PRODUCER RESOURCE

GRAIN-FED VEAL

FACT SHEETS

VEAL Farmers of Ontario

Your calf care partners

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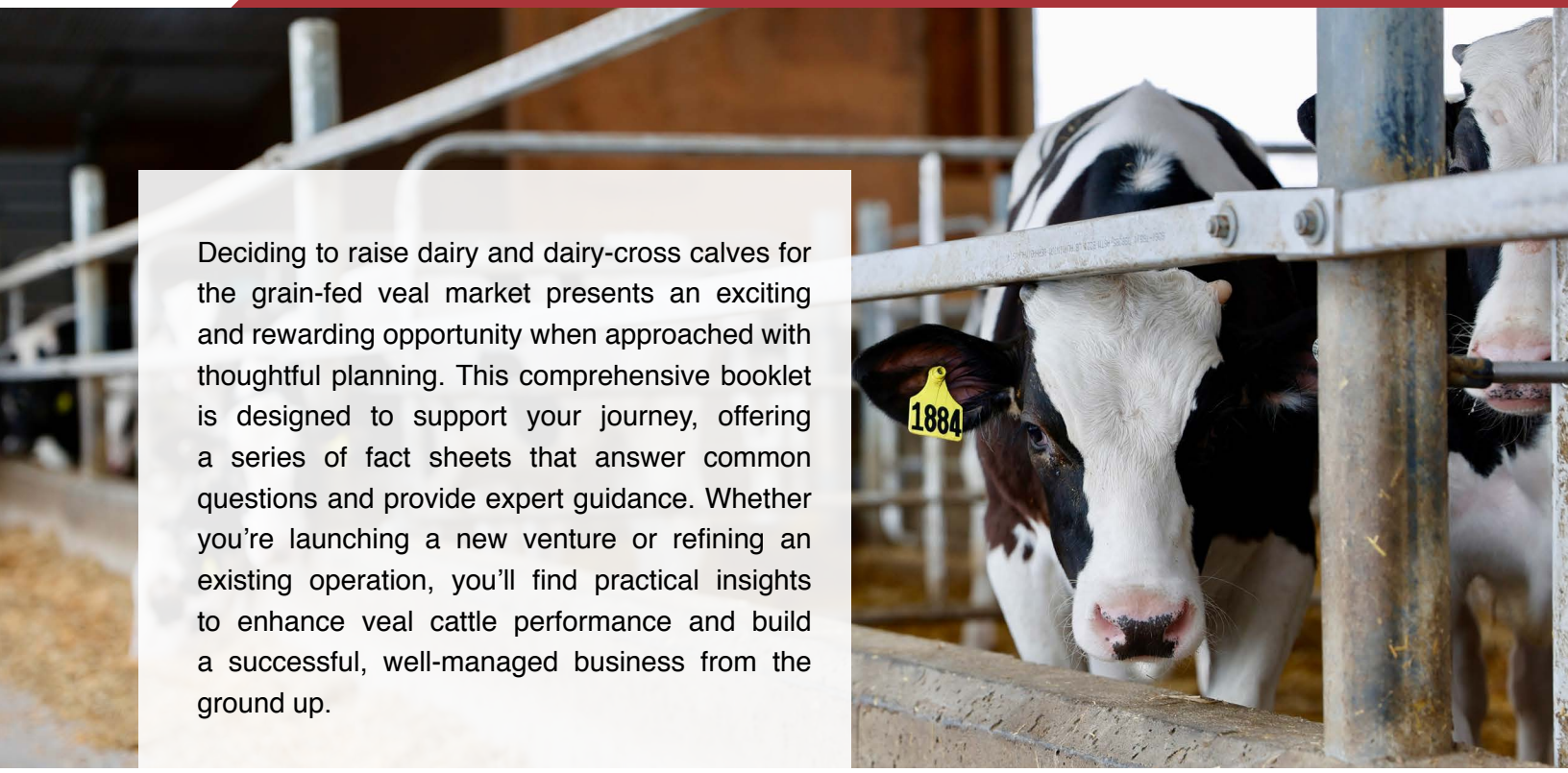
Introduction



Deciding to raise dairy and dairy-cross calves for the grain-fed veal market presents an exciting and rewarding opportunity when approached with thoughtful planning. This comprehensive booklet is designed to support your journey, offering a series of fact sheets that answer common questions and provide expert guidance. Whether you're launching a new venture or refining an existing operation, you'll find practical insights to enhance veal cattle performance and build a successful, well-managed business from the ground up.

