts and types of feed
- older cows can sometimes take over feeding and watering areas, which keeps younger cows from eating and drinking enough
- young cattle shouldn't be exposed to older cows as younger animals have weaker immune systems
- cattle new to your farm shouldn't be immediately housed with your existing herd as the new cows may carry disease

It is possible to design a housing system that separates heifers into groups that are no more than three months apart in age. Calves aged 6 to 9 months; heifers, 21 months to calving; and dry cows can be combined in different ways, depending on the size of the herd.

When separating your cattle, their housing should provide

- grouping by age and size
- feed bunks designed for the age and size of heifers
- easy movement of animals from one group to another
- areas for treatment and breeding

Dehorning

Cows need to be dehorned so they are safer to handle and are less likely to cause injuries to other animals. Calves should be dehorned when very young because there is less horn tissue, so the chance of pain and infection is reduced. Pain control is mandatory during dehorning and castration in both proAction® and the *Code of Practice for Care and Handling of Dairy Cattle*. The two most common methods of dehorning young calves are chemical and electric dehorning. Chemical dehorning involves putting caustic chemicals onto the surface of the horn. Electric dehorning uses a hot iron to kill horn cells at the base of the horn.

Removing Extra Teats

Extra teats may interfere with milking. They should be removed when the calf is one to two months old. Before removing extra teats, make sure the teat is not a milking one.

proAction®

Canadian dairy farmers have excellent standards and practices to deliver the best milk every day. Dairy Farmers of Canada and their members initiated the development of the proAction® initiative to provide measurable proof of the quality and safety of milk and meat, and to work continually to improve animal health and welfare, as well as environmental stewardship.

In order to ensure your procedures and standards are always current and correct, you should continually reference the proAction® webpage (https://www.dairyfarmers.ca/proaction). The information on the proAction® site takes precedence over any information in this resource.

This section of the website includes resources for farmers to use in implementing proAction®: https://www.dairyfarmers.ca/proaction/resources/overview

Traceability

Traceability is a component of proAction®. In Nova Scotia, cattle fall under the Nova Scotia Premises Identification (PID) program. Farmers must apply for a PID number. This is a unique number, based on national standards, that is assigned to a premise. Each premise will be issued a single premises identification number, regardless of the number of animal types or premise types on that parcel of land. Either the owner or renter of a land location may apply for a PID for a location. Land ownership must be indicated on the application.

A premise is defined as a parcel of legal land where animals are grown, kept, assembled, or disposed of. Premises include farms, hobby farms, stables, feedlots, pastures, hatcheries, egg-grading stations, abattoirs, assembly yards, auctions, sale facilities, rendering plants, zoos, petting farms, fair grounds, race tracks, competition facilities, and veterinary facilities, etc.

Benefits of the PID program include the ability to

- notify premise owners of disease outbreaks in their vicinity and recommend biosecurity precautions
- determine which species are near a disease outbreak
- respond in a rapid and informed manner when emergencies occur
- address all phases of emergency management (preparedness, prevention, response, and recovery phases)
- reduce the impact of marketing restrictions by enabling quicker resolution of emergency situations

You can find the application form to apply for a PID on the website listed under Additional Resources at the end of this manual, by calling 902-890-3377, or by emailing NSPID@novascotia.ca.

NOTE

For more information on traceability, see the information sheet in the appendix at the end of this manual.

Livestock Traceability Quick Tips

WHAT TO DO?		TIME PERIOD
1. PREMISES IDENTIFICATION		
Obtain a premises ID number (PID)	Contact your provincial dairy association or your provincial department of agriculture	
Prince Edward Island, Quebec, Ontario, Manitoba and Alberta producers already have their premises identification number		
2. PREPARE FOR IDENTIFYING YOUR ANIMALS		
Order your approved dairy tags	Contact NLID/ATQ for dairy cow/calf tags NLID 1 877 771-6543 ATQ 1 866 270-4319 For calves born on farm and destined for the beef industry, you may order approved RFID beef tags. Contact CCIA 1 877 909-2333 or local tag dealers	
3. DAIRY ANIMAL BORN ON FARM		
Identify your animal	Must be **double-identified** with approved NLID/ATQ tags Any calves born on farm and destined for the beef industry **may be** identified with a single RFID ear tag (approved beef tag) – Except for provinces that requires dual tagging	**Within 7 days of birth** or before the animal leaves the farm of origin, whichever occurs first
4. TAG ACTIVATION		
Once calves are identified, you need to activate their tags (For age verification)		
RECORD animal birth	• Animal identification number – 15 digits ISO Code structure reads electronically as: 124 000 289999999 (Country / Unique ID number) • Date of animal's birth • Premises identification number where the animal was born	**7 days of birth** or before it leaves the farm of origin, whichever occurs first
REPORT animal birth to the national traceability database	• Animal identification number – 15 digits • Date of animal's birth • Premises identification number where the animal was born	**45 days of birth** or before it leaves the farm of origin, whichever occurs first
5. DAIRY ANIMAL IDENTIFICATION & LOST TAGS		
It is prohibited to remove, or cause the removal of, approved NLID/ATQ/CCIA tags from a dairy animal		
The animal is identified only by a NLID/ATQ electronic button tag (RFID) or NLID/ATQ visual panel tag	Order a replacement tag, a new visual panel tag or electronic button tag (RFID) from NLID (or ATQ in Quebec) with the same number as the remaining tag	Apply immediately when the tag is received & check that the number of the replacement tag matches the original one
The animal is identified with two official US tags starting with "840" (RFID button and visual panel tags)	Please refer to factsheet for information on lost «840» tags (approved US tags) – *Identification of Animals Imported from the USA*	

DFC would like to acknowledge and thank Linda Markle at National Livestock Identification for Dairy, for her collaboration in this document.

Image Copyright: Dairy Farmers of Canada

Livestock Traceability Quick Tips

WHAT TO DO?		TIME PERIOD
5. DAIRY ANIMAL IDENTIFICATION & LOST TAGS (CONTINUED)		
The animal is not identified with two official tags (NLID/ATQ electronic button tag (RFID) and visual panel tags) or	The owner must purchase a set of approved dairy tags from NLID (or ATQ in Quebec) or use a set from their inventory and report the tag replacement to the national traceability database and dairy breed herdbook (if registered)	**7 days** following the identification of the animal or before it leaves the farm, whichever comes first
The dairy animal is identified with an RFID beef tag (yellow CCIA button)	Replacing two lost tags requires the animal's owner to report both animal identification numbers and replacement date to the national traceability database and dairy breed herdbook (if registered) so the numbers can be cross referenced	
Lost both official tags or	If the animal loses its RFID beef tag, replace with another beef tag from your inventory and report the tag replacement to the national traceability database so the numbers can be cross referenced	
6. DAIRY ANIMAL ARRIVES AT YOUR FARM		
Reception of an animal at the farm | Animal move-in		
RECORD animal movement and REPORT to the national traceability database • ATQ in Quebec • CCIA in all other provinces	• Animal identification number – 15 digits • Date of animal's arrival • Premises identification number of the farm of arrival • Premises identification number of the farm of departure • Vehicle (single unit) or trailer (tandem unit) licence plate number	**7 days** following the arrival of the animal or before it leaves the farm, whichever comes first
REPORT animal move-in from outside of Canada (Import Event)	• Animal identification number – 15 digits • Date of animal's arrival • Premises identification of the farm of arrival • Location of the site the animal was kept at before it was imported (departure) • Vehicle (single unit) or trailer (tandem unit) licence plate number	
7. DAIRY ANIMAL DIES AT THE FARM		
Approved NLID/ATQ/CCIA tags may be removed from dead stock disposed of on-farm		
RECORD animal death and REPORT to the national traceability database • ATQ in Quebec • CCIA in all other provinces	• Animal identification number – 15 digits • Date of animal's death • Premises identification number of the farm where the animal died	**7 days** following animal death
8. DAIRY ANIMAL IS EXPORTED TO ANOTHER COUNTRY		
REPORT animal move-out to destination outside of Canada (Export Event)	• Animal identification number – 15 digits • Date of animal's departure • Premises identification of the farm of departure • Location to which the animals were exported (arrival) • Vehicle (single unit) or trailer (tandem unit) licence plate number	**7 days** following animal loading for export

* If the premises identification number is not allocated in the province you are in, provide the name and address of the location

NATIONAL TRACEABILITY DATABASE: CCIA – www.ccia.livestockid.ca or ATQ – www.atq.qc.ca for Quebec farmers
DAIRY BREED HERDBOOK: contact your breed association

Agriculture and Agri-Food Canada | Agriculture et Agroalimentaire Canada

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https://www.dairyfarmers.ca/Media/Files/proaction/Traceability-Quick-Tips

proAction® Implementation

Welcome to proAction

Welcome to Dairy Farmers of Canada's (DFC) proAction Initiative, an on-farm quality assurance program that groups six programs under one umbrella:

- **Milk Quality** is addressed in provincial regulations. DFC was instrumental in reducing the somatic cell count regulatory limit to 400,000 cells/ml in 2012.
- **Food Safety** (formerly Canadian Quality Milk, or CQM): the food safety program has been implemented on farms across the country. It is based on the principles of HACCP.
- **Animal Care:** the program is based on the Code of Practice for the Care and Handling of Dairy Cattle and includes an assessment of animal-based measures.
- **Traceability:** the program is based on the 3 pillars of premises identification, animal identification, and movement recording and reporting.
- **Biosecurity:** the program has been developed and is based on preventing the introduction into, and spread of disease within, a herd.
- **Environment:** the program is under-development. It includes the required completion of an environmental farm plan (EFP).

DFC has Technical Committees for each program, composed of subject-matter experts and farmers. These committees report to the proAction Committee, which is largely composed of farmers. The proAction committee reports to the DFC Board of Directors. Recommendations on content and program direction are then brought to DFC Delegates for approval. Farmers are, and have been, involved at every level; everyone has worked diligently to develop practical programs.

Implementation Timelines

Each element of proAction has been developed and is being implemented in a staged approach so that farmers have adequate time to learn about the requirements and implement them on their farms.

Animal Care and Livestock Traceability are being launched together. The final program materials were published on September 1, 2015, which launched the training and communication phase to farmers and stakeholders. Since that time, farmers have been learning about program requirements, training staff and adjusting their practices, as necessary.

As of September 2017, the Animal Care and Traceability requirements will be incorporated into the food safety validation checklist. Farms that are due for a validation will also be evaluated on their conformance to the Animal Care and Livestock Traceability requirements.

The **Biosecurity** program has been developed and was tested on-farm in a pilot project in 2016. Training materials for farmers and veterinarians will be ready for Fall 2017. Biosecurity will be incorporated into the validation process in September 2019.

Following a pilot project of the draft requirements in 2016, the **Environment** program was divided into two phases. Training for the first phase will start officially in September 2019, and the program will be incorporated into the validation process in September 2021. Phase 2 is under discussion and would be included in validations beginning in September 2023.

August 2017

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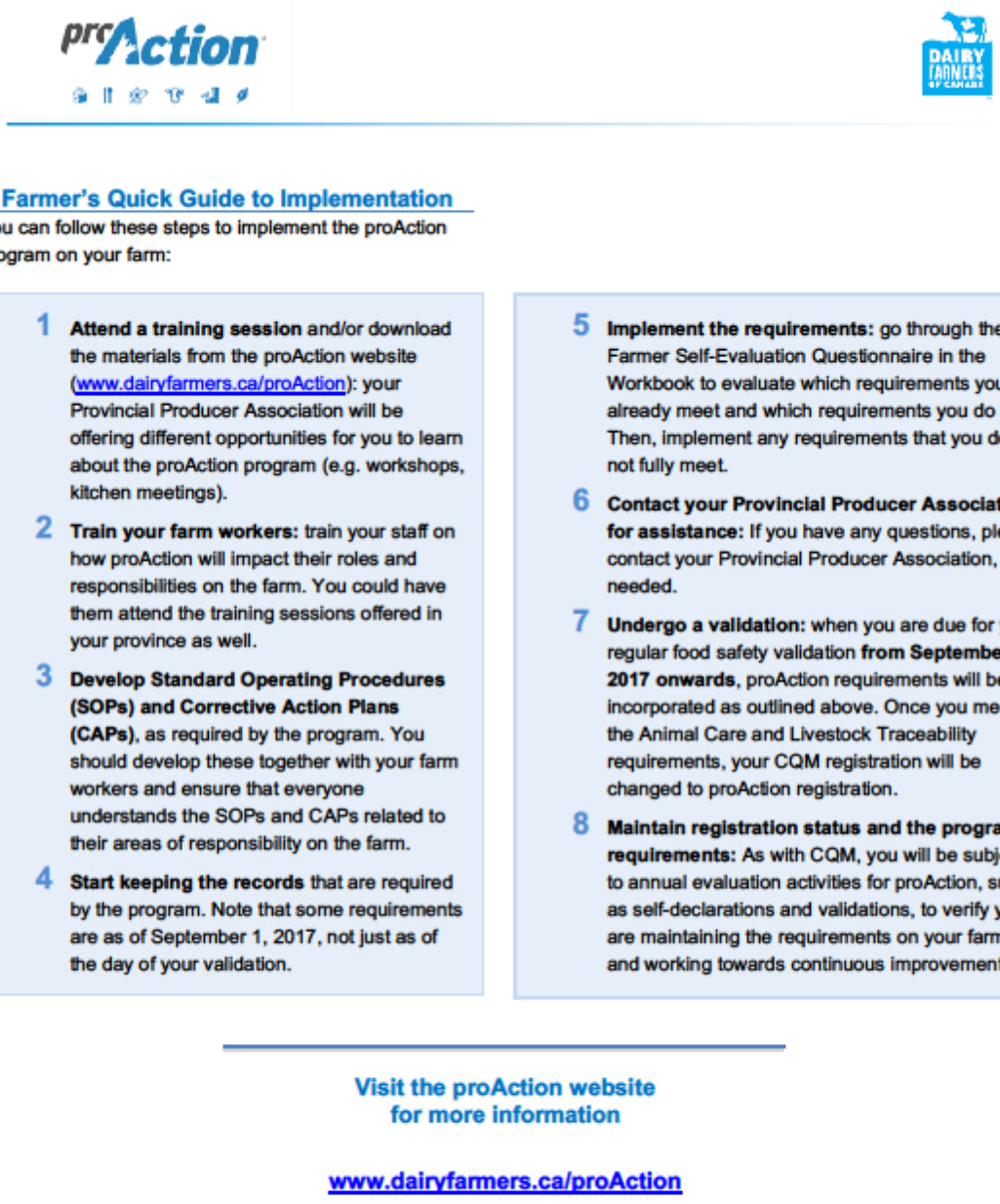

A Farmer's Quick Guide to Implementation

You can follow these steps to implement the proAction program on your farm:

1. **Attend a training session** and/or download the materials from the proAction website (www.dairyfarmers.ca/proAction): your Provincial Producer Association will be offering different opportunities for you to learn about the proAction program (e.g. workshops, kitchen meetings).
2. **Train your farm workers:** train your staff on how proAction will impact their roles and responsibilities on the farm. You could have them attend the training sessions offered in your province as well.
3. **Develop Standard Operating Procedures (SOPs) and Corrective Action Plans (CAPs)**, as required by the program. You should develop these together with your farm workers and ensure that everyone understands the SOPs and CAPs related to their areas of responsibility on the farm.
4. **Start keeping the records** that are required by the program. Note that some requirements are as of September 1, 2017, not just as of the day of your validation.
5. **Implement the requirements:** go through the Farmer Self-Evaluation Questionnaire in the Workbook to evaluate which requirements you already meet and which requirements you do not. Then, implement any requirements that you do not fully meet.
6. **Contact your Provincial Producer Association for assistance:** If you have any questions, please contact your Provincial Producer Association, as needed.
7. **Undergo a validation:** when you are due for your regular food safety validation **from September 2017 onwards**, proAction requirements will be incorporated as outlined above. Once you meet the Animal Care and Livestock Traceability requirements, your CQM registration will be changed to proAction registration.
8. **Maintain registration status and the program requirements:** As with CQM, you will be subject to annual evaluation activities for proAction, such as self-declarations and validations, to verify you are maintaining the requirements on your farm, and working towards continuous improvement.