The goal of a grain-fed veal farmer is to achieve the desired finish on veal cattle at the right weight and age. Ideally, market-ready grain-fed veal cattle should weigh between 295 to 320 kg (650 to 705 lb) at 28 to 32 weeks (seven to eight months) of age. To achieve this goal, it is critical to have the right feed rations and ratios.

Veal is defined as cattle of any dairy breed or dairy crossbreed dressing no more than 190 kg (419 lb). This converts to a live weight of roughly 349 kg (769 lb), which is reached at approximately eight months of age. Producers are strongly encouraged to target a dress weight of 180 kg (397 lb) to maintain some flexibility within the system to manage veal carcass weights.

Average daily gain (ADG) should be 1.2 kg (2.6 lb) or better. Targeting daily gains above 1.5 kg (3.3 lb) may require additional nutrient requirements.

Grain-fed veal cattle are fed a balanced ration based of grain (usually clean, whole-shelled corn) and pellets made of protein, vitamins, and minerals. A small amount of fibre should be offered daily to maintain rumen health. Cattle should also have continuous access to their feed, to encourage slower eating and stimulate chewing. Ensure there is adequate bunk space for each animal.

Becoming a grain-fed veal producer

About Veal Farmers of Ontario

Veal Farmers of Ontario (VFO) is a farmer-run organization that represents the interests of Ontario veal and dairy calf farmers, providing proactive and engaged leadership to promote industry development through collaboration and communications.

Licence fees

VFO collects a **$7.50 per head licence fee** on all veal cattle sold in Ontario, including bob calves, animals sold through auctions or dealers, cattle processed into veal, and custom-killed or freezer-trade cattle. These fees are reinvested to support the objectives in our strategic plan: advocacy and industry relations, consumer marketing and promotion, member relations, producer programs, and operations and governance, while also funding initiatives to expand export markets, strengthen retailer partnerships, and encourage consumers to enjoy Ontario veal.

To learn more about licence fees, contact VFO or visit:

➔ https://vealfarmers.ca/about-us/licence-fees/

How do I start raising calves for grain-fed veal?

If you do not have previous experience working with cattle, a great place to start is to work on an established veal or dairy farm. This will give you an idea of the amount of work involved in raising calves and whether raising veal cattle is right for you. Attending industry events, meetings, and trade shows are also excellent opportunities to network with producers and learn more about the sector.

Working on a farm and talking to producers can also help you determine which size of calf to begin with. You can choose to buy calves as young as nine days of age or purchase weaned calves (also known as “started” or “preconditioned” calves). Purchasing weaned calves may allow you to avoid some of the common health challenges young dairy and dairy-cross calves experience, but these calves are more expensive.

Do I need a business plan?

As with any new business, a plan should be developed. This process will help you to think about what you really want to achieve. Consider the following questions as you develop your business plan:

- ✔ What is your vision for your business?
- ✔ What are your goals?
- ✔ How do you plan to achieve your goals?
- ✔ What is your strategy?
- ✔ What is your risk tolerance?
- ✔ What is your marketing plan?
- ✔ What do you need to get started?

For more information on business planning, find the Ontario Ministry of Agriculture, Food and Agribusiness (OMAFA) fact sheet “Starting a farm in Ontario” here:

➔ https://www.ontario.ca/page/publication-61-starting-farm-ontario

Can I be a full-time veal farmer?

There are many things to consider when determining if you can be a full-time veal farmer without off-farm income. Start by assessing your expected Cost of Production (COP). Making a profit in veal farming relies on the cost of buying calves, feed, low mortality, and the market price of finished veal cattle.

VFO and OMAFA updated the veal COP tool in 2019 to help producers calculate their annual costs for planning purposes. The COP tool was designed to accommodate multiple production systems, including growing to finishing, starting with preconditioned calves, or a combination of both. It can be found online here:

https://vealfarmers.ca/producer-information/veal-cost-of-production-tool/

For more information on the COP tool, find this article in *The Connection* magazine:

"Cost of Production: another tool for the toolbox"

https://vealfarmers.ca/wp-content/uploads/2020/04/TheConnectionSUMMER2019-HRonline.pdf

Financing

To proceed, you will need to ensure financing is in order if required. Starting a new venture is expensive, so consult with a lender experienced in agriculture. You are also encouraged to review your business plan with an accountant to ensure something was not overlooked and the plan is financially sound.

For more information see the following articles in *The Connection* magazine:

"Financing options for crop, livestock, and equipment purchases"

https://vealfarmers.ca/wp-content/uploads/2020/04/TheConnectionWinter2019-HR-online.pdf

"Meeting with your lender"

https://vealfarmers.ca/wp-content/uploads/2020/06/TheConnectionSummer-LRonline.pdf

Please review your COP and reach out to your financial advisor, accountant, and/or lender for advice and to determine which programs and financial assistance measures may be applicable for your specific circumstances. Please use the individual websites of each program to determine eligibility and for application details.