Visit the proAction website for more information

www.dairyfarmers.ca/proAction

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https://www.dairyfarmers.ca/Media/Files/proaction/proaction_implementationguide_29aug2017.pdf2

Quick Tips

Topic	What to do?
Animal Care (AC) 1. Housing for unweaned calves (Demerits) **AC2. Housing for weaned heifers** (Demerits)	Check housing to ensure it allows calves and heifers to easily stand up, lie down, adopt normal resting postures, and have visual contact with other cattle. If group housing, the bedded area needs to be large enough to allow all calves and heifers to rest comfortably at the same time. Unweaned calves need to be able to turn around (180°). Establish a routine to ensure housing has bedding to keep animals clean and dry. Bedding is required even when mats are used (rubber or pasture mats).
AC3. Housing for bulls (Demerits)	If bulls are on your farm, housing must have bedding and allow them to easily stand up, lie down, adopt normal resting postures, and mount safely.
AC4. Stocking density for dry cattle and lactating cattle (Demerits)	Calculate your stocking density to ensure it meets the following requirements: • Free-stall: does not exceed 1.2 mature cows per usable stall • Bedded-pack pens: provide 11 m^2 (120 ft^2) per mature Holstein cow. You can include the feed/scrape alley in the square footage calculation. Smaller breeds (e.g. Jerseys) require 8.8 m^2 (96 ft^2) per mature cow.
Food Safety (FS) 6 (AC). Cleanliness of lactating cattle (Demerits)	Ensure lactating cattle's udders, legs and flanks are clean. Ideally all cattle in your herd score 1 or 2 on the Cow Cleanliness Assessment chart. More than 20% of the herd scoring 3 or 4 is unacceptable. * *This requirement enhances the Food Safety requirement for clean udders on lactating cattle.*
AC5. Calving area (Demerits)	Keep calving area clean and bedded. The area should meet the stocking density requirements. Cattle may be kept in tie-stalls to calve as long as the gutter is covered.
AC6. "Hospital" pen or area (Demerits)	• Designated area for segregation and treatment of sick and injured cattle • Must be clean and bedded, and provide cattle with easy access to feed and water • The area should meet the stocking density requirements
AC7. Tie-stall barns: electric trainers (Demerits)	Check that the voltage written on the electrical box does not exceed 2,500 volts. If not available, safely have the device checked to ensure it does not exceed 2,500 volts. Ensure electric trainers have a height adjustment and are located over the chine when the animal is standing with her hind feet near the gutter curb.
AC9. Feed for heifers (Demerits)	Provide feed to heifers that meets their nutritional, developmental and growth requirements; and maintains health, growth and vigour.
AC10. Clean water source to all cattle (Demerits)	• Provide good quality water to calves over 10 days of age, heifers, bulls, dry cattle, and lactating cattle • In winter, offer water at least 2x/day to calves in the process of being weaned or weaned calves
AC12. Medical care for cattle (Demerits)	• Provide care for cattle that are sick, injured, too thin (Body Condition Score (BCS) ≤2), lame, in pain, or suffering, which may mean euthanize animals that are beyond recovery or not fit to transport • Have equipment or method to safety restrain or handle cattle
AC14. Animal-based measures: BCS; hock, knee and neck injuries; and lameness (Major/minor)	• Have a qualified assessor evaluate a sample of the milking herd every two years for BCS, hock, knee and neck injuries, and lameness (make sure it is done within the 24 months before your validation due date for the first assessment, and within 12 months before your validation due date for subsequent assessments) • Keep records of results and take corrective actions if your herd scores show a need for improvement **See Reference Manual for complete protocols*

AUGUST 2017

proAction Animal Care

Topic	What to do?
AC15. Tails: no tail docking (Major/minor)	• Ensure the tails of the cattle on your farm are not routinely docked, either by you or by a third party (e.g. heifer raiser) • Tail docking is only permitted if it is medically necessary for an individual animal, and then you must keep a record of every instance along with the rationale
AC16. Electric cattle prods (Demerits)	• Move cattle in a calm manner and be familiar with quiet handling techniques • Electric prods should only be used in extreme situations, (e.g. animal's safety is at risk) • Never use electric prods on the face, anus or reproductive organs of dairy cattle or on calves that you can move manually
AC17. Train all animal handlers (Demerits)	Train all farm personnel in cattle behaviour and quiet handling techniques, so that they understand how to handle and move cattle quietly and with low stress.
FS42 (AC). Corrective action plan for downed animals (Major/minor)	Have a written correction action plan for moving downed animals that is adequate for your farm *Do not pull, drag or lift an animal by the neck or legs
AC8. Standard Operating Procedure (SOP) for colostrum management and calf feeding (Demerits)	Purpose: ensure calves are fed enough to maintain their health, growth and vigour • Feed newborn calves at least 4 litres (for a 45 kg calf) of good quality colostrum within 12 hours of birth, with the first meal occurring as soon as possible, and no more than 6 hours after birth • Feed calves a volume and quality of milk or milk replacer to maintain health, growth and vigour *See Reference Manual for all required elements*
AC11. SOP for animal health practices and branding	Purpose: ensure staff can perform the procedures while minimizing animal discomfort • Include disbudding/dehorning, castration, supernumerary teat removal and branding, as applicable to your farm, and describe methods used • Describe pain control methods used for disbudding/dehorning, castration and branding *See Reference Manual for all required elements*
AC13. SOP for euthanasia (Demerits)	Purpose: ensure staff can act promptly, and ensure cattle are euthanized by qualified persons in a manner that is quick, and causes the least possible pain and distress • Describe the method used for euthanasia on your farm • Promptly euthanize cattle with untreatable conditions, not responding to treatment, or not fit for transport • Confirm death immediately and prior to moving or leaving the animal *See Reference Manual for all required elements*
FS40 (AC). SOP for shipping cattle (Major/minor)	Purpose: ensure animals are fit for transport, identified, well prepared for the journey and handled properly for their welfare • Assess every animal prior to loading and only transport those fit for travel • Feed newborn calves colostrum prior to loading. Feed and water cattle within 5 hours of loading if trip is expected to be longer than 24 hours from time of loading • Ensure only experienced and train handlers load cattle and avoid use of electric prods • Segregate cattle that are incompatible by nature *See Reference Manual for all required elements*
Quick Guide to Implementation	1. Attend a training session 2. Develop your SOPs and corrective action plans 3. Train your farm workers 4. Start keeping records no later than September 1, 2017 (regardless of your validation due date) 5. Have an assessor evaluate your herd; document and implement a corrective action plan if improvement is required 6. Implement the rest of the requirements 7. Contact you Provincial Producer Association for help 8. Undergo a validation

AUGUST 2017

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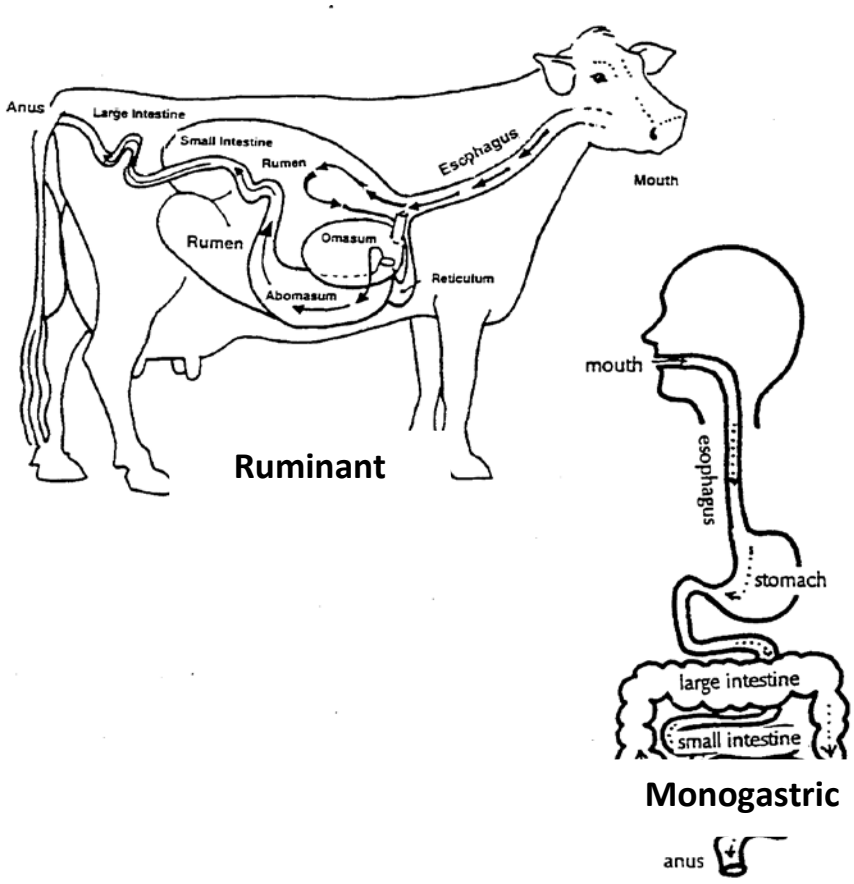
https://www.dairyfarmers.ca/Media/Files/proaction/Quick_Tips-Animal_Care-Aug2917.pdf

Section 3: Nutrition

What is a Ruminant?

A cow is a ruminant animal, which means it is a mammal that chews its cud and has a stomach that is divided into four-chambers. In order they are: rumen, reticulum, omasum, and abomasum.

In contrast, monogastric animals, like humans, have a single-stomach digestive system.



Four Chambers of a Ruminant's Stomach

The Rumen- The rumen is the first and largest compartment. It makes up approximately 80 per cent of the stomach. In the rumen, fibrous feeds such as grass, hay, and silage are mixed, fermented, and broken down by the rumen micro-organisms. These micro-organisms break down the fibrous portion of feeds and synthesize nutrients. When the rumen micro-organisms die, they pass out of the rumen and are digested to be used as a nutrient source. This gives cattle and other ruminants the ability to efficiently utilize a wide range of feed.

The Reticulum- From the rumen, the food moves into the reticulum. The main purpose of the reticulum is to send smaller particles of food along the digestion process to the omasum, and to send the larger, coarser material back up to the mouth for more chewing. The reticulum will force cuds, or balls of coarse material, back up to the mouth to be chewed further. The animal will leisurely chew on its cud before swallowing it again. The cow spends about eight hours per day ruminating or "chewing its cud." In total, this makes up about one third of its entire life.

The Omasum- The third compartment of the stomach is the omasum. It is made up of many folds that increase the surface area of this compartment so it can absorb moisture and nutrients from the feed.

The Abomasum- The fourth compartment of the stomach is the abomasum, which is very similar to a human stomach. It secretes stomach juices and acids. These juices break down food materials into simple substances (protein, carbohydrates, and so on). The cow's body uses these substances, called nutrients, to give itself energy and to help it grow. When a newborn calf drinks milk, it goes directly to the abomasum.

Newborn Calves: Pre-ruminants

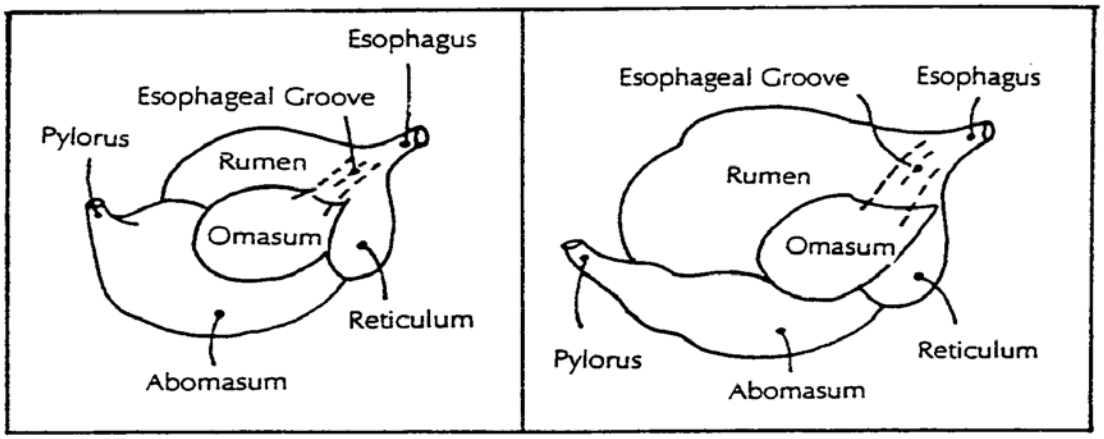
A newborn calf has a very different stomach from its mother. In newborn calves, the abomasum is larger and it is the only compartment that works. Newborn calves have an esophageal groove, which is a tunnel in the digestive system that lets milk go directly into the abomasum and bypasses the rumen and other stomach compartments. The calf's sucking reflex causes the muscular folds of the rumen and the reticulum to meet, creating the groove. The calf's rumen needs to be bypassed as it is young and the rumen needs to consume dry feed to develop.

As the calf gets older, a good feeding program will stimulate the growth of the rest of its stomach. A calf should be offered a dry grain mix within a few days of birth. Grain stimulates rumen development, which increases the number and variety of rumen microbes. The microbes grow quickly and extract nutrients from the grain the calf consumes.

Percentage of Total Stomach

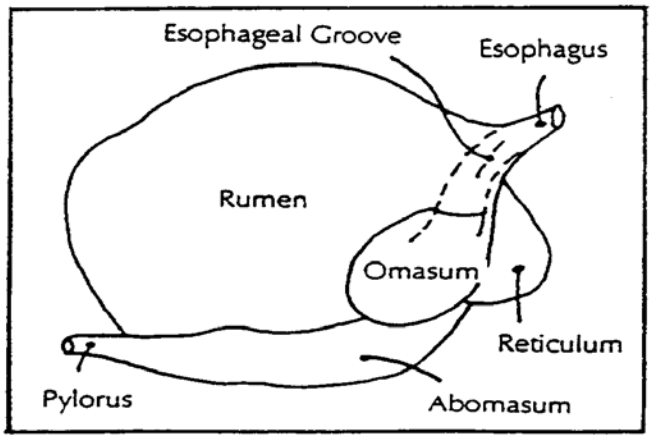
	Newborn Calf	Adult Cow
Rumen	25%	80%
Reticulum	25%	6%
Omasum	10%	3%
Abomasum	40%	11%

Development of a cow's stomach



First Week

Three to four months



Maturity

Taking Care of Milk Cows:
Digestion in the Ruminant Animal

Essential Nutrients

Now that you understand a little bit about a cow's digestive system, the next step is deciding on what to feed your herd. Cattle require the following five nutrients in a balanced ration:

1. Energy
2. Protein
3. Minerals
4. Water
5. Vitamins

All these nutrients can be found in varying amounts in the feed cattle eat. The trick is to balance your cattle's diet to ensure they are receiving these nutrients in the correct amounts.

Energy

Cows need energy for

- Growth
- Reproduction
- Milk production
- Muscle movement
- Immunity response

Cows get energy from two sources: carbohydrates and fats. Carbohydrates are found in grains and forages, such as corn and hay. Carbohydrates in grains are easy to digest, which means they have high feeding value. In forages, carbohydrates are part of the plant's fibre and they are harder to digest. Cows need this hard-to-digest fibre to keep their stomachs working. Think of plant fibre as weights a cow uses to keep its stomach in shape.

Fats give the cow lots of energy in a small bite. Fats are found in small doses in many feeds, including grains. Fat can also be added to a cow's ration.

Protein

Protein is important for a cow's growth. Protein builds and repairs

- Organs
- Skin
- Hair
- Hooves
- Bones
- Blood
- Milk protein

Protein can be found in all feeds, including grain and forages. Alfalfa, hay, and silage are high in protein, as is oil seed, such as soybean and canola. Some cows also get added protein in the form of supplements. Supplements are byproducts made from the processing of oil seeds. For example, the protein supplement soybean meal is what is left over after soybeans are crushed to make margarine.

Minerals

Minerals are a very small part of a cow's diet, but cattle can get sick without them. Minerals are divided into two groups: major and trace. Cows need major minerals in larger quantities than trace minerals.

Major Mineral:	Needed For:
Calcium	Bones, milk production, digestion
Phosphorus	Nervous system
Sodium	Digestion, use of other nutrients
Chlorine	Digestion, use of other nutrients
Sulphur	Digestion

Trace Mineral:	Needed For:
Selenium	Tissue repair, healthy calves
Cobalt	Digestion, use of vitamin B12
Iron	Red blood cells
Copper	Blood, body tissue
Molybdenum	Energy use, growth, iron use
Manganese	Growth, bones, reproduction, nervous system
Iodine	Metabolism—the rate food is used in the body as energy

Water

Water is one of the most important resources on the farm. Cows need water to

- cool their bodies
- digest food
- get rid of body waste
- maintain body fluids

A cow's body is 70 per cent water and milk is made up of 88 per cent water plus fat, protein, minerals, and other solids. A cow needs 5 litres (1 gal) of water to produce 1 litre (.2 gal) of milk. Each cow can drink up to 50 to 130 litres (13 to 34 gal) of water a day. Cows should always have access to clean water to ensure they get enough to drink each day.

Vitamins

Dairy Cows need vitamins and minerals in small amounts. For this reason, they are measured in parts per million. Even though they are only needed in small amounts they are still very important to the cow's health. Vitamins are found in forages and grains, received from sunshine, manufactured in the rumen, and supplied as supplements. Vitamins can either be fat soluble (Vitamin A, Vitamin D, Vitamin E and Vitamin K); or water soluble. (Vitamin B and Vitamin C.) Vitamins are usually added to feed in a vitamin and mineral premix or as commercial supplement.

Creating a Balanced Diet

To create a balanced ration, you need to

- know the weight of the cow
- know the amount of forage the cow will consume
- use concentrated sources of protein, such as roasted beans, soymeal, and corn gluten meal
- feed the cow's stomach—micro-organisms in a cow's rumen need to be fed for healthy digestion

You can work with a nutrition expert to create diet plans that meet your cattle's nutritional requirements for every step of their life. However, it is important that you understand what types of feed you can give your cattle to ensure they receive a balanced ration.

Roughages and Forages

Hay, corn silage, haylage, and greens are all examples of roughages and forages. Cows are ruminants, which allows them to break down hard-to-digest fibre found in plants.

Hay—Hay is a common roughage made from legumes, such as alfalfa, and grasses like timothy grass. Hay has to be cut and dried in the sun. After the hay is baled, it has to be stored somewhere dry. Timing is important in harvesting hay. The hay loses feed value as it ages and matures.

Haylage—Haylage is made from hay cut early in the season and stored in a silo. Haylage should be green and smell like clean, sharp vinegar. Haylage is more nutritious than hay as haylage contains leaves, where most plant nutrients are found.

Corn Silage—You make corn silage by chopping corncobs and stocks of corn plants, then putting them in a silo to ferment. Corn silage has high energy and low protein.

Concentrates

Concentrates are the sweet-tasting part of a cow's diet and provide a concentrated source of energy. It's important to make sure cows do not overeat concentrates. You can buy concentrates that are pre-mixed with vitamins and minerals. You can also make your own concentrates and buy mineral mix to add. Some examples are

- **Grains**—corn, oats, and barley etc.
- **Distillery and brewing byproducts**
- **Oilseed meals**—soybean, linseed, and canola meal etc.
- **Whole seeds**—soybean and cotton seed
- **Non-protein nitrogen (NPN)**—feed-grade urea and anhydrous ammonia

Protein Supplements

High-protein oil seeds (such as soybeans and canola), or byproducts (such as a soybean meal, distiller's grains, and brewer's grains), can add a concentrated source of protein to the ration.

Mineral and Vitamin Supplements

These supplements add salt, minerals, and vitamins to the ration. While most of these nutrients can be found in the other elements of a balanced ration, supplements can boost these levels.

Feeding Terms

The following feeding terms are important to know when building a balanced ration. These terms may appear on feed tags and ration analyses. They also refer to how a balanced ration can be mishandled when it is fed to cattle.

Dry matter intake (DMI)—All the nutrients in dry matter that an animal consumes.

Crude protein (CP)—The total protein content in a food source as determined by its nitrogen content. Crude protein repairs and builds organs, skin, hair, hooves bones, blood, and milk protein supplements. Rumen micro-organisms consume this type of protein very quickly.

Degradable intake protein (DIP)—The fraction of crude protein that is digested and degraded by the microbes in the rumen. Cows get degradable intake protein, or soluble protein, from legumes and some protein supplements.

Undegradable intake protein (UIP)—The amount of protein that is digested in the small intestines and escapes degradation in the rumen. Undegradable intake protein is also known as bypass protein.

Focus on Bypass Protein

Bypass protein is sometimes called "rumen escape" or "undegradable" protein as the micro-organisms in the rumen cannot digest bypass protein. High-producing, early-lactating cows benefit from bypass protein as they use this extra protein to make milk. Sources of bypass protein are dried distiller's grain, dried brewer's grain, roasted soybeans, corn gluten meal, and fish meal. To feed bypass protein properly, you must avoid upsetting the micro-organisms in the rumen. Rumen micro-organisms are also a source of protein for cows, and cows digest the micro-organisms as they pass through the digestive system. If you feed too much bypass protein, the rumen function is upset and the amount of protein the cow absorbs decreases.

Amino acids—These are the building blocks that make up protein.

Neutral detergent fibre (NDF)—Neutral detergent fibre measures most of the structural components in plant cells and represents the bulkiness of feed. Cows need about 28 per cent

NDF for proper rumen function. NDF is negatively correlated with dry matter intake, as the NDF in forages increases, the animal will consume less forage.

Acid detergent fibre (ADF)—Acid detergent fibre is the least digestible part of the plant fibre. ADF predicts the amount of energy in feed—the more ADF, the less energy. Cows need a ration of at least 19 per cent ADF for proper digestion.

Effective fibre—You can feed the proper amount of ADF and NDF, but if the forage is ground too finely, the cow won't take in the proper amount. Cows don't chew finely ground forages enough for proper digestion. For the best fibre intake, forages must be coarse.

Non-fibre carbohydrate—Non-fibre carbohydrates, such as sugars and starches, are easy to digest. This means they're a good source of energy. Grains are high in non-fibre carbohydrates.

Total Mixed Rations (TMRs) vs. Traditional Feeding Program

Traditionally, farmers have fed forages and concentrates separately, usually adding top dress for energy, protein, and vitamins. TMRs are rations that include all feeds mixed together.

	Traditional Feeding	**TMR**
Description	• Feed forage, concentrates, and top dress separately	• Blends all ingredients together into one mixture
Equipment requirements	• Storage facilities • Feed delivery system • Scales	• Feed storage facilities • Feed delivery system • Scales • Mixer and space for mixing TMR that is attached to feed storage facilities
Labour requirements	• Getting feed from storage facility to cattle	• Getting feed from storage facility to cattle • Daily weighing and mixing of feed • Weekly moisture testing of ingredients
Feed program benefits	• Easier to implement • Reduced costs • Can give individual attention to cows • Feed mistakes affect few cows	• Can increase production by 10 to 20% • Reduced labour • Reduced food waste • Know average amount and cost of feed per cow
Feed program disadvantages	• Cows can avoid what they don't like (minerals) and not get a balanced ration • Labour intensive, as each food source is fed separately	• Expensive to start due to equipment cost • Continually changing ration to account for moisture changes

		• Mistakes are serious because they affect all cows • May have to redesign facilities for TMR system

Calf Feeding

You should aim to have your calves gain 0.7 kg (1.54 lbs.) (small breeds) or 1 kg (2.2 lbs.) (large breeds) a day. Calves need to grow so they are big enough to have a calf by the time they are two years old. If it takes too long for a cow to gain weight, you will lose money because you have to wait a while for the cow to produce milk. Getting calves to eat enough and gain weight is an important goal for any calf-feeding program. Here are a few things you can do to make your calves “clear their plates!”

Regular feeding—Feed the calves at the same time each day. This prevents calves from going too long without food and becoming hungry. A hungry calf may consume its food too quickly, which can result in digestive problems.

Uniform feed—Feed the same thing each day, at the same temperatures.

Clean equipment—Always wash the feeding equipment between feedings to avoid germs that can make the calf sick.

Overfeeding and underfeeding—Underfeeding can lead to underdeveloped calves or cause the calf to eat too fast at its next meal. Overfeeding can result in obesity and can cause scours. Learn more about scours and other conditions in Section 4 of this manual.

Feeding Utensils

A calf can be fed from a bottle or from a pail. Feeding a calf from a bottle is like feeding a baby from the bottle. If you use a pail to feed the calf, make sure it doesn’t gulp the milk. To teach the calf to drink from a pail, let it suck your fingers on top of the milk in the pail until it drinks properly. When feeding a calf, it is important to know exactly how much it eats so you can monitor its health and development. Also, keep in mind that calves need to suck when they drink to get the milk into their working stomach. If they don’t suck, the milk goes into the wrong stomach and the calf gets gas and looks bloated.

What Can I Feed My Calf?

For the first three days of a calf’s life, you should feed colostrum. After the first three days, calves can be fed sour colostrum, whole milk, or milk replacer. As calves get older, they can start eating dry feed.

Colostrum

Colostrum is thick, creamy, and yellow. It is the first milk the mother gives after the calf is born. It is the most important drink you can give a newborn calf, as it provides the calf protection from

disease. Colostrum is full of antibodies that help the calf fight off germs. It also cleans out the digestive tract, has three times more vitamin D than normal milk, and 100 times more vitamin A.

The calf should be fed about four litres (.87 gal) of colostrum in the first two hours of its life. The longer you wait, the fewer antibodies the calf absorbs. Colostrum is like a super vaccine, but with a time limit.

Colostrum vs. Normal Milk		
Nutrient	**Colostrum**	**Normal**
Protein (builds muscle)	14%	3%
Milk fat (energy)	6%	4%
Lactose (milk sugar)	3%	5%
Minerals	1%	1.7%
Total Solids (% not water)	24%	13%

Sometimes heifers having their first calf fail to produce colostrum that is high in antibodies. Colostrum can be poor quality when the cow

- Was dry fewer than three or four weeks
- Was milked before calving or leaked out milk before calving
- Did not have its udder and teats cleaned before milking
- Is new to the herd and has not built up antibodies against diseases in the herd

If a cow has poor quality colostrum, as is sometimes the case in first-calf heifers, its calf should be fed colostrum from other mature cows. Colostrum can be frozen, and then thawed for newborn calves.

Freezing Colostrum

When freezing colostrum for emergencies, it is best to take it from an older cow as they tend to have more antibodies and have a larger amount of colostrum. You should only freeze in small quantities so the colostrum can be frozen and thawed quickly. When thawing colostrum, put it in a container and place the container in a bucket of warm water. The colostrum should be stirred frequently while thawing. Frozen colostrum should not be microwaved.

Sour Colostrum

Sour colostrum is colostrum that has been allowed to ferment, but that does not mean it is bad. Fermenting colostrum produces acid, which keeps the milk from spoiling. Sour colostrum is a healthy meal for your calves and saves a lot in feed costs.

Feeding Sour Colostrum

Three parts sour colostrum mixed with two parts water should be fed to calves. Calves should only be fed 10 per cent of their body weight in feed each day.

Daily Amount			
Weight of Calf	**Colostrum**	**Water**	**Total**
40–45 kg (88–99 lbs.)	2.5	1.7	4.2
35–40 kg (77–88 lbs.)	2.2	1.5	3.7
30–35 kg (66–77 lbs.)	1.9	1.3	3.2
25–30 kg (55–66 lbs.)	1.6	1.1	2.7

Method for Making Sour Colostrum

1. Thoroughly clean and disinfect a garbage pail. Once the pail is clean, line it with a new garbage bag.
2. Use extra colostrum from the cow's first milking. Don't use colostrum from cows with mastitis or cows that have recently received medication.
3. Pour colostrum into the garbage pail and close the lid. Stir the colostrum each time you add the next milking or feed the calf.
4. To speed up souring, add one cup of fermented buttermilk to the colostrum. You can also store the garbage pail in a warm room, such as the milk house, for the first five days.
5. After five days, put the garbage pail in a cool place at 5° to 20° C (41 to 68° F). It takes five to ten days for colostrum to sour. Sour colostrum can be kept for 30 days. After that, its nutritional value decreases and it starts growing mould.

Whole Milk

Whole milk is a healthy food for young calves, but it's also the most expensive. Whole milk can be fed to calves at 20 per cent of their body weight each day. For example, a 50 kg (110 lbs.) calf should be fed 10 kg (22 lbs.) of whole milk each day.

Milk Replacer

Good quality milk replacers are an excellent option for feeding calves and cost less than whole milk. A milk replacer is made up of milk products like dried skim milk, dried buttermilk, and dry whey. A good quality milk replacer should have most of its protein source from milk or milk byproducts. Calves have trouble digesting protein from plants if the calf is younger than three weeks old. Be sure to read the label of milk replacers and follow the feeding instructions.

Calf Feeding Schedule

As the calf grows, its feed needs to change to meet its needs for a balanced diet.

Day 1 to Day 3

- Feed only colostrum. Ensure the calf gets colostrum within the first two hours following birth.

Day 3 to Weaning

- Feed a liquid feed, such as milk, sour colostrum, or milk replacer.
    - Feed 15 to 20 per cent of the calf's body weight in liquid feed each day.
- Introduce a calf starter ration that has 18 to 22 per cent protein at four days of age.
- Have fresh water available at all times.

Weaning

- When a calf is eating 1 to 2 kg (2.2 to 4.4 lbs.) of calf starter a day for several days in a row, wean it from liquid feed.
- Have fresh water available at all times.

Weaning to 3–4 Months

- Feed as much calf starter as the calf will consume, up to a daily maximum of 2.5 kg (5.5 lbs.).
- Feed fine leafy hay.
- Have fresh water available at all times.

Weaning

Weaning means the calf moves completely from a liquid diet to dry feed. Calves are usually weaned between six and ten weeks of age. Economical savings from early weaning mostly come from reduced labour as it takes less time to feed calf starter than liquid feed. It also takes less time to clean out calf housing, as calves eating a liquid diet have looser manure and are more likely to have scours. Calves should be eating 1 kg (2.2 lbs.) of dry calf starter per day for three days in a row before they can be taken off liquid feed.

Dry Feed

Calves should start eating dry feed as soon as possible to develop their stomach. The benefits of getting calves to eat dry food early are

- reduced farm labour
- reduced costs (dry feed is cheaper than milk)
- reduced likelihood the calves will develop scours and become ill
- increased micro-organisms in the rumen

Begin feeding calf starter a few days after the calf is born by putting a little in the bottom of a pail for the calf. At first, the calf will probably will not eat it. However, as time goes by, it will start eating more and more. A good calf starter will be delicious, nutritious, and coarse, being rolled or cracked and not finely ground. Before two months of age, the digestion of calf starter develops a calf's stomach better than hay.

Hay

Hay is an important part of the calf's diet. It helps further develop the calf's stomach and gives the cow energy. Long, dry hay should be given to calves at about two months of age. Hay helps the calf's stomach grow. It also gives the calf extra energy.

Heifer Feeding

Heifers must gain 0.7 kg (1.54 lbs.) (small breed) and 1 kg (2.2 lbs.) (large breeds) a day to ensure they are ready to be bred around 14 months of age and calve out at 23 months.

Heifers move through the following four feeding stages.

Post-weaning Stage (3 to 4 months)

- Feed good quality forages.
- At three to four months of age, the calf can be switched from calf starter to grains.
- Design a balanced ration that will help the calf grow without making it fat, and feed a maximum of 2.5 kg (5.5 lbs.) of grain a day.

Heifer Stage (6 to 12 months)

- Between six and nine months, at least half of the total roughage dry matter (DM) should be from hay. The rest should be from haylage, corn silage, and pasture.
- Between nine and 12 months, the cow's ration should be balanced by varying the type and amount of grain while taking the nutritional content of the forage into consideration.
- Balance the ration for minerals and vitamins by using a pre-mix top dressing, which can be added to forages or grains.

Breeding Stage (12 to 18 months)

- Feed a balanced ration.

Bred-heifer Stage (18 to 24 months)

- Feed to increase growth, but also to prevent heifers from becoming fat. Don't feed too much high-quality forage, such as corn silage.
- Two to three weeks before calving, feed a similar diet to close-up dry cows.

Pasturing Heifers

Heifers can be well-fed on pasture. However, the quality of the pasture depends on the time of the year. Heifers can feed on spring and early summer pastures very well. From August to early October, they need supplemental feedings of forages and concentrates. After October, pastures usually lose most of their nutritional value.

Increasing Dry Feed

Increasing the amount of dry feed your cows consume is a major goal of a feeding program as it leads to increased milk production and a higher-quality product. The following are some tips on how to encourage your cattle to eat additional dry ration:

24-hour access—Ensure your cows have access to food at all times. It is especially important that they have fresh feed in their bunks or mangers following milking, as cows tend to be hungriest after they have been milked.

Water—Make sure cows have fresh, clean water at all times. Cows that drink more consume a greater amount of dry feed.

Feeding schedule—Try to feed several meals a day instead of one or two big meals.

Clean mangers—Manger and bunks should be cleaned daily as cows are picky eaters. Any feed left over is likely a result of the cows not wanting to eat it.

Create activity around a feed bunk—Frequently sweep feed up to tied cows as curious cows will take a bite.

Feed a total mixed ration—A total mixed ration (TMR) blends all the elements of a balanced ration together into one feed.