Code of Practice for the Care and Handling of Veal Cattle

Ontario farmers follow standards of care outlined under science and consensus-based national codes of practice to ensure the health, safety, and welfare of their animals.

The *Code of Practice for the Care and Handling of Veal Cattle* (the Code) was released in November 2017. This resource outlines the standard of care that is expected of veal farmers, including calf selection and the care of newly arrived calves, housing, feed and water, husbandry practices, health management, transportation, and euthanasia.

Find the Code here: https://www.nfacc.ca/codes-of-practice/veal-cattle

Where can I purchase calves?

Calves can be purchased from a livestock auction market or directly from a dairy farm. Purchasing directly from a dairy farm allows you to establish a relationship with a local dairy farmer who will sell you their dairy and dairy-cross calves. Having this relationship allows you to ask about critical newborn care the calf received and will minimize commingling of young calves from different farms. Commingling of calves from multiple sources increases the risk of illness. If purchasing calves directly (private treaty), licence fees must be remitted to VFO. Learn more about licence fees here:

https://vealfarmers.ca/about-us/licence-fees/

Calves may also be purchased through a licenced calf dealer. A dealer is defined as a person engaged in the business of buying or selling cattle as a principal or as an agent. If working with a dealer, discuss the type of calves you want, prices, and the transportation costs and commissions.

To check if a dealer is licenced visit:

https://www.agricorp.com/en-ca/Programs/OBCFPP/Pages/licensed-dealer-list.aspx

If you wish to become a licenced dealer, contact Agricorp to request an application package here:

https://www.agricorp.com/en-ca/ContactUs/Pages/Default.aspx

Transportation

Under the *Health of Animals Regulations* Part XII (Transport of Animals) calves eight days and under may only be transported once and are prohibited from going to assembly centres.

Calves must have a dry, healed navel and be able to walk easily onto the transport vehicle. Transport is stressful, so calves are at a higher risk of becoming ill during this time. Reduce transport stress by ensuring calves are handled gently and minimizing the length of the trip.

Updated transport regulations can be found here:

https://vealfarmers.ca/producer-information/transportation/

Feeding veal cattle

Depending on the management program, by the time cattle go to market, each calf will have consumed approximately 750 kg (1,653.5 lb) of grain (mostly corn), 230 kg (507 lb) of supplement, 20 kg (44.1 lb) of roughage, 35 kg (77.2 lb) of milk replacer, and 25 kg (55.1 lb) of calf starter. Feed is one of the most expensive inputs into a veal business, but the cost of purchasing calves, veterinary bills, bedding, and overhead expenses will also add up. Be sure to include these costs in your business plan and use the COP tool to determine if your business will be profitable.

Do I need a herd veterinarian?

Before purchasing calves, talk to a bovine veterinarian and learn about the common signs of sickness and how to develop herd health protocols, including use of vaccines, to help keep the herd healthy. A thorough understanding of calf health will help to make the best decisions when purchasing calves.

Establish a strong working relationship with your herd veterinarian through a valid, ongoing Veterinary-Client-Patient Relationship (VCPR). The Code requires that every producer maintain a VCPR with a licenced veterinarian, including at least one on-farm visit per year to assess herd health and welfare. All treatments – preventative or therapeutic – along with health issues and disease outbreaks, must be recorded. Pharmaceuticals and vaccines must be used according to label directions or veterinary prescription.

Your veterinarian, together with your nutritionist, forms a key part of your farm team, helping you make informed management decisions that support both herd health and farm success.

How do I market finished veal cattle?

There are several different options to market right-weighted veal cattle. Direct to packer, through an auction market, or freezer trade business. Regardless of how veal cattle are marketed, ensure the buyer is a licenced dealer under the Ontario Beef Cattle Financial Protection Program (OBCFPP).

A listing of provincially licenced veal processors is available here:

https://data.ontario.ca/dataset/provincially-licensed-meat-plants/resource/fb7d5f1b-fdc1-496e-bf0b-26c3d3c5f1c2

For more information on the OBCFPP, see this article in *The Connection* magazine:

https://vealfarmers.ca/wp-content/uploads/2020/04/TheConnectionSpring-Final.pdf

What happens if my veal cattle dress over 190 kg (419 lb)?

Veal is defined as meat from a bovine carcass that is less than 190 kg (419 lb) once dressed.