Space cows out—Cows eat less at head-to-head feeders because of social interactions. Head-to-head feeders should be at least 3 m (10 ft.) apart.

Enough room to eat—Give each cow at least 60 cm (23.6 in) of bunk space to eat from.

Manger positioning—Eating in the heads-down grazing position increases saliva and, in turn, the amount a cow eats. Mangers should be 10 cm (3.9 in) above hoof level.

Smooth mangers—Stale feed can get caught in rough mangers.

Light-coloured feeders—Cows fear light and dark patterns because they have trouble perceiving depth. Try using light-coloured tile or liners in feeders.

Safe walkways—Make it easy for cows to get to and from the feed by having wide passages and non-slip floors for them to walk on.

Feeding Dry Cows

Cows need a break from milking to let their udders rest, get ready to calve, and to prepare for lactation. Cows should be dried off 50 to 55 days before calving. A cow should never be dry for fewer than 40 days. The best way to dry off a cow is to offer a lower-nutrient dense feed for three to four days to reduce milk production. Do not suddenly reduce the number of times you milk the cow each day, as this can allow bacteria to build up and multiply. If the herd is milked twice daily, you should continue to milk the cows that are drying off twice daily before gradually

stopping milking. Dry cows can be fed as one group from the point of dry off to calving or as two different groups as follows:

- **One Group Feeding:** Feed 50 per cent corn silage and 50 per cent chopped straw plus 3 kg (6.6 lbs.) of a supplement with high-quality protein.

- **Two Group Feedings:**
  1. **Far-off Dry Period**
     - Feed diet consisting of at least 85 per cent forage.
     - Dry cows eat 2 per cent of their body weight in dry matter each day.
  2. **Close-up Dry Period (2 to 4 weeks before calving)**
     - Cows eat less, so increase the nutrients in their ration.
     - Begin lead feeding.

Lead Feeding

Lead feeding means gradually increasing the amount of grain and protein a dry cow eats throughout the two weeks before it calves so it has enough energy to milk. A gradual increase is important so the micro-organisms in the cow's rumen can acclimate to a new diet. If a cow is suddenly fed a lot of grain, the micro-organisms will not be ready for the high-grain diet and the cow won't be able to properly digest the grain to get all the energy. To keep up with the energy demands from milking, the cow will start using its own body fat. Cows that burn fat to produce milk can have health problems.

Dry Cow Therapy

After a cow is dried off, it should be given dry cow treatment to prevent mastitis if it has a high somatic cell count (SCC) at the end of lactation (>250, 000 cells). (Learn more about SCC in Section 4 of this manual.) A dry cow treatment program should be designed with input from your veterinarian. The blanket use of antibiotics involved in dry cow treatment may lead to resistance as the bacteria evolve. Mastitis is the number one problem affecting milk quality and quantity. Dry cows are more at risk for mastitis during the three weeks following drying off, when the udder is collapsing, as well as the two weeks before calving when the udder is bagging up. Mastitis is easier to treat and cure in dry cows, plus, there is no lost milk production when you treat during the dry period. Dry cow treatment also reduces the risk of mastitis in the following lactation. Overall, dry cow treatments are a big health and economic advantage to your farm.

Dry Cow Therapy Procedure

1. Milk the udder out completely following proper milking procedures.
2. Immediately following the teat cup removal, dip all teats in an effective teat dip.
3. Allow the teat to drip dry, then clean excess dip off with a clean, single-service paper towel.
4. Starting with the teats on the *far side* of the udder, disinfect the teat ends by scrubbing each for a few seconds with a separate alcohol-soaked, cotton swab.

5. Starting with teats on the *close side* of the udder, inject each quarter with a single-dose syringe of the recommended treatment. Massage the treatment up into the quarters.
6. Immediately following treatment, dip all teats in an effective dip.
7. When practical, teat dip all treated cows at least once a day for two weeks after drying-off for two weeks before calving.

Feeding Pre-calving Cows

Cows that are close to calving need special attention. What they eat will directly affect their health, their calving, and the amount of milk they will produce during the lactation.

Milk fever is a disorder that typically occurs in dairy cows that are near calving. The sudden production of milk and colostrum following calving depletes calcium in the cow's blood. The decrease in blood calcium results in the cow's legs becoming weak, making it unable to get up from a lying-down position. This can lead to death.

During the dry period, the cow receives lots of calcium from its ration, which decreases the efficiency of calcium absorption in its intestines as well as its ability to draw calcium from its bones. Feed management for dry cows is important as it affects the amount of calcium available to replace blood calcium and the efficiency with which calcium can be used. The standard advice for feeding pre-calving cows is to *limit* the amount of potassium and sodium in their ration. Limiting these helps the cow absorb calcium from its bones and digestive tract. Then it can deal with sudden need for calcium at calving. Some dairy producers try to balance dietary cation-anion difference (DCAD) in pre-calving rations to prevent milk fever.

Dietary Cation-Anion Difference (DCAD)

DCAD refers to how different molecules in the cow's body and its feed react together. A ration with a negative DCAD can create the same effect as reducing dietary calcium.

Feeding a negative DCAD ration is like giving a cow heartburn on purpose. The cow's body reacts by looking for calcium to get rid of the acid. The cow uses the calcium from its bones. Therefore, the cow's body learns to absorb calcium from its internal resources when it has a shortage. The principle behind DCAD involves some chemistry:

- Cations carry a positive charge and increase blood pH, making it more basic.
- Anions carry negative charges and lower blood pH, making it more acidic.

When there are more anions than cations, the difference between the ions is negative and blood pH becomes acidic. To increase and neutralize the blood pH, the cow uses the cation calcium (Ca^{+}) from its bones.

Guidelines for Feeding a Negative DCAD Ration

To feed a negative DCAD ration properly, follow these tips:

- Test the ration often to make sure the right amount of anionic salts are added.
- Use combinations of two or four anionic salts to reduce taste problems.
- Feed anionic salts in a total mixed ration so cows don’t avoid eating the salts.
- Feed negative DCAD rations at least 14 days before calving.
- Do not give negative rations to milking cows.
- Consult an expert on nutrition before feeding a DCAD ration.

Section 4: Health

Signs of a Healthy Animal

Animals get sick for many reasons. They can become ill from infectious or noninfectious diseases. Infectious diseases are caused by viruses, bacteria, and parasites. Noninfectious diseases are caused by poor diet, stress, heredity, toxicity, tumours, and injury. Care should be taken to prevent both infectious and noninfectious diseases.

A healthy calf is off to a strong start in life. The health of a calf can be determined by watching for signs such as the following:

- Strong appetite (eats and drinks well)
- Activity level
- Shiny and smooth hair
- Normal manure and urine—manure should be formed and semi-soft
- Normal vital signs

Vital Sign	Ideal Rate	Range
Temperature	38.6° C (101°F)	38.1–39.5° C (100.5–103.1° F)
Respiration rate	30 per minute	10–30 per minute
Heart rate	50 beats per minute	40–70 beats per minute

Note the range of these vital signs can change based on time of day, activity level, excitement level, the weather, and individuality.

Focus: Managing Your Herd's Health

To manage your herd's health properly, you need to have a plan. A herd health program should cover three areas:

1. Prevention instead of treatment
2. An organized plan for all health-related procedures and exams
3. Record keeping to use in management decisions

Biosecurity

When raising cattle, it is important to practise good biosecurity as the potential for disease outbreak can pose serious threats to your cows' overall health and longevity. Biosecurity is a system of best management practices that are put in place to reduce the introduction of disease. Biosecurity implementation could include screening measures for new or returning

visitors/animals/equipment and/or creating an area of isolation for new/sick animals. There are three main sources of health threats to a farm:

1. Physical transfer from visitors
2. Biological transfer from new, sick, or contaminated animals
3. Transfer from equipment, supplies, or machinery

A good farm operator will take several steps to prevent the transmission of contagious diseases, including the following:

1. **Isolation**—Prevent close contact between sick animals, newly purchased animals, and animals that have been away at a show.
    - Sick animals should be housed in a separate section of the barn, away from all other animals. If an animal dies, immediately remove the dead carcass for disposal and thoroughly disinfect its pen. If possible, leave the pen unoccupied for three to four weeks. Feed and handle sick animals last.
    - Newly purchased animals should be kept separate for three to four weeks and watched carefully for signs of disease.
    - If you compete in a lot of shows, you might want to keep a small separate area to house frequently shown animals. Look after the animals that stay at home first before you tend to any animals that leave your property.

2. **Handling practices**—Always handle sick animals last to prevent the spread of disease. Also handle younger animals before handling older animals as adults are more likely to have developed immunities/tolerances to diseases.

3. **Traffic control**—Keep your farm secure from unauthorized visitors. Any visitors should wear clean clothes, sanitize their footwear, or wear foot covers. Limit traffic near your farm and consider sanitizing vehicle tires that have been to other farms.

4. **Sanitation maintenance**—Sanitize new equipment and pens that may have been in contact with other animals. Clean off organic matter such as feces and hair. Allow for proper drainage of urine and excessive water that may harbour disease. Remove manure and other debris that builds up in and around pens. As a post-clean up measure, spread hydrated lime to reduce odour and decompose manure and hay quicker.

5. **Hygiene**—Wash your hands, clothing, and footwear after visiting another farm. Use latex or rubber gloves when handling sick animals.

6. **Control pests**—Barn flies, rodents, and parasites can all be methods for spreading disease.

7. **Observation**—It's a good practice to observe healthy animals so you can notice any changes that may indicate when an animal is ill. Becoming familiar with disease symptoms ensures a quick response in isolation, treatment, and future prevention.

NOTE

For more information on biosecurity and tips for keeping your animals safe and healthy, view the *Biosecurity for Small Scale Livestock Production* factsheet in the appendix of this manual. Also refer to the proAction® Biosecurity Module, as well as the proAction® Biosecurity Quick Tips.

Storing and Using Medication

In order to treat diseases properly, you need to know how to store and use medicines safely.

Read the label—The label will contain the following information:

- Who the medicine is for
- What the medicine is for
- Where the medicine should be stored
- When the medicine should be used
- Expiry date
- Ingredients
- Instructions for use

Use the right dose and equipment—Figure out the dose according to a cow's weight and label's instructions. Always use the right equipment for administering medication. For example, use a disposable needle only once.

Stop milk contamination—Medicine travels into a cow's milk. There is a fine for selling contaminated milk, so all milk from a treated cow needs to be kept out of the bulk tank. Use a home test kit for antibiotics to ensure the milk is safe to put in the bulk tank.

Keep records—Records help prevent milk contamination. Always keep treatment records and properly identify treated cows. Use animal spray paint, tags, or leg bands. Keep the label information from the medicine for records, too.

Vaccination

Immunity is protection from infectious diseases. Heifers get immunity from antibodies in colostrum when they're calves; however, this protection wears off by the time heifers are about two months old. Farmers vaccinate heifers to give their immunity system a boost.

The following are some common infectious diseases that heifers should be vaccinated for. It is always best to consult your local veterinarian to design a vaccination program.

Bovine Virus Diarrhea (BVD)	
Transmitted by:	Body fluids from dam to fetus
Symptoms:	Abortions, malformed and weak calves, diarrhea, fever, drop in milk production, respiratory disease
Prevention:	Remove carriers from herd and vaccinate all breeding heifers to protect the fetus. There are two types of vaccines: 1. killed vaccine and 2. modified live vaccine.
When to vaccinate:	Killed vaccine: 7–8 weeks before breeding, 3 –4 weeks after first shot, then annually Modified live vaccine: 3–4 weeks before breeding, then annually
Infectious Bovine Rhinotracheitis (IBR)	
Transmitted by:	Saliva, nasal discharge
Symptoms:	Abortion, brain and genital infections, pneumonia, inflamed eyes
Prevention:	Vaccination
When to vaccinate:	Vaccinate at 6 months of age (if using a killed vaccine, repeat the shot after 3–4 weeks) Vaccinate again 7–8 weeks before breeding, than annually
Rabies	
Transmitted by:	An infected animal biting another animal
Symptoms:	Behaviour changes, trouble swallowing, a distinct bellowing call
Prevention:	Vaccination
When to vaccinate:	All animals once a year
Leptospirosis	
Transmitted by:	Infected animals, water, mud, vegetation, urine
Symptoms:	Cattle: abortions, often with retained placentas; drop in milk production; clotted, thick, reddish milk but no signs of udder swelling Calves: severe illness with jaundice (yellow skin) and reddish to dark brown urine
Prevention:	Vaccination in problem areas
When to vaccinate:	All breeding cattle annually
Blackleg	
Transmitted by:	Cattle ingest the bacteria
Symptoms:	High fever, lameness, swelling in the heifer’s body, and death within 12 to 24 hours
Prevention:	Vaccinate cattle under two years of age
When to vaccinate:	All heifers under two years of age

Milk Fever	
Caused by:	Milk production results in the sudden need for calcium at calving and causes the cow's blood calcium level to drop. This causes the cow to weaken, go down, and possibly die.
Symptoms:	Cow is weak, lies down, secondary injury, death
Losses:	Drop in milk production, death of cow
Prevention:	Feeding a proper ration the two weeks prior to calving prepares the dry cow's body to get extra calcium from her bones.
Ketosis	
Caused by:	Chemical changes in a cow's body during the month it has a calf. The cow does not eat enough to keep up with its own milk production. This creates a negative nutritional balance.
Losses:	Drop in milk production, general poor health, possible liver damage
Prevention:	Change the feeding program just before drying off to ensure proper body conditioning. Change it again just before calving; this can increase a dry cow's appetite. The new ration should be high in energy to prevent a negative nutritional balance.
Udder Edema	
Caused by:	Too much salt (sodium), potassium, or a lack of vitamin E can cause the udder to fill with fluid.
Losses:	Increased chance of udder infection, damage to the udder that causes sudden breakdown
Prevention:	Limit the salt dry cows and heifers eat to 30–40 grams (1.0–1.4 oz.) per day. Balance the ration for vitamin E and limit grain to a maximum of 4 kg (8.8 lb.) per day before calving. Avoid feeding forages high in potassium during the last weeks before calving.

Noninfectious Disease

You cannot vaccinate against noninfectious diseases, but you can manage your herd to prevent them. These are some common noninfectious diseases in cows related directly to the dry period before they calve.

Common Calf Diseases

When you are raising calves, you need to know how to keep them healthy, how to treat sick calves, and how to prevent sickness. All owners and handlers should be made aware of the signs of diseases.

Diseases can be clinical or subclinical.

- Clinical diseases cause outward signs that an animal is sick. Calf scours and pneumonia are two common clinical calf diseases.

- Subclinical diseases show no obvious outward signs that an animal is ill. Parasites are commonly subclinical.

Calf Scours

Calf scours is due to a problem in the calf's digestive tract. Scours can be caused by poor nutrition, feeding calves too much milk, poor quality feed, a change in diet, or unclean feeding equipment. The calf will have thin, watery, and sometimes bloody manure.

About 75 per cent of all losses occur during the first two weeks of a calf's life. Scours, or calf diarrhea, is the biggest cause of death in calves. Calf scours cost the average farmer $1,000 per year.

Early Signs of Scours

- Calf drinks more slowly or plays with its milk
- The calf drinks but lies down right afterwards
- The calf does not come to drink
- The calf acts listless when it is normally eager to eat
- Loose manure

The most common type of scours is infectious scours. It is serious,par as it requires a lot of labour and money to treat. Also, it is the most likely to result in death. Here are a few different organisms that cause infectious scours:

- ***E. coli***—This is the most common cause of scours and calves up to one week old are most susceptible. *E. coli* can quickly kill a calf if not treated.
- **Salmonella**—Calves are infected by contaminated feed and other infectious animals. They are the most likely to be infected between one and four weeks of age.
- **Rotavirus**—This virus hits calves between one and two weeks of age. Rotavirus causes mild to moderate scours and the calf usually recovers.
- **Coronavirus**—Compared to the rotavirus, this virus is more likely to kill a calf. It infects calves from two days to three weeks old and causes watery scours, which quickly leads to dehydration.

Treatment

- Separate the sick calf to stop the infection from spreading.
- Replace lost fluids with electrolytes.
- Rotate offering milk and electrolytes to the calf.
- With the help of your vet, figure out the cause and treatment of the scours. Use this knowledge to prevent future outbreaks.

Pneumonia

Pneumonia is a lung infection. If untreated, it can kill an animal in three or four days. Pneumonia is caused by germs from other cows. Calves that are already sick, or did not receive the proper amount of colostrum at birth, are more likely to get pneumonia.