Overweight veal cattle are sold as ungraded beef, not veal. Selling ungraded beef as veal is illegal. Careful monitoring of veal cattle weight throughout production can reduce the chance of shipping overweight veal cattle. Investing in a scale should be something to consider as you develop your business plan.

To learn more about the regulations of the *Food Safety and Quality Act (2001)* visit:

https://www.ontario.ca/laws/statute/01f20

How do I develop a freezer trade business?

All meat sold in a freezer trade business must be harvested at a licenced processor. As a farmer, it is your responsibility to know the rules and regulations about selling veal meat.

Evaluating COP

About COP

COP is a tool that can help in farm-level decision making. Farms with multiple enterprises can use COP to assess which ones are making money and which are not. You can also use it to concentrate on individual or groups of costs that have the biggest impact. Pricing targets for inputs, like dairy and dairy-cross calves and feed purchases, and outputs can be set at different cost break-even levels. For veal farmers, knowing your other costs can help show you what you can afford to pay for dairy and dairy-cross calves.

How to use the COP tool

VFO and OMAFA developed a COP tool to help farmers calculate their costs and use them in their planning. The tool uses the production systems approach to calculate COP. It allows for a production period divided into two stages (weaning and finishing), buying in preconditioned calves, or a combination of both. The veal production practices are broken out, and input prices applied, to arrive at a total cost for each cost. Capital investments are costed out based on replacement costs with typical depreciation, interest, repair, and insurance rates. From a planning perspective, these are useful because the amounts used, and prices paid, are detailed out so changes to rations or input prices can be made and the impact on the financials can be quickly determined.

Before diving into the costs, the first section of the budgeting tool allows the user to provide their production profile. This is basically painting the production picture of your farm; how many dairy and dairy-cross calves are purchased, purchase and sale weights, ADG, death loss percentages, etc. Production drives COP, so having a good handle on your farm's productivity, and how different productivity levels will change your COP, is key.

Farming has many risks; disease, weather, and market volatility can quickly change your financial forecasts. Some of the key risk factors that impact a veal operation are considered in the budget such as dairy and dairy-cross calf purchases and sale prices, death loss, and ADG. Identifying the risks and the range of possible outcomes can help in planning for ways to manage or mitigate them. If death loss is twice as high as you expect, how does that affect your bottom line? If you can increase your ADG from 1.36 kg (3.0 lb) to 1.58 kg (3.5 lb) per day, how much will this lower your feed cost? Understanding and monitoring price seasonality and volatility both on the dairy and dairy-cross calf and finished veal cattle side are important considerations in deciding what you can afford to pay for dairy and dairy-cross calves based on the potential market price outlooks.

Figure 1

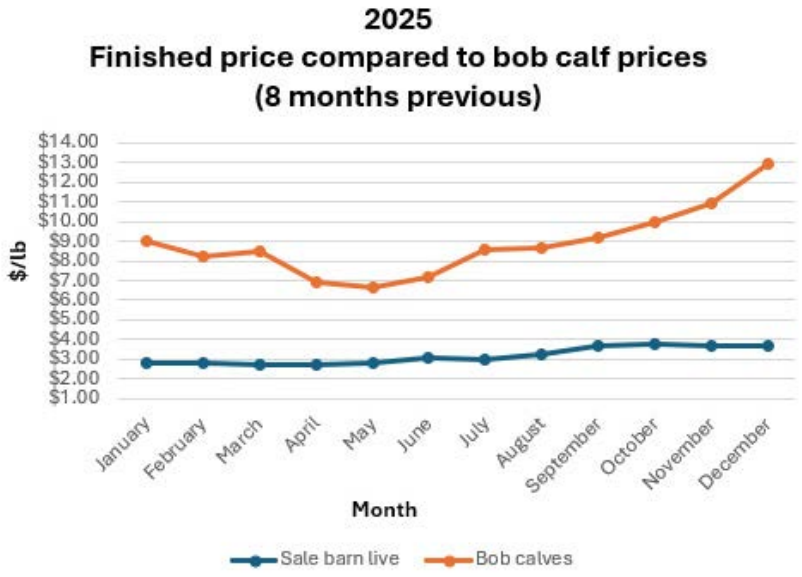


Figure 1 shows the seasonality of market price and how dairy and dairy-cross calf purchase prices from eight months prior relate to the price they received as finished veal.

Notes: VFO releases updated graphs quarterly on their website here:
https://vealfarmers.ca/market-information/

Find weekly market report information compiled by VFO here:
https://vealfarmers.ca/market-information/weekly-market-report-archives/

While the format of COP budgets can vary, they typically include the following:

- **Revenue**: the gross revenue from crop and livestock sales before any costs have been deducted
- **Direct Variable Costs**: input costs to produce a specific commodity, which change depending on the level of production (e.g., dairy and dairy-cross calf purchases, feed, veterinary costs, seed, fertilizer, and pesticides)
- **Indirect Variable Costs**: costs used in producing all commodities on the farm (e.g., fuel, labour, and utilities). These also change depending on the level of production but not in direct relationship with production
- **Fixed Costs**: costs that remain the same regardless of the level of production (e.g., property taxes, fire insurance, term interest, and depreciation)
- **Net Farm Income (Profit Margin)**: revenue minus all variable and fixed costs

As you move down this list the costs become more individual; everyone is purchasing and feeding veal cattle and has a health program in place, so those tend to be more consistent across farms. But things like your hired labour can depend on how much you do yourself or how many family members are involved; building and machinery investment are unique to you; and debt commitments will differ farm-to-farm based on the stage of your farm business and your attitudes towards debt.

Figure 2

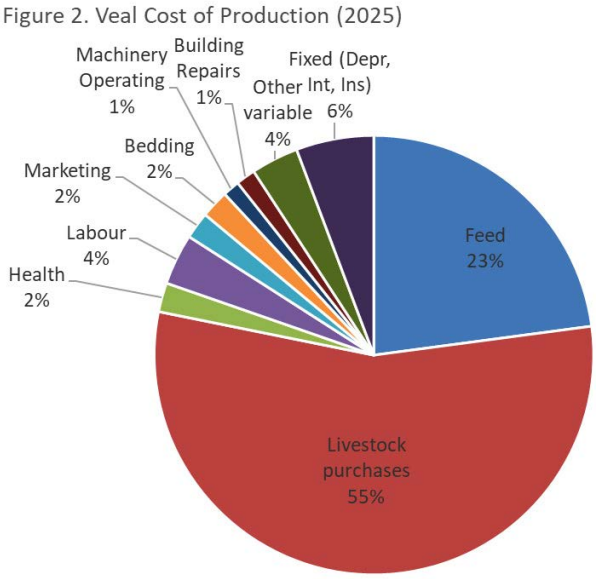


Figure 2 presents the breakdown of the costs of a typical veal operation. With the costs broken down you can identify those areas that impact your COP the most. Feed costs represent the second highest total cost, so it makes sense (and cents) to concentrate planning time on knowing your feed costs. Purchased feeds are straightforward, but how do you account for homegrown feed? Their costs will be spread across all the crop-related costs like seed, fertilizer, and fuel. If the farm also sells cash crops this further complicates the homegrown feed cost picture. There are one of two ways to handle homegrown feed costs; they can be valued at cost or at market value. Market value represents the opportunity cost of feeding the crops to livestock rather than what you would have received selling them. Regardless of the approach you use, having a good handle on feed costs is a good starting point in controlling your COP. You can move through your COP, looking at each cost to determine areas that you are strong in and areas that could be improved.

The COP tool developed is based on a typical veal operation with underlying assumptions on how the costs were determined. It is important to use these just as a guide in determining your own COP; replacing the sample numbers with your own numbers will be more meaningful and useful in making farm business decisions. The tool is available in Excel format (English or French).

Download the tool here: https://vealfarmers.ca/producer-information/veal-cost-of-production-tool/

Thank you to John Molenhuis, Business Management Specialist, OMAFA, for his contributions to this fact sheet.

For more information:

For more information on business and marketing, visit:

Risk Management Program for Ontario veal producers
https://www.agricorp.com/en-ca/Programs/RMP/Veal/Pages/Overview.aspx

AgriStability
https://www.agricorp.com/en-ca/Programs/AgriStability/Pages/Overview.aspx

Ontario Beef Cattle Financial Protection Program
https://www.agricorp.com/en-ca/Programs/OBCFPP/Pages/Overview.aspx

5-year holiday planner for producers
https://vealfarmers.ca/wp-content/uploads/2025/12/TheConnection-Winter-2025-5Year.pdf

Purchasing calves

The quality and health of calves upon arrival at the veal facility is a major factor in their subsequent health, need for treatment, growth performance, and carcass quality. All veal producers must have access to a copy of the Code and be familiar with and comply with the requirements in the Code. The following are points to consider when purchasing calves:

- Limit the number of sources for dairy and dairy-cross calves
  - Source calves from locations with the shortest journey
  - Calves cannot travel longer than 12 hours from the last feeding
- If purchasing directly from dairy farms:
  - Ensure the calf had four litres of colostrum within six hours of birth
  - All medication the calf has received, and outstanding withdrawal dates, should have been recorded and sent with the calf
- Calves should be nine days of age or older
  - It is recommended calves be at least 14 days of age before leaving the dairy farm
- Ensure calves do not have a fever
  - Normal calf temperature is 38.5°C (101.3° F)
- Evaluate calves for signs of dehydration
  - Ensure eyes are not sunken
  - Test skin elasticity
- Ensure calves have a dry, healed navel
  - An infected navel can cost around $40.00
  - Calves with unhealed navels are considered unfit for transportation
- Ensure calves do not have a sunken flank
  - Calves with a sunken flank have a four times greater risk of dying in the first 21 days
- Do not purchase calves with scours
  - Diarrhea could cost up to $150 in losses per case
- Ensure joints are not swollen
- Calves should be square and blocky
  - Look at the muzzle and back-end
  - This type of calf will develop a better finish than a lean, narrow calf
- Holstein is the preferred breed for veal
  - Should be at least 41 kg (90 lb)
- The calf can easily rise unassisted and appears alert and sturdy
- Hair coat is clean and shiny
- Ears are up and alert
- Breathing is steady and even
- Handle calves in a quiet manner, abusive handling is unacceptable
  - Do not use electric prods!