Signs of Pneumonia

- Runny nose
- Hacking cough
- Rapid breathing
- Fever
- Refusing to eat

Treatment

- Keep sick calves in separate stalls that are dry and well ventilated.
- Calves with pneumonia also need antibiotics, so consult your vet.
- Keep track of the calf's temperature to determine if it is getting better or worse.
- Figure out what's causing the pneumonia, especially if several calves are sick. Once you know the cause, you can work to prevent future outbreaks.

Parasites

Parasites are a living organism that requires a host to survive. Parasites can be internal, living inside the host, or external, living on the outside or hide of the host. Parasites feed off their host, which can result in the host losing weight and becoming more susceptible to other diseases. Often times an animal will appear to be completely normal if the infection of parasites is small. Prevention is the best way to manage parasites.

Examples of Parasites

- **Coccidia**—Calves ingest this parasite by eating infected bedding or manure. This parasite usually infects cattle older than four weeks of age.
- **Cryptosporidium**—This parasite causes scours in two- to three-week old calves. After four weeks, the calves become immune to the parasite. Infected calves clear up in five to ten days, so be patient.
- **Lice**—These are external parasites. They can live in the hides of calves and heifers of all ages.

Treatment

Treatment depends on the parasite. If the parasite causes scours, the scours must be treated first and manure samples should be checked for coccidiosis and other worms. Drugs to control parasites are available in injectable, pour-on, and feed-added forms. Some calf starters even contain medicine to prevent coccidiosis. The best approach to parasites is prevention, by keeping the calf and feed areas clean. Consult your veterinarian for advice regarding management of parasites.

Ruminant Health Problems

Acidosis

Acidosis is caused by poor feeding or overfeeding. When a cow eats too much grain (soluble carbohydrates) and not enough hay (fibre), their rumen becomes acidic. Think of it as “cow heartburn.” This acid is absorbed by the cow’s bloodstream making its blood acidic and causing laminitis—a hoof disease.

Signs of Acidosis

- Going off feed
- Scours
- Low milk production and low milk fat percent
- Skinny cows
- Foot abscesses
- Chewing wood or bedding (the cows are looking for fibre)

Cows can die from acidosis due to high blood acidity. Also, once a cow has laminitis they will likely never have normal feet again. To cure acidosis, change the feeding program. Focus should be placed on cows near calving as they are most likely to get acidosis.

Displaced Abomasum

One of the problems with having such a complex stomach is that it can get twisted. This is called displaced abomasum (DA). The most common displacement occurs when the abomasum gets trapped on the left side of the cow, between the rumen and the abdominal wall.

A DA happens most often in larger, high-producing dairy cows, usually during the first six weeks of lactation. DAs are most common in cows recovering from health issues, such as retained placentas, milk fever, fat-cow syndrome, ketosis, indigestion, and mastitis. No one really knows what causes DA, but bad feed, too much grain, and sudden changes in ration are factors.

Symptoms of Displaced Abomasum

- Severely reduced appetite
- Reduced and discoloured feces
- Distinct pinging sound when you listen to the left side of the cow’s mid-section with a stethoscope or with your ear

Hardware

Cows can accidently consume hardware, such as nails and pieces of wire, which can get caught in their reticulum. This metal causes abscesses and can puncture the side of the stomach, through the stomach wall, and into the heart, which results in death.

Signs of Hardware Disease

- Going off feed
- Fever
- Restlessness
- The cow kicking at its side

To prevent hardware from hurting the cow, it can be given a magnet. The magnet will collect the pieces of metal to prevent punctures. The magnet stays in the cow's stomach for the rest of its life.

Lameness

Lameness is a common health problem that can result in decreased income, loss of body weight, lower milk production, and premature culling. A number of factors cause lameness, including the following:

- **Stressful environments**—Slatted floors, slippery housing, and abrasive surfaces, such as stones, stubble, or frozen ground, all put stress on an animal's feet and legs. Warm, wet housing breeds diseases, such as foot rot.
- **Poor nutrition**—Feeding too much high-energy feed, or a sudden change in diet, can lead to acidosis and, eventually, laminitis. Laminitis is a crippling hoof condition, and once a cow gets laminitis, its feet will never develop properly. Lack of calcium, phosphorus, magnesium, zinc, vitamins E and D, as well as an excess of calcium and fluorine can create lameness issues.
- **Foot rot**—Foot rot is a contagious infection cows get from a wet, dirty environment. The disease literally rots the cow's foot. To diagnose foot rot, study the cow's hoof. Generally, the foot has infected areas that emit a distinct and unpleasant odour. To treat foot rot, use antibiotic ointments, keep the foot dry and clean, and get rid of dead tissue.
- **Poor foot conformation**—Cattle born with bad feet are more susceptible to lameness. Some common conformation defects are abnormally straight hocks, cow hocks, weak pasterns, flexed pasterns, and overlapping toes.

Lameness Prevention

Besides breeding cows with better foot conformation, here are some management techniques to prevent lameness:

- Follow proper nutrition guidelines.
- Allow cows to stand on well-drained dirt and grass. The grass cleans their feet and the dirt keeps away organisms.
- Groove slippery concrete and smooth rough concrete.
- Trim feet at regular intervals, ideally four times per year.
- Install a footbath to remove irritants, harden the hoof, and prevent infections. In parlours, install the bath so cows walk through it as they leave. The footbath solution should be selected based on the foot problems in the herd.

- Keep barn dry and well bedded so cows can lie down comfortably and rest, thus allowing their hooves to dry out.

Mastitis

Mastitis is an udder infection. Bacteria enter through the teat end and infect the udder. Mastitis infections come from two forms: contagious and environmental. Contagious forms of mastitis, such as *Streptococcus agalactiae*, are passed from cow to cow during milking. The milker's hands, dirty udder towels, and teat cup inflations on milking machines can all spread contagious mastitis. Environmental forms of mastitis, such as *E. coli*, are picked up when the teat ends touch infected bedding, manure, or mud. Mastitis lowers milk production when the cow is infected and can have permanent effects on milk production by destroying milk-secreting cells, which result in the cow losing its ability to produce milk.

How Do You Test for Mastitis?

Examine the udder—Feel the udder to see if it is swollen, painful to the cow, or feels warm. Squirt a small amount of milk into a strip cup to see if the milk is lumpy or flaky.

Test somatic cell counts (SCC)—Somatic cells are a cow's response to an infection. When they're higher than normal, it is a sign of infection.

Use the California mastitis test (CMT) —A CMT is a quick and easy way to test for high somatic cell count. Squirt some milk from the quarter you think is infected into a CMT paddle. Then, squirt the provided liquid into the milk. If the cow is infected, the mixture will thicken and become a gel.

Culture the milk—By sending a milk sample to the lab, the exact type of infectious organism, contagious or environmental, can be determined.

Somatic Cell Counts (SCC)

Somatic cells are white blood cells. These cells destroy bacteria, prevent or get rid of infections, and repair damaged tissue. If a cow's milk has a high SCC, then its somatic cells are working overtime to get rid of an infection. SCCs are good management tools, as they can identify cattle with a mastitis infection. Cows can be tested for SCCs when they are tested for milk production. Generally, SCCs are a good indication of contagious mastitis; however, since environmental mastitis tends to last only a few days, there is a high chance of missing an elevated SCC. The province's standard is 400,000 SCC/ml.

Contagious vs. Environmental Mastitis

	Contagious	Environmental
Source of infection	Bacteria on/under skin	Bacteria in environment
How infection spreads	• Contact with an infected animal	• Come into contact in the environment • Milking wet udders
Most common organism	• *Streptococcus agalactiae* • *Staphlococcus aureus*	• Coliform • *Streptococcus nonagalactiae*
Infection dynamics	• Persistent subclinical infection, with repeated clinical flare ups • Seldom cured without antibiotics	• Short-term clinical infection • Often cured without antibiotics
Somatic cell count of infected cows	• Always high but variable	• Highly variable
Clinical symptoms	• Swelling and abnormal milk with none (*Strep ag.*) or very mild to moderate (*Staph*.) fever	• Swelling and abnormal milk, none to moderate fever (*Strep. nonag.*) or more sever fever and off-feed cows (coliform)
Detection	• Test for mastitis • Often subclinical so may not have visible symptoms	• Clinical signs
Treatment	• Antibiotics at dry off • Antibiotics in lactation (*Strep ag.* and clinical *Staph* only) • *Staph* infections are difficult to cure and may result in culling the cow	• Strip the quarter frequently • Treat systemic symptoms

How Do You Prevent Mastitis?

The cheapest and healthiest way to manage your herd is by preventing mastitis before it happens. The following controls mastitis:

Sanitation—Wash hands and wear nitrile gloves; wipe cow's udder with a single-use cloth for each cow; wash milk machine teat cup inflations; keep bedding dry and clean.

Use a teat dip—Dip a cow's teat pre and post milking with a reputable teat dip. This reduces infections by up to 50 per cent.

Proper milking equipment—Poorly setup milking equipment can push bacteria into the udder.

Stress-free environment—Reduce flies, prevent teat injuries, and increase cow comfort.

Dry cow treatment program—Dry cows often get mastitis and should be treated properly to stop new infections.

Cull infected cows—Cows that do not respond to treatment should be culled to prevent the spread of contagious mastitis.

How Do You Treat Mastitis?

Even with a good prevention program, some cows may still get mastitis. There are two options for treating mastitis:

No medicine—A cow can fight many types of environmental mastitis on its own. Give the cow a comfortable place and supportive therapy. The cow should be milked often to remove toxins produced by the bacteria. Often this management practice is sufficient to bring a case of environmental mastitis under control.

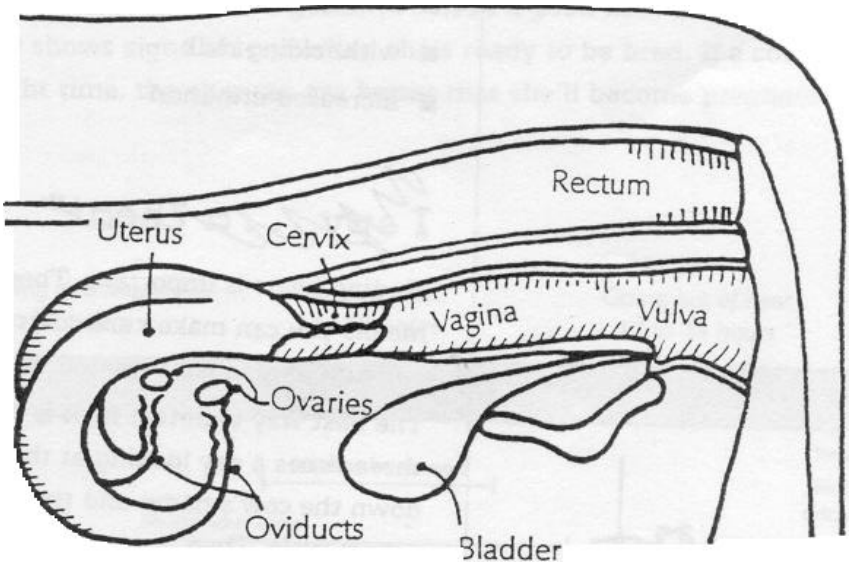
Antibiotics—Another option is to treat the cow with antibiotics. If a cow has contagious mastitis, antibiotics are *infused,* or injected, directly into the cow's teat canal in the infected quarters. It is important that milk from cows treated with antibiotics does not enter the bulk tank until the withdrawal period has passed. All loads of milk are tested with very sensitive kits for the presence of antibiotics before the milk is accepted by the processor. Stiff penalties apply if antibiotic-laden milk is shipped and tested as positive for antibiotics. Once traced back to the offending farm, future milk shipments from that farm are not allowed until the cause of the contamination is found and a negative test result happens.

Section 5: Breeding and Calving

Reproductive System

Main parts of a cow's reproductive system:

- Ovaries
- Oviduct
- Uterus
- Cervix
- Vagina
- Vulva



The 21-day Cycle

Cows can get pregnant only a few days each month. The cycle a cow's body goes through is called the estrus cycle. The estrus cycle is usually 21-days long. At the beginning of the cycle, the cow's brain sends a message to its ovaries to start producing eggs. Once an egg is big enough, it's released into the oviduct. This is called ovulation. Sperm gets to the egg through the vulva. It travels through the vagina, past the cervix, into the uterus, and up to the oviducts where the egg is fertilized.

On a dairy farm, cows are fertilized using sperm placed in a special straw that is injected into the cow's uterus. This is called artificial insemination. Once fertilized, the egg travels to the uterus and attaches itself to the uterine wall. Over the next nine months, the egg will develop into a calf. If the egg is not fertilized, the wall of the uterus breaks down and the cow begins another estrus cycle.

Signs of Heat

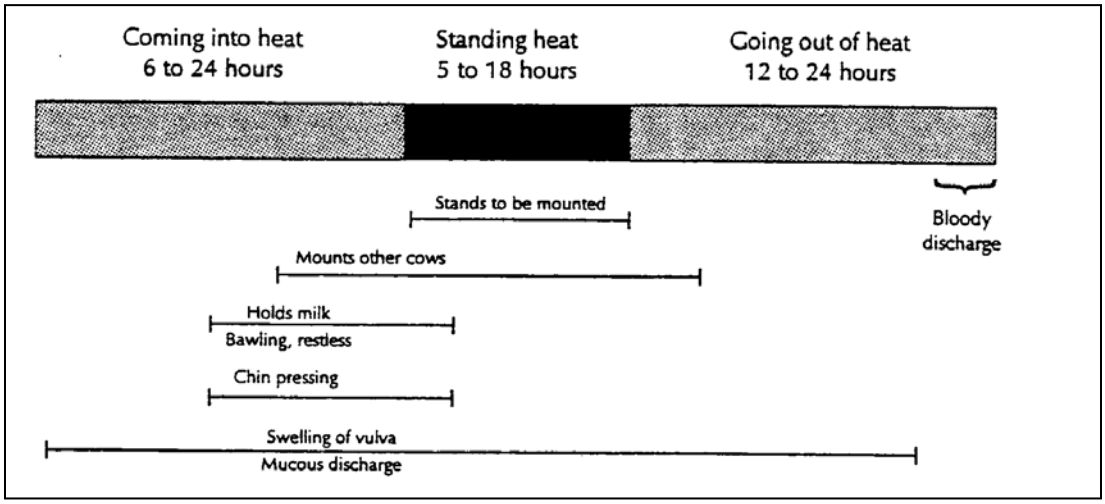
Once the ovary releases the egg, the cow shows signs of heat. These signs of heat are nature's way of saying, "I am ready for breeding." The best sign of heat occurs when a cow stands to be mounted by another cow. This is called a standing heat. Once a cow in standing heat is spotted, she needs to be bred within 12 to 24 hours.

Other Signs of Heat

- Bawling, restless behavior
- Butting

- Chin pressing on other cows
- Swollen, reddened vulva
- Lip curling
- Licking of the vulva
- Withholding milk
- Shortened feeding time
- Increased urination

Recognizing heat is important, as it's a sign of when the cow should be bred. This ensures cows are in calf quickly and no valuable semen is wasted on cows that are not ready to be bred.



Extra Help with Heat Detection

Heat mount detectors—A patch filled with dye can be taped to a cow's rump. If the patch changes colour, it means the cow was mounted and is in standing heat.

Computer transmitters—Computer transmitters work like dye patches. A pressured trigger transmitter is taped onto the cow's rump. When a cow is mounted, the transmitter sends a signal to a receiver. The receiver sends this information to a computer with the cow's name, number of mounts, as well as their time and length.

Heat detector animals—Heifers treated with hormones can detect heats in cows. A chin ball marker is put on the treated animal. When it mounts a cow in heat, the mounted cow is marked.

Pedometers—These devices measure the amount a cow walks and transmits it to a computer. The computer calculates the cow's average amount of activity. During heat, a cow will generally be more active. So if the cow's activity level is above average, it is in heat.

Activity monitors—These devices measure the variance in a cow's activity and, if it is alarmed as being more active than typical, the dairy producer can check to see if the cow is at the right stage of the estrus cycle and breed the cow if need be. The computer calculates the cow's average amount of activity. During heat, a cow will generally be more active.

Reproductive Health

Keeping records on all health- and reproductive-related matters for each cow is essential. This information should include identification, birth date, breeding date, fresh date, heat date, the sex and health of the calf, and any other findings and sex.

Cows also need to be examined to determine their reproductive health. These exams include a pre-breeding exam at 15–45 days after calving for all cows

- an exam for cows bred three or more times
- an exam for cows with abnormal discharge
- an exam for cows that have been in calf for six weeks or more
- an exam for cows showing no heat or irregular heats

Breeding and Genetics

A calf's parents, grandparents, and great-grandparents all contribute parts of a calf's genes. Improving these genes makes cows more productive and profitable.