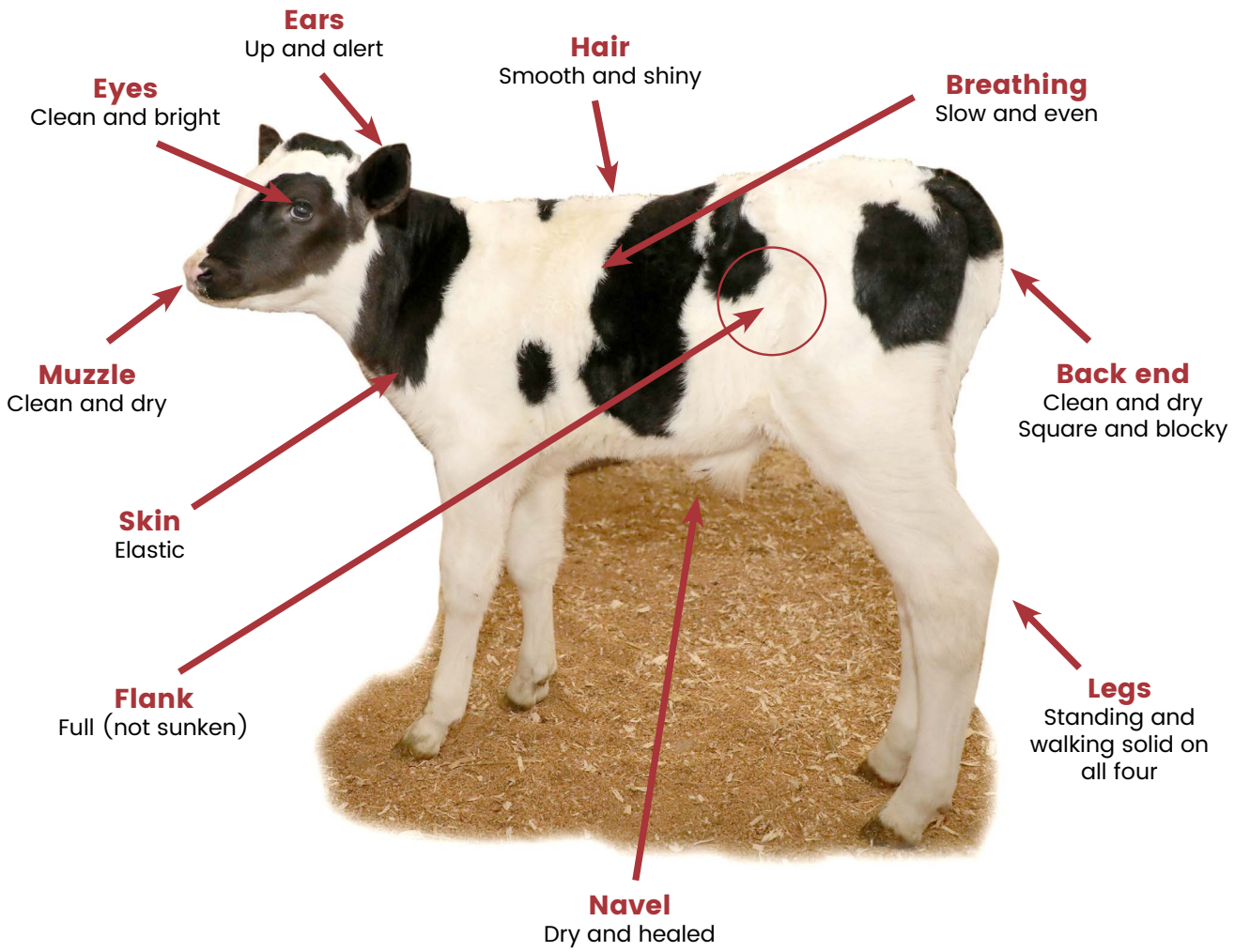
Purchasing calves... continued

- Always deal with a licensed dealer
  - An up-to-date list is available on
    https://www.agricorp.com/en-ca/Programs/OBCFPP/Pages/licensed-dealer-list.aspx
  - Have the licence fees been paid to VFO for the calf?
- For more detailed information on calf health, visit https://calfcare.ca

Purchasing calves is one of the most important parts of being a veal farmer. If the right calves are not purchased, there will be challenges that could last a long time and have a poor return on investment.

It is worth the extra time and cost to purchase healthy, strong calves, free of sickness. Once some diseases like *Salmonella* Dublin (S. Dublin) are introduced in the barn it will always be present.

NOTE: The only way for calf quality to improve is for veal producers to communicate with dairy farmers, sales barns, and dealers. Make is clear what is needed and refuse to buy if the calf does not meet those standards.



On arrival protocols

The first two weeks after arrival is a critical period for the health and welfare of calves. To reduce the risk of mortality and even sickness, it is important that protocols are established prior to calves arriving and everyone on the team follow them.

For the protocols to be encompassing they should be established with the help of the herd veterinarian. VFO has worked with Dr. Dave Renaud to establish protocol templates for veterinarians, available in the Veterinarian Portal on https://calfcare.ca.

The following is a guideline to consider when drafting an on-arrival protocol to set the calf up for success.

Cleaning and disinfecting

Cleaning and disinfecting facilities and feeding equipment will have a significant impact on the health and welfare of the calves, leading to improved performance and reduced antibiotic use. Protocols should include the following requirements:

The Code requirements

Cleaning and disinfection procedures for all facilities housing cattle must be developed and implemented
- Cleaning procedures for feeding and watering equipment must be developed and implemented
- Prior to calf arrival, milk-mixing and milk feeding equipment must be cleaned and disinfected

Ventilation

- Check the ventilation to ensure everything is in good repair and working order
- Adjust fans as required

Water

- Prior to arrival, ensure the water bowls are working and clean
- Water bowls/buckets must be cleaned daily to ensure calves have continuous access to fresh clean water
- After the initial milk feeding, offer water and electrolytes

Housing

- Calves housed in hutches and outdoor enclosures must not be tethered and calves in hutches must be able to access an area outside the hutch
- If housing calves individually, they must be grouped no later than eight weeks of age. Calves must be allowed to turn completely around without assistance, groom, adopt sternal and lateral (on their side with legs extended) resting postures, easily stand up and lie down, and have visual and physical contact with other cattle
- If housing calves in groups, cattle must be able to easily stand up and lie down, turn around, groom, adopt sternal and lateral resting postures, and rest on the enclosure floor at the same time

For a complete listing of requirements refer to the Code:
https://www.nfacc.ca/codes-of-practice/veal-cattle

Bedding and thermoregulation

Thermoregulation refers to an animal's ability to maintain its core body temperature without using extra energy. The range where this balance is achieved is known as the thermoneutral zone, and staying within it is essential for the comfort, health, and growth of calves. Flooring and bedding play a major role in helping calves conserve body heat, especially during colder months.

- Use bedding that matches seasonal needs to help calves stay warm in winter and cool in summer
- Check bedding quality by performing the "kneel test" or by using VFO's guide to nesting scores:
  https://calfcare.ca/management/a-producer-guide-to-evaluating-nesting-scores/

Handling

It can be overwhelming with the arrival of many calves at one time. It is important to remember that these are young animals, and care and patience must be taken when handling them. **There is a saying if you have five minutes to move calves it will take two hours. If you have two hours, it will take five minutes**. Ensure all team members have been trained on calf handling.

- Handle calves in a quiet manner, abusive handling is unacceptable
  - Do not use electric prods!