Genes are the building blocks of all living things. In humans, genes give us our hair colour, eye colour, height, nose, mouth, ears...everything! They are important because they are inherited and passed down to offspring.

Farmers want to improve genes in cows that affect size, health, udders, ease of calving, and milk, such as fat- and protein-production content. All of these factors improve a cow's money-making ability.

Ranking Genes

To make breeding decisions, you must know how good the genes of the sire and dam are. This can be accomplished by making a report card on their genes. All registered animals will get a genetic evaluation, which outlines how each animal should be performing. All bulls used for artificial insemination are genetically tested. This means scientists look at the bull's DNA and see what the animal may pass on to its progeny. A sire's genetic report card is called a bull proof. A dam's genetic report card is called a genetic index. These records tell you which sires and dams get an A+ in areas such as conformation, milk, fat, and protein production.

Inheriting Genes

Dairy farmers selectively breed certain cows so their calves will inherit profitable genes. However, some genes are easier to pass on to calves than others. If a characteristic is easy to pass to offspring, it is highly heritable. This means that a characteristic is easy to breed into, or out of, your herd. If a characteristic is difficult to pass on, it is less heritable. These traits can

show up unexpectedly and unpredictably. Genetic improvement involves a little bit of knowledge and a little bit of luck.

Here are the heritability ratings for dairy cows:

Highly Heritable	Moderately Heritable	Less Heritable
Percentage of fat and protein in milk	Milk yield	Life span
Size as adults	Mammary system	Strength in feet and legs
	Milking speed	Fertility
		Calving difficulty
		Resistance to mastitis

Sire's Reliability

Choosing a sire is a bit like gambling, there is always the risk you will lose. To increase the chances of winning, check out the bull's *reliability* ranking. The higher the ranking, the more accurate the bull's transmitting ability. It can repeat the results in breeding after breeding and surprises, such as calving problems or low protein production, are less likely to show up.

Genetic Indexes

A genetic index is the measure of an animal's ability to transmit its genes to the next generation, reflecting the animal's genetic makeup (genotype). Canada has two genetic indexes: Lifetime Performance Index (LPI) and Pro$. Though both are good representations of the animals, there are some unique differences highlighted below.

Comparison	Lifetime Performance Index (LPI)	Pro$
Built using	Formula relative weights 40-40-20	DHI profit data analysis
Accounts for trait correlations	✖	✓
Published formula	✓	✖
Expressed in	LPI index points	Canadian Dollars
Index Average	1992	0
Range	Positive	Negative & Positive
Emphasis on Type	✓✓	✓
Emphasis on H&F	✓	✓✓
Emphasis on Prod	✓	✓✓

Young Sires vs. Proven Bulls

Young sires are bulls that have not had many daughters. In the past, this meant it was hard to judge their genetics as they had a reliability of 30 to 40 per cent. With genomic testing, we now are more confident in unproven bulls and young sires are used more frequently. To have an official proof, the bull must be five years of age, have a reliability of 70 per cent (for Holsteins), and must have 20 daughters at least 120 days in milk (DIM) in at least 10 different herds.

It is also important to look at the parent average (PA). The PA can be found by taking the value of the dam plus the value of the sire and dividing by two. All animals have a PA before they are born. You can even calculate the PA before the animal is bred if you know who the dam and sire are going to be. By comparing many PAs, you are able to pick the optimal breeding for your animal.

Once an animal has several progenies, the PA will evolve to an estimated breeding value (EBV). EBV only occurs if a cow has performance information (that is, milk recording and/or classification).

Improving the genetic quality of the herd is at the root of every decision to mate a particular sire with a particular cow. Genetic decisions made now will affect the herd for six or more years.

Reading a Genetic Index or Bull Proof

Bull proofs and genetic indexes are based on the animal model. This means all of the daughters and other relatives of a sire are compared for type and production each year. These numbers are then used to create both indexes and proofs. Because cow indexes and bull proofs are based on the same numbers, the two can be directly compared. This makes it much easier to make genetic decisions.

The Canadian Dairy Network (CDN) compiles and publishes genetic evaluations. Four times a year the CDN sends a Genetic Herd Inventory (GHI) to dairy farms. This is a for-fee service. The GHI lists all cows in a herd and their rankings against cows across Canada. The GHI is divided into the following five sections:

Cow Identification

Name =	Registered name or tag of the cow
Cow =	Registered number of the cow
Sire =	Registered number of the cow's sire
Dam =	Registered number of the cow's dam
Birth date =	The cow's birth date

Production Record

Last calf = Calving date for the most recent record in the cow's index
DIM = Days in milk for that record
#HRD = Number of herds the cow's been milked in
#REC = Number of production records in the evaluation

Milk, Fat, and Protein Index

REP = Repeatability. This is a measurement of how accurate the milk, fat, or protein index is. If these numbers can be repeated, the accuracy is high (1 = low accuracy; 99 = high accuracy). A cow needs a REP of 30 to have a published index.

RK = Percentile rank for milk, fat, or protein yield. Percentiles refer to the percentage of cows that rank below the cow. For example, a cow in the 90th percentile is in the top 10 per cent of all cows. A cow in the 80th percentile is in the top 20 per cent.

MILK, FAT, PROTEIN = Index for milk, fat, and protein in kilograms. This number is an EBV (estimating breed value), which is an estimate of the worth of the genetic material of the cow. Half of this genetic material will pass to her calves.

FAT %
PROT % = For fat or protein in the total milk volume, expressed as average or above.

Type Index

REP = Repeatability of the conformation index
%RK = Percentile ranking for overall conformation
CONF = Cow's index for overall conformation

Lifetime Profit Index (LPI)

RK = Percentile rank for LPI
LPI = Index combining production and type. The weighting for production type is 6:4. Production is more important and, therefore, given a higher weight in figuring out LPI. Protein and fat yield have a 9:2 weighting (protein: fat).
The mammary system, feet and legs, conformation, and capacity have a 5:4:1:1 weighting (mammary system: feet and legs: conformation: capacity)

Cow Identification (1)	**Production Record (2)**	**Milk Fat and Protein (3)**			**Type Index (4)**	**Lifetime Profit Index (5)**
Cow Name, Cow Sire Dam DOB Last Calve DIM #HRD #REC		REP RK milk	RK Fat fat%	RK Prot %	Rep RK conf.	RK LPI
4-H Jackson 568355 245891 548932 94-02-20 96-01-08 95 1 1 Bossy 15A		48 99 1697	99 55 -.031	99 55 -.015	80 4	99 26 15

Mating Strategies

Once you have picked from a list of the top genetic sires, you need to decide how to mate the sires with the cows in your herd.

Mass Selection

Mass selection involves mating the best sires to the best cows. That way, individuals with poor genetics do not contribute to the next generation of cattle. The rate of genetic improvement that occurs from mass selection mating varies due to a number of factors including selection intensity (how rigidly the program is followed); variation and accuracy of genetic indexes used to make the decisions; and generation interval (the earlier you get new genes into the herd and breed those genes to better sires).

Corrective Mating

Corrective mating involves trying to correct a cow's faults by breeding it with a bull strong in those areas. Usually, breeders use this strategy to fix type problems. For example, a producer breeds a cow with a poor suspensory ligament in her udder to a bull that is proven to produce cows with excellent udders.

Tool Kits for Genetic Improvement

The dairy industry uses a number of tools to improve genetics in Canada.

CANWEST/VALACTA—Records milk production for dairy herds. These records are used to calculate genetic evaluations. Use these evaluations to get rid of genetically lagging cows and to find genetic superstars.

AI units—Artificial insemination (AI) is a key to getting a bull's superior genetics to a greater number of cows. AI units collect semen, search out new bulls, and offer breeding advice to farmers.

Bull proofs and cow indexes—The facts and figures in genetic indexes and bull proofs are excellent tools for improving genetics. Concrete decisions can be made about the genetic worth of one animal over another from these numbers.

Registration—Registered cows have a complete family tree. Studying this family tree is useful to making breeding decisions.

Classifications—Each breed has classifiers who come to the farm to rate the conformation or body type of the animal. This classification rating makes up a cow's genetic record for conformation.

Genomic testing—GenoID is a genomic (DNA) testing service available to discover parentage and provide a genetic evaluation. Genetic evaluations form the basis for many herd-improvement decisions and accelerating genetic progress.

Multiple Ovulation and Embryo Transfer (MOET)

Injecting a cow with a hormone increases the number of eggs it produces. Then, the cow is artificially inseminated. Eight days later, the fertilized eggs are removed, or flushed, from the

cow and put into other cows. MOET lets a genetically superior cow have many calves in a year, which increases the rate of genetic progress.

In Vitro Fertilization (IVF)

In vitro means “in glass” or, in this case, in a laboratory dish. A technician removes an egg from a cow’s ovary. The egg is fertilized and grown for one week in a lab dish. Eggs can be taken from live cows or, they can be removed from the ovaries of a dead or culled cow, a process called genetic salvage. In advanced IVF procedures, eggs can be taken from two- to three-month-old calves. IVF decreases the time from one gestation to the next. In other words, it increases the rate of genetic improvement. It also makes saving the eggs from a valuable, but dead, animal possible.

Reproductive Goals

Measure of Performance	**Goal**	**Too High, Needs Work**
Interval From Calving • Number of days from the time a cow calves to the time it comes into heat again and is ready for breeding	< 40 days	60+
Days To First Service • Number of days from calving to the first breeding	60 days	90+
Days Open • Days when the cow is not pregnant, measured from calving to a successful breeding	85 days	110+
Calving Interval • Time between one calving to the next calving	12 months	13+
Services Per Conception • Average number of times a cow needs to be bred before it becomes pregnant. The closer to 1.0 the better.	1	2.0+
First Service Conception Rate • The percentage of cows that conceive, or become pregnant, on first breeding	60%	less than 50%
Cows Culled For Reproductive Reasons • The percentage of cows that leave the farm due to the inability to conceive	5%	10%+
Age at First Breeding • Aim to breed heifers so they will calve by 24 months of age	15 months	17+

Calving

One of the bigger events on any dairy farm is the birth of a calf. Knowing the calving process is key to making sure everything goes well. No matter how much you hope that everything goes according to plan, it is not always the case. This section addresses potential adverse situations you may find yourself in.

When a cow is near its calving date, it should be moved to a suitable calving pen. The cow's calving date can be estimated from breeding records. Cows carry their calves for 280 to 290 days.

Stages of Calving

The birth of a calf happens in three stages:

Labour

The birth process begins with labour. In this stage, the cow's body works to get ready to calve. This stage lasts two to six hours.

Signs of Labour

- The cow stops eating
- Restlessness
- The cow wants to be by itself
- The ligaments around the tail head and vulva relax
- Clear vaginal fluid comes out of vulva

Calving

The second stage of labour begins with the water bag appearing and ends with the expulsion of the calf. The calf enters the birth canal and the cow starts straining to push it out. It can take up to three hours for a heifer to give birth to its first calf. Older cows take about two hours to give birth.

Normally the calf is born on its stomach with its front legs stretched out in front of it. The front feet are born first. Next comes the head, then the chest. After the front half of the calf is out, the rest of it slips out easily.

During this stage, help is required if

- it lasts longer than 2 to 3 hours
- the cow keeps straining, but no part of the calf is showing
- part of the calf other than the front feet appears or can be felt

The placenta

The last stage of calving happens when the cow expels the placenta, called afterbirth. The placenta is the sac that surrounded the calf when it was in its mother's body. Normally, the cow expels the placenta within 12 hours after the calf is born. If it takes longer the vet should be called as the cow could have a retained placenta. This will create health problems for the cow, such as a uterine infection.

After the Calf Is Born

What's next? Make sure the cow and calf are healthy by following these steps:

- Clear the calf's nostrils of any fluid. The mucus in the calf's lungs should drain out and the calf should start breathing.
- Dry the calf off so it does not get cold.
- Dip the calf's navel (bellybutton) into iodine to kill any germs.
- Wash the cow's udder and milk the cow.
- Provide lots of bedding to ensure the cow's udder is clean.
- Monitor the calf to ensure it is suckling and receiving colostrum.
- Give the cow fresh water and forage.
- Make sure the cow can stand up and that it doesn't have an infection or retained placenta.

Problem Births

The normal birth position for a calf is front feet first with the head resting on the front legs; however, calves may try to come out in a number of positions.


Normal Position

- Head first with one, or both, legs bent backwards.
- Head and one leg first, with the other leg crossed over its neck.
- Front feet first with the head twisted backwards.
- Front feet first with the head bent down between the front legs.
- Breech, backwards with hind feet first.
- Breech, with rear legs tucked under the calf's body.
- Breech, upside down, feet facing up.
- Hiplock–calf is stuck at the hips.

Repositioning the Calf

If the calf is in the wrong position, it must be repositioned so it comes out feet and head first. Calves can also be delivered backwards with the hind feet first.

- Correct the head position first, then the feet.
- Cup the calf's hooves with your hand so they don't tear or rupture the uterus.
- Reposition the calf between the cow's contractions to avoid hurting the calf or the cow.
- If the calf cannot be repositioned after several minutes call the vet immediately.

Calves delivering backwards are hard to get out alive. The mother doesn't dilate (the cervix does not open fully) and the umbilical cord, which gives the calf oxygen, breaks sooner. If the calf's head is still inside the mother, the calf smothers. Be quick when pulling a calf out backwards.

Double Jeopardy

Twins are more common in some breeds than others. However, they are usually not a cause for celebration on a dairy farm. Twins are more difficult to give birth to, which increases the chance of complications. Also, unless the calves are both the same sex, they are useless to the farmer. Fraternal twins—heifer and a bull—share female and male characteristics. Almost all the time, this means the female is not fertile.

When to Call the Vet

Always call the vet when:

- you see a lot of blood in the discharge before or after delivery
- you only feel a tail; this means the calf is in a breech position and twins are a possibility
- the discharge from the vagina has a foul odour
- the udder on the cow seems to be getting smaller rather than larger
- the cow has a uterine torsion
- the cow stays in stage one for a long time and doesn't dilate
- A yellow, manure-stained discharge from a cow means the calf's in trouble; deliver it quickly

Section 6: Business and Production

Regulations

Cow's milk is a supply-managed commodity in Canada, meaning that product supply and consumer demand are matched by way of a production quota. The three pillars of supply management are import control, producer pricing, and production discipline. Producers of cow's milk must have a licence from Dairy Farmers of Nova Scotia (DFNS) and hold a minimum of 10 kg (22 lbs.) of quota.

Anyone can own one or more milk cows on their own premises, as well as consume and process the milk produced by their cow(s). However, they may not sell, offer for sale, or give the milk and anything produced from it away. In addition, all licensed producers of cow's milk must sell all the milk they produce to DFNS. They may keep their own milk for personal consumption, if they wish, but may not sell, offer for sale, or give away their milk and anything produced from it to anyone except DFNS.

If you are interested in purchasing dairy quota, there are two avenues:

1. Purchase with a retiring dairy farmer. In this case, you must purchase the entire block of quota and the accompanying farm, including the land holdings, buildings, and equipment required to support the herd.
2. Apply to DFNS's New Entrant Program. The link to the DFNS website can be found in additional resources at the end of this manual.

There are some regulations that apply to all milk producers. All milk producers must adhere to the Dairy Industry Act and accompanying regulations. The Dairy Industry Act and regulations have stipulations that cover the following aspects of dairy production:

- The farmyard
- Barn construction and water supply
- Milking parlour construction
- Bulk milk tank specifications
- Milk-handling equipment
- Hygiene during milking operations
- Animal health requirements
- Handling and transport of bulk milk
- Milk transfer
- Criteria for raw (unpasteurized) milk (Note this refers to unpasteurized milk sold for processing)

Dairy inspections of licensed producers are conducted once each year to ensure continued compliance with the Dairy Industry Act. In addition, raw (unpasteurized) milk is tested multiple times per month to ensure the total bacteria and somatic cell counts do not exceed the maximum allowable levels. Stiff milk quality penalties apply, with the eventual pick-up suspension, in cases where milk produced does not meet the quality standards. Milk-house water (the water used to wash equipment) must also be tested annually.

There are other regulations that apply to dairy farms in Nova Scotia, including municipal zoning regulations and environmental regulations. For more information on municipal zoning regulations, contact your municipal office. For more information on environmental regulations, contact an agricultural resource coordinator with the Nova Scotia Department of Agriculture.

All licensed cow dairy farms must sell their milk to DFNS. DFNS then sells the milk to licensed milk processors according to a pre-set pricing schedule, based on the dairy products they make.

For dairy farms that process their own milk, this sale and repurchase occurs on paper even though the raw (unpasteurized) milk may not actually leave the farm.

For small-scale licensed milk processors, raw (unpasteurized) milk can be sourced on a scheduled basis through DFNS. A transporter, who picks up milk in that area, can be directed by DFNS to deliver milk to a licensed processor. Transportation and delivery surcharges will apply. Alternatively, pasteurized milk may be purchased directly from another licensed processor (likely in 20 L containers), who determines the price and delivery arrangements.

All licensed processors report their monthly milk purchases and dairy product production directly to DFNS.

The licensed processor is required to have a suitable milk receiving area and a way to accurately measure and test the milk that is delivered.

Getting Started in Small Scale Dairy Production is a valuable resource and the link to it can be found in additional resources at the end of this manual.

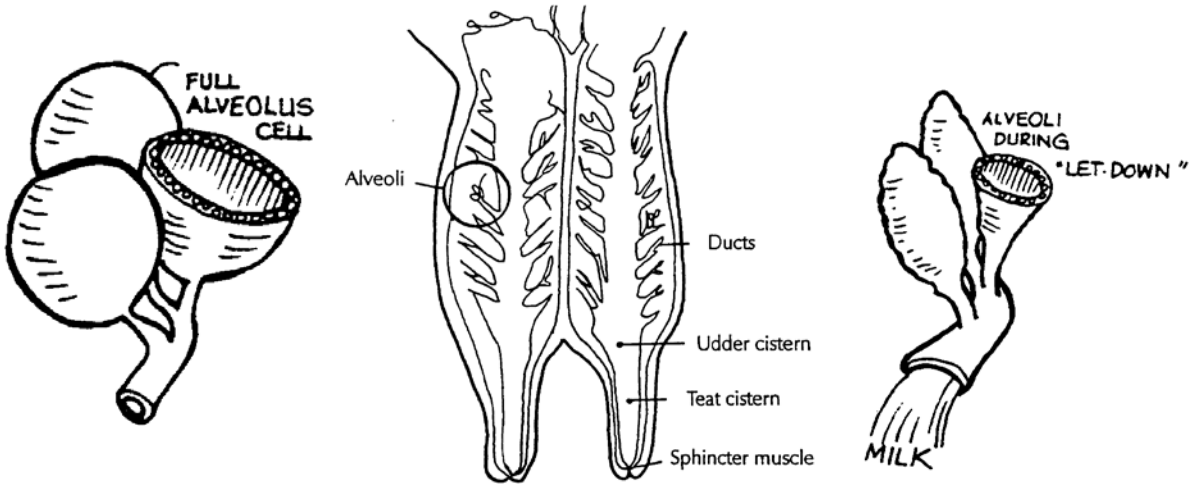
The ultimate reason we have dairy cattle is to produce one of nature's great foods: milk. This section deals with milk production from physiology to management to economics and business.

The Udder

Milk is produced in a cow's udder. A cow's udder is a complicated piece of equipment and all part works together to create milk. Once you know how a cow's udder works, you need to know how to get milk out of an udder. A proper milking procedure keeps the udder healthy and your bulk tank full**.**

Inside the Udder

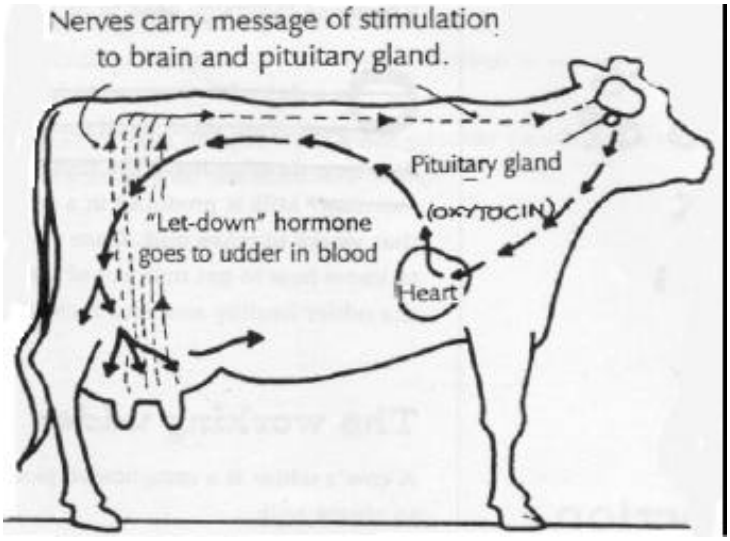
The udder is broken into four glands called quarters, and the quarters house the alveoli cells that produce milk. It takes thousands of alveoli to make one droplet of milk and these cells need a lot of energy to produce all this milk. The energy comes from nutrients in the cow's blood that flows through the udder.



Milking Steps

Milk let down, or ejection, is a reflex act. A reflex is something the mind has no control over. For example, if you touch something hot you automatically pull your hand away.

At milking time, washing and massaging the udder sends a message to the cow's brain to start letting down milk. The cow's body releases a hormone called oxytocin, which sends a signal to the udder to squeeze the milk out of the alveoli cells. The milk travels to the teats where there are holding areas called cisterns. The milk sits there until the milking unit is attached and the milk comes out of the udder.



Milking Cows

1. **Provide a clean, stress-free environment and routine for milking**. Giving your cows a comfortable home keeps them healthy and able to produce more milk**.**
2. **Milk your cows at the same time every day**. You can milk cows twice a day, 12 hours apart, or three times a day, eight hours apart.
3. **Wear gloves.**
4. **Wipe the teats.** Wiping the teats cleans off dirt and germs. It also sends the signal to the cow's body to let milk down. You should wipe with a single-use cloth for each cow.
5. **Fore strip.** Squirt a few streams of milk from each quarter into a strip cup or onto a clean and dark surface to look for any problems. From this milk, you can see if the cow

has clinical mastitis, an udder infection. The first milk out of the teats also has more bacteria so it's a good idea to get rid of it. Also, fore stripping further readies the udder to let down milk.

6. **Pre-dip.** After fore stripping, pre-dip the teats to kill any bacteria that may contaminate the teats. Ideally, the pre-dip should cover the whole teat or at least three-quarters of it. The pre-dip should remain on the teat for at least 30 seconds.
7. **Dry the teats**. Dry and massage the teats with a single-use cloth for 30 seconds. This further helps with milk let down.
8. **Attach milker.** Placing the milker unit onto the cow at the right time is important. It needs to be placed on while the cow is still letting down her milk, so the milking machine doesn't have to work as hard. Attach the milker 60 to 90 seconds after initial stimulation. Cows usually take four to six minutes to milk out. It is important to not leave the milker on too long. Overmilking can cause the teats to become sore and infected.
9. **Remove the milker**. Once the milk flow slows, shut off the vacuum to the claw and remove the milker. Most farms now have automatic claw removal (ACR), where the claw comes off automatically once milk flow slows down. Never try to remove a milker that is still sucking on the udder as this can damage the teats.
10. **Dip the teats**. Always dip your cow's teats right after the milker is taken off as teat dips kill germs and stops infections. Keeping these steps in mind will make you a better milker, and your cows happier.

Milking Systems

The types of milking systems dairy farms use are in-barn pipeline, robot, and parlour.

In-barn Pipeline

Usually for smaller herds, the pipeline system allows one operator to milk 25 to 30 cows an hour. A pipeline is installed above the animal's stall and the cows are milked in sequence by moving down the rows of stalls. The milking machine is a lightweight hose assembly that is plugged into the pipeline. The milk travels down the pipeline into the bulk tank.

Robot

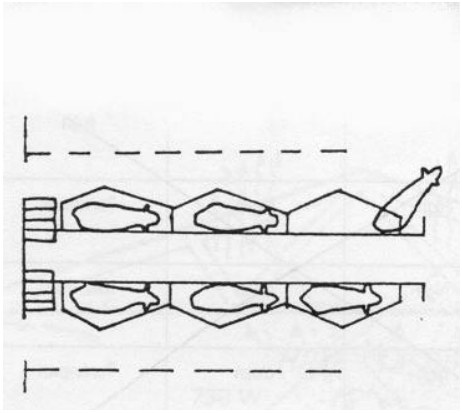
One robot will milk up to 60 cows a day. The free-stall barn can be organized in two ways: 1. guided flow, where the cows pass by the robot before going to the feed bunk, or 2. free-flow, where the cows are milked by the robot, feed, drink, and socialize at their own free will. This may mean the farmer has to bring a cow to the milker if it has not gone in a while. One person can manage approximately 150 cows due to not having to spend time milking.

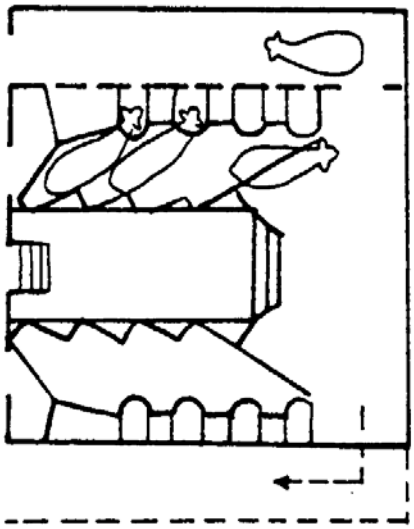
Parlour

Parlour systems milk between 60 to 120 cows per hour, depending on system and design. There are a number of designs, including side opening (double and single), herringbone (polygon, double, and single), rotary platform, and parallel. Let's compare these three common types: double-sided opening, double herringbone, and parallel.

Double-sided Opening

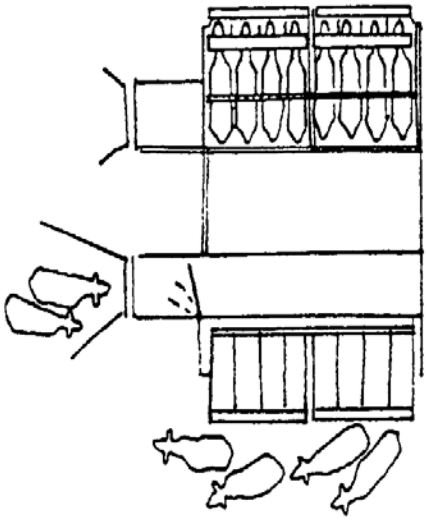
Side-opening parlours involve more labour than other systems because the operator has to walk the full length of the cow to get from one udder to the next. An advantage to side-opening parlours is that cows are handled individually so a slow milker doesn't hold up an entire group of cows.





Double Herringbone

The double herringbone parlour reduces the distance the operator needs to travel from cow to cow. This means more cows can be milked per hour, especially as the number of stalls increases. These cows are milked in groups, so a slow milking cow will hold the group up. In most herringbone parlours, cows enter at one end and exit at the other. Because cows must leave single file, it takes time for one group to leave before the next group can enter. In rapid-exit herringbone parlours, the side farthest from the parlour pit lifts out of the way. All cows can turn and leave at the same time, which reduces the time required for milking.



Parallel

Cows stand perpendicular to the milking pit, which decreases the amount of time moving cow to cow. Milkers are attached between the rear legs. A guard protects against defecation. Parallel parlours have reduced kick-offs, so operators have less of a chance of being kicked. Cows in parallel parlours are milked in groups, so a slow cow holds up the group. Most parallel parlours are designed to be rapid exit so the barrier in front of cows lifts up and cows exit at once. This parlour is the only one listed in which one operator is busy. In the other parlours, labour is underused. The dilemma for some farms is that a parallel parlour is expensive if not efficiently used by milking a significant number of cows. A double twelve parlour can milk more than 700 cows three times a day.

Comparing Milking Systems

Characteristic	In-barn Pipeline	Robot	Parlour
Herd size	• 60 cows or fewer • Pipeline is difficult to manage with large herds	• Each robot can handle milking 60 cows • Expansion is done in groups, rather than individually	• More than 60 cows • Initial costs and labour is high for a small herd
Installation costs	• Usually lower because no special building is required	• Can be expensive, particularly with expansion	• Usually more expensive due to modern equipment and new building
Labour	• Labour needed to bring equipment to the cows • One operator can milk 25 to 30 cows per hour	• Reduces the cost of labour and enables workers to focus on other aspects besides milking • One robot can milk 60 cows per day	• Cows come to milk parlour • One operator can milk 60 to 100 cows per hour • Clean-up can take 30 minutes longer than pipeline
Milk contamination	• Possible when milking units move from cow to cow	• Minimal	• Possible when milking units move from cow to cow

Milking Machine

A milking machine is made of a number of parts and works by vacuum. It must do two things:

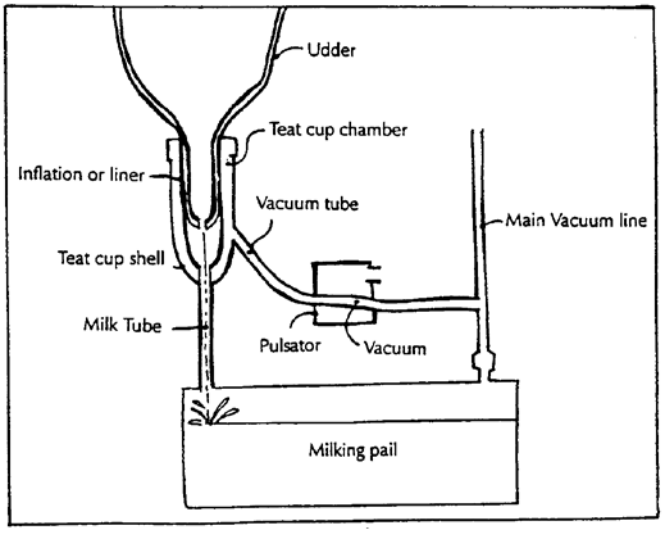
1. Get milk to flow out of the teats
2. Massage the teats so that they don't get sore from milking

Parts:

- **Vacuum parts**—The vacuum pump, hoses, and controller (regulator) control the amount of air and vacuum in the milking system.

- **Pulsator**—The pulsator creates the air, vacuum, and air cycle that milks the cow.

- **Teat cup shells and liners**—The teat cup shell liners go onto the cow's teats. The liner inflates with air, and then collapses when the air is vacuumed out. Liners wear out and need to be replaced. A natural rubber



liner lasts for 500 to 700 milkings, while a silicone liner lasts for 5,000 to 10,000 milkings.

- **Milk claw**—The milk claw catches the milk after it is sucked from the udder. The milk goes into the pipeline from the milk claw.

- **Pipeline**—The pipeline carries the milk to the bulk tank. Pipelines are stainless steel, or glass, so they are easy to clean. Pipelines are on a slant toward the milk house. This way, gravity helps move the milk.

- **Receiver**—The milk travels through the pipeline to the receiver**.** The milk is collected in the receiver then delivered to the bulk tank.

- **Bulk tank**—The bulk tank holds the milk after each milking. It cools the milk down and keeps it cold and clean until the milk truck comes to take the milk to the dairy.

Record Keeping

Records keep track of a herd's performance, health, daily management, and ancestry. Records of expenses and receipts are important and can help in determining the productivity and profitability of your herd. Be sure to keep your records in a convenient place and keep them up to date. You may wish to include some of the following information in your records.

Types of Records

Pedigrees—This record shows the family tree of each individual animal. It lists the sires, dams, grand sires, grand dams, and great-grand sires and dams. It also includes the colour and senior weight of each animal. Pedigrees are important because they can establish that your animal is purebred and show ancestry, so you can avoid accidentally inbreeding.

Herd records—This lists the sex, sire, dam, date of birth, weight, and the date the animal leaves your farm for every individual animal. Comments, such as buyers' names or show winnings, can be added and help keep track of each animal.

Breeding record—Each breeding is recorded here. It will help you keep track of heat dates and help you decide which animals are productive and worth breeding.

Show record—A show record includes the dates and places of shows entered plus information on classes and awards received.

Health records—Health records should include any symptoms or possible signs of disease and the date they were observed in each animal. If the animal receives any medication, the amount and the date must be recorded. Health records can help keep track of the withdrawal period for medication that must be adhered to before an animal can go to market.

Feeding records—These records should include the type and amount of feed given to each animal. The record can also track the overall feed costs of your operation. Feeding records can also help you to design and implement feeding programs according to the life stage of your animals.

NOTE

For examples of record templates see the appendix at the end of this manual.

Additional Resources

- Dairy Farmers of Nova Scotia: www.dfns.ca
- Dairy Industry Act: https://www.nslegislature.ca/sites/default/files/legc/statutes/dairyind.htm
- Getting Started in Small-Scale Dairy in Nova Scotia: https://novascotia.ca/thinkfarm/documents/getting-started-in-small-scale-dairy-production.pdf
- Holstein Canada: https://www.holstein.ca/en/Public
    - https://www.holstein.ca/PublicContent/PDFS/JourneyToTheRing_EN.pdf
    - https://www.holstein.ca/PublicContent/PDFS/OnWithTheShow_EN.pdf
- Humane Handling Guidelines for Dairy Cattle: http://www.afac.ab.ca/dairy
- Guide for Beginning Farmers in Nova Scotia: https://novascotia.ca/thinkfarm/documents/beginning-farmers-guide.pdf
- Introduction to Livestock: http://nsnewfarmer.ca/home/livestock/
- Livestock Fencing Guidelines: https://novascotia.ca/thinkfarm/documents/fencing-guidelines-2013.pdf
- National Farm Animal Care Council Transportation: http://www.nfacc.ca/codes-of-practice/transportation
- Nova Scotia Premises Identification Program (PID): https://novascotia.ca/agri/programs-and-services/industry-protection/
- Manure Management Guidelines: https://novascotia.ca/thinkfarm/documents/manureguide_2006lowres.pdf
- proAction®: https://www.dairyfarmers.ca/proaction

References

- 4-H Nova Scotia. *Dairy*. Nova Scotia Department of Agriculture, 1998. Leader Resource Guide.
- Dairy Farmers of Canada. *proAction®.* https://www.dairyfarmers.ca/proaction. Accessed March 2018.
- Dairy Farmers of Nova Scotia. https://www.dfns.ca/. Accessed March 2018.
- Government of Alberta. "Know your Feed Terms." *Alberta Agriculture and Forestry*, June 27, 2002. http://www1.agric.gov.ab.ca/$department/deptdocs.nsf/all/agdex4521. Accessed June 28, 2018.
- Holstein Canada. https://www.holstein.ca/en/Public. Accessed March 2018.
- https://www.holstein.ca/Public/en/About_Us/The_Canadian_Dairy_Industry/The_Canadian_Dairy_Industry
- https://www5.agr.gc.ca/eng/industry-markets-and-trade/canadian-agri-food-sector-intelligence/dairy/?id=1361290521529
- http://www.dairyinfo.gc.ca/index_e.php?s1=cdi-ilc&s2=aag-ail
- National Farm Animal Care Council. http://www.nfacc.ca/. Accessed 2018.
- Nova Scotia Department of Agriculture. Nova Scotia Premises Identification (PID) Program. Industry Protection, 2013. https://novascotia.ca/agri/programs-and-services/industry-protection/#pid. Accessed July 23, 2018.
- Perennia. *Biosecurity for Small Scale Livestock Production*. 2016. PDF. http://www.perennia.ca/wp-content/uploads/2018/04/biosecurity-for-small-scale-livestock-production.pdf. Accessed July 5, 2018.
- ThinkFARM.*Getting Started in Small-Scale Dairy in Nova Scotia*. Nova Scotia Department of Agriculture, 2013.

Appendix A: Traceability in Nova Scotia

The Canadian Food Inspection Agency is proposing changes that will affect cattle, sheep, goats, pigs, bison, and deer.

Currently cattle, sheep, and pigs require tags, and only pigs require movements to be reported. Moving forward, all listed species will require both tags and their movements to be reported.

Traceability has three major components:

1. **Animal Identification**—All animals will be required to be identified with individual animal ID tags. Most of these tags can be purchased at local feed stores or online directly from the Canadian Cattle Identification agency http://canadaid.com/

2. **Premises Identification**—All sites where livestock are housed or assembled will require a Nova Scotia premises ID number (PID) issued to them.

   Any livestock producer in Nova Scotia can apply for a PID at no charge. This is a one-time application and the issued number stays with the farm property regardless of changes in ownership, species, or animals etc. The same number is used when ordering tags and reporting movements for all animals regardless of species.

   A PID can be used in trace back of animals for emergency measure such as food recalls or animal disease outbreaks. Producers can apply for a PID at www.novascotia.ca/agri/pid/, by calling 902-890-3377, or by emailing NSPID@novascotia.ca.

3. **Animal Movements**—All movements of regulated species between premises need to be reported to the responsible administrator for that species:
   - Canadian Cattle Identification Agency for cattle, sheep, goats, bison, or deer (https://www.canadaid.ca)
   - PigTrace for hogs (http://pigtrace.ca)

The following information needs to be reported:

- Premises ID of departure and arrival sites
- Time and date
- Individual animal ID number
- Licence plate of livestock trailer

No reporting will be necessary for movements within a farm unit including

- onsite pastures (pastures that are part of your farm unit)
- other barn locations (heifer barns or other locations where animals are kept)
- off-site pastures owned or leased (property where you are pasturing your animals only, not comingling with other producer's animals)

Appendix B: Biosecurity

Biosecurity for Small Scale Livestock Production

Biosecurity is the protection of people, animals and the environment from infectious disease, pests, and other biological threats. It refers to the proactive measures taken to exclude threats from farms that are disease free, and preventing spread of pathogens to other herds or flocks if/when a disease does occur. The ultimate goal of a good biosecurity plan is to implement easily attainable protocols that reduce problems to inexpensive and manageable occasions. The are the key components of any biosecurity plan.

1. **Fences:** Good fences keep livestock in and wildlife out. Inspect boundary fences regularly and repair as needed. Stray stock may spread disease and feral animals introduce new pathogens to your farm.

2. **Housing, Equipment, and Yard Maintenance:**
    - Pens should be completely emptied, cleaned, and disinfected at least annually.
    - All equipment that comes into direct contact with livestock or poultry should be cleaned and disinfected periodically, including feeders and waterers.
    - If sharing equipment with other farms, be sure to disinfect the equipment before using on your farm. Use your best judgement and weigh the risks carefully.
    - Prevent pests and rodents by:
        - keeping area around pens free of debris
        - cutting the grass short around pens and enclosures
        - keeping feed in tightly closed containers and cleaning up spilled feed
        - using traps and bait as necessary
    - Standing water should be drained.

For organic production, a robust biosecurity program can prevent the need for antibiotics and parasiticides, and can reduce the potential of GMO contamination or loss of certification.

3. **Introducing New Stock:**
    - Don't bring new stock to your property if they appear unhealthy.
    - Avoid purchasing stock from markets and auctions.
    - Obtain a health certificate if possible.
    - Birds, eggs, and livestock should be sourced from farms with a solid herd or flock health program.
4. **Quarantine:**
    - Have a quarantine area available for animals new to the farm and for sick or injured animals.

- The area should be a separate area or building to prevent bird-to-bird or animal-to-animal contact.
- Three weeks will allow time for a proper assessment of health, condition, and recuperation from transport or illness.
- Observe animals or birds for any abnormal behaviour, and signs/symptoms of disease. Presence of unusual behaviours or symptoms calls for veterinary inspection or tests.

5. **Water and Feed:**
   - Water should be tested at source to ensure its suitability for livestock production at least annually.
   - Design and position water bowls, troughs and waterers to prevent fecal contamination.
   - Feed or ingredients should be purchased from sources that verify its safe origin.
   - Keep feed pest-free and dry, cover feed bins and feed systems to reduce the chance of contamination.

6. **Herd or Flock Health:**
   - Contact your herd health veterinarian when livestock appear sick, mortalities are high, or production drops off without apparent reason. Low numbers of mortality should be examined by a vet if the cause of death is unknown.
   - Mortality should be disposed of in a timely manner to prevent contamination of the farm environment, reduce risk of spreading disease to other livestock and humans, and prevent attraction of pests.
   - When animals are stressed from parasites, weather extremes, etc. natural treatments may be less effective. Monitor carefully and resort to other options as necessary. As well, remember that sick animals benefit from remedial care.
   - Vaccinate as required (keeping the necessary records).
   - Pay attention to parasites. Fecal egg counts are useful in determining if treatment is necessary.
   - Keep records of treatments and veterinary care.

7. **Work Flow:**
   - Farm owners and workers should have separate clothing and footwear for working around various animal species. These should be kept at the barn entrance.
   - Use hand sanitizer or wash hands with soap and warm water before entering and after leaving livestock areas.
   - Work with the youngest and most susceptible animals first.

8. **Manure:**
   - Manure should be removed from the production area regularly.
   - Farms, even hobby farms and small stables, should have a manure management plan that includes collection, storage, moving, and disposing of manure to minimize chance of spreading disease.
   - Tools and equipment used for manure handling should not be used for feed or bedding.

9. **Visitors/WWOOFers/Contractors:**
    - Discourage unannounced visitors.
    - All visitors must follow biosecurity protocol.
    - Designate a parking area for visitors.
    - Visitors should be accompanied by farm staff.
    - A visitor log is recommended.
    - Post “Biosecurity” and “No Entry without Permission” signs on entrance doors.
    - Keep extra footwear and outerwear (coveralls, smocks, etc.) available for visitors.

Biosecurity is not limited to large-scale farms. Regardless of size or production philosophy, all farms, even hobby farms, have a responsibility to prevent an outbreak or spread of animal (or plant) disease or pests. Stay on top of industry association news and be aware of local conditions or issues as they arise. If there is a serious disease outbreak, you don’t want to be the last to know!

There are national biosecurity standards for most livestock commodities.
These guidelines are a good place to start when developing a biosecurity plan for your farm.

http://www.inspection.gc.ca/animals/terrestrial-animals/biosecurity/eng/1299868055616/1320534707863

For more information, contact:
Heather McLean,
Non-Ruminant Livestock Specialist,
Perennia

(902) 678-7722

www.perennia.ca

Appendix C: Record Keeping

Herd Record							
Name	Tattoo	Sex	Sire: Dam:	DOB	Colour	Date Sold	Comments

Inventory Record							
Animal ID (Name/#)	Registration #/Tattoo	Description Breed, colour, marking, etc.	DOB	Sex	Ownership Information	Purchase Price	Value
					o Raised o Purchased _____Date if purchased		
					o Raised o Purchased _____Date if purchased		
					o Raised o Purchased _____Date if purchased		

Breeding Record

Dam	Sire	Date Bred	Date Birthed	No. Born Alive	# Dead at Birth	Comments

Show Record

Name of Show	Location	Date Entered	Identification Number	Classes Entered	Number in Class	Comments

Health Record

Name/ #	Breed	Sex	Age	Illness/ Symptoms	Treatment	Date Treated	Cost of Treatment	Recovered from illness/ successful treatment

Death Record					
Name/#	Breed	Sex	Age	Date of Death	Cause

Feed Record		
Situation Description	Method of Feeding	Amount of Feed

Nutritional Value of Feed						
Name of Feed	Type of Feed	Cost of Feed	Amount fed per day	Protein %	Fat %	Fiber %

Appendix D: Activities for a 4-H Meeting

Each chapter in this manual can serve as information and act as a guide to help you plan a 4-H meeting. This manual is meant to act as a starting point for providing you with knowledge to teach your members. As a leader, you are encouraged to tailor your meetings to your groups' interests and abilities.

The table below outlines a typical 4-H meeting and gives suggestions for the length of time.

Welcome, Call To Order, And Pledge		10 min
Roll Call		5 min
Parliamentary Procedure	Minutes and business	10 min
Topic Information Discussion	Use the manual as a guide to present information on the meeting's topic.	20 min
Activity	Time to apply the newly learned information. See the list of suggested activities below.	30 min
Handle The Animals	If possible, members may use this time to practise handling their animals.	20 min
Wrap Up And Adjournment		10 min

The following has different topic suggestions, information to discuss, as well as some possible activities for each section of the manual. Ideally, one or two topics should be selected to discuss during each meeting. Try to select topics from different sections for each meeting so members are exposed to a wide variety of knowledge. As a leader, feel free to be creative and use a variety of activities and tools to help your members learn. There are many worksheets available on various websites for members to fill out. You can also invite experts and guest speakers to come in to talk to your members or arrange day trips to visit new locations.

Section 1: Selecting an Animal

Topic	Information	Activity
Parts of the animal	Show members a labeled diagram of the animal. For younger or newer members, begin with basic parts of the body. For older or more experienced members, you can discuss more advanced topics such as skeletal or muscular structure.	Have members label the parts of the animal. This can be done by using a worksheet or by having members take turns placing labels on an actual animal.
Animal breeds	Teach your members about different breeds. Possible information to include is • distinct breed characteristics • differences among the breeds • history of a breed	Some suggested activities: • Have members match a picture of the animal to its breed. • Have members research and present the ideal characteristics of their chosen breed.
Choosing an animal	Discuss particular features a member might want to look for in an animal. Make sure to include information on correct conformation and conformation faults.	Have members practise judging. The members should place the animals and give reasons for their placings using the correct judging format.
Purchasing stock	Outline your members' options for where they might purchase an animal. Discuss the pros and cons of purchasing from a private sale, a large breeding operation, an auction, or breeding their own.	Organize a trip for the members to visit a breeding operation or an auction.

Section 2: Care and Management

Topic	Information	Activity
Housing	Discuss with your members the different options for housing their animals. Make sure to include information on the National Farm Animal Care Council code of practice.	Have members design their own farm using whatever materials they like, such as modeling clay, popsicle sticks, paper, etc. Have members present their farms and discuss their farms with the group.
Handling	Inform members about proper animal handling and demonstrate how to properly handle the animal. This activity meeting can include information on animal behaviour, proper handling techniques, and safety tips.	Have members practise handling an animal while you observe.
Grooming	Teach members how to properly groom their animals. You can discuss basic grooming techniques as well as grooming an animal for show.	Have members assemble a grooming kit and take turns grooming an animal. They could bath, clip/shear, trim nails/hooves etc.
Identification	Discuss the importance of proper identification and tagging/tattooing animals.	Have members observe an animal being tagged/tattooed.

Section 3: Nutrition

Topic	Information	Activity
Digestive system	Teach your members about their animal's digestive system.	Have members label an image of the animal's digestive system and include brief descriptions on the functions of each part.
Essential nutrients	Inform your members about what the essential nutrients are and why they are important to their animal's diet.	Have members complete a worksheet where they match essential nutrients to their function.
Classes of feed	Discuss the different types of feed available for the members to feed their animals. Describe each feed and its pros/cons.	Have an animal nutritionist, feed salesmen, veterinarian etc. come in and give a talk on animal nutrition.
Feeding programs	Teach your members about their animal's nutritional requirements for their different developmental and life stages.	Instruct members to design a feed program for the different stages of their animal's life. Compare and contrast how a newborn is fed compared to the diet of a mature animal.
Body condition scoring	Inform members on how to score an animal's body condition, when to score, how often, and why. Include some basic information on how a member could adjust the animal's diet to raise or lower a body condition score.	Have members practise palpating and scoring the body condition of an animal. Provide images of animals in different condition so members have a visual.

Section 4: Health

Topic	Information	Activity
Recognizing a healthy animal	Teach members how to recognize a healthy animal and what normal vital signs are.	Have members practise taking an animal's vitals.
Biosecurity	Inform members on the importance of biosecurity.	Have members discuss proper biosecurity practices and ways they can implement them into their own program.
Common diseases	Discuss some common diseases, their cause, prevention, and treatment.	Have a veterinarian in, or visit a vet clinic, to talk about common diseases and what members can do about them.
Parasites/vaccinations	Inform your members about the importance of routine vaccinations, as well as deworming.	Have your members design a deworming and vaccination schedule. If members are older and more experienced, they may want to learn how to properly administer vaccines.

Section 5: Breeding

Topic	Information	Activity
Reproductive cycle	Teach members about the animal's reproductive cycle.	Have members label diagrams of the animal's reproductive system.
Signs of heat and breeding	Inform your members about the signs of an animal in heat. Proper breeding practices, as well as natural vs artificial insemination, may also be discussed.	Have members record some signs of an animal in heat. Then, have members discuss the advantages/disadvantages for natural service or artificial insemination. Also, you could arrange to have the members observe animals being checked for pregnancy.
Giving birth	Discuss the stages of labour and some signs of issues with the birthing process.	Have members fill out a timeline on the stages of labour with a description of each stage.
After-birth care	Teach your members about what to do following the birth of an animal. Care for the newborn as well as the mother should be discussed.	Have members create an after-birth care kit complete with towels, disposable gloves, buckets etc.

Section 6: Business and Production

Topic	Information	Activity
Marketing	Discuss with members the importance of marketing and some marketing ideas/tips.	Have members research potential markets for products from their animals. Alternatively, you could organize a trip to a dairy farm, specialty meat market, farmers market etc.
Record keeping	Talk to members about why records are kept, how to keep them, and what members should keep track of.	Have members fill out a record booklet throughout the year. You may use the record templates provided in this manual or use your own.