Arrival

- Whenever possible, newly received calves should be segregated from the general barn population
- It is recommended that compromised calves be identified, separated, and provided treatment if needed
- Where possible keep the new calves grouped together
- Ensure calves do not have a fever
  - Normal calf temperature is 38.5°C (101.3°F)
- Evaluate calves for signs of dehydration
  - Ensure eyes are not sunken
  - Test skin elasticity
- Ensure calves have a dry, healed navel
  - An infected navel can cost around $40.00
- Evaluate feces
  - Diarrhea could cost up to $150 in losses per case
- Administer any medications/vitamins in the neck unless otherwise recommended by the herd veterinarian. Follow label directions
- Health records regarding medications received or any broken needles should accompany the calf

Feeding

- Not knowing the history of the calves, the last feeding could have been the night before. They need energy and then rest
- Calves should be fed a milk ration on arrival, feed newest calves first

The success of a calf starts before it is purchased with high-quality colostrum that is given at birth, and then it is up to the care it receives when it arrives at the veal operation. Purchase good quality calves that are fed four litres of colostrum at birth and spend the time to ensure they get off to a good start.

"An ounce of prevention is worth a pound of cure."

Record-keeping

Keeping detailed records is an essential component of strong farm management, they form the basis for good decision-making. Records allow you to stay on top of production, feeding, and profitability. They also ensure you are meeting food safety and traceability requirements. When we think of farm business record-keeping, we often think of tracking and recording expenses, revenues, and other financial information. However, there is more data that Ontario grain-fed veal producers can be collecting, recording, and using to benefit their operations and help grow their businesses.

Keep in mind:

- Good record-keeping supports good decision-making
- Record-based decisions are only as good as the data used

Livestock production

All operations should have a visitors' log at the entry of the barn. In the event of a disease outbreak, trace in and out can be reviewed. This information could be invaluable.

The easiest way for producers to begin keeping records is by tracking the movement of calves on the farm. Use the calves' ear tag numbers – either a management tag or the DairyTrace tag – to identify each calf and information like:

- Source farm, auction, or dealer, recorded on the Incoming Veal Record
- The barn or pen they are housed in
- Date and destination of when they leave the farm, recorded on the Outgoing Veal Record

Store all your records in a labelled binder with one divider (one side for tracing-in, one side for tracing out). Records can be found at https://vealfarmers.ca/downloadable-resources/

Animal health

The Code and the Verified Veal Program (VVP) are very clear on the requirements regarding animal health and antimicrobial usage.

Downloadable copies of these records are available at

https://vealfarmers.ca/record-keeping-templates/

The Veal Treatment and History Record can be electronic or handwritten but should be readily accessible.

All records must be kept for two years. Before shipping any animals off the farm, check the records for the last time the animal was treated and what the meat withdrawal was.

Health and treatment records are important for disease prevention and detection, food safety, and consistency and continuity of treatment. Without records, producers tend to underestimate the incidence of disease on their farms. Research has also shown that producers who keep accurate and detailed health records achieve a lower incidence of disease. Health records can also be used to assess the health and welfare of individual animals and overall herd health status. For example, annual mortality is an important indicator of the general health of veal cattle. Mortality records are a Code requirement, and **mortalities (including reason for death or euthanasia, if known) must be recorded**.

Feed

Not only is feed one of the highest input costs, but it is also a key component of finishing veal. As part of the VVP, all incoming feed should be recorded, along with where it is stored. A feed sample should also be taken and stored for nine months after the date of sampling. In case of a feed event, there will be a detailed record of when the feed came in, the source, and if it was medicated. In addition, there is a medicated feed mixing record that is highly recommended to be filled out (if applicable). When mixing medicated feed on-farm, there should be a feed mixing protocol established.

Water

Water quality must be tested at least annually to ensure its suitability for cattle, and corrective action must be taken if an issue is identified. There is a Water Quality Record to keep track yearly of when the tests were completed, and any actions required. Writing this information down helps to monitor ongoing issues with water quality.

Pest control

Pest control is a requirement for all veal farms in Canada. Ongoing strategies to monitor and control pests and insects must be implemented. The Pest Control Record keeps track of date, company responsible (if applicable), method of application, and who is responsible. The simple act of writing this information down will help to keep the barn well-managed and prevent something like rodents from taking control.

Conclusion

Record-keeping may seem time-consuming, but in the event of an issue information will be needed, and these records become invaluable. Always keep the records stored in the same location and ensure that all staff and family members are aware of the record-keeping procedures. Records tell the story of your cattle and by ensuring records are kept up-to-date and accurate, you will gain a lot of insight into your farm. This will allow you to be prepared to make decisions quickly and accurately.

Remember you cannot manage what you do not measure!

Water

Water is one of the most important inputs into any livestock production system. Water is one the areas that crosses not only food safety, but welfare. The two main guidelines available for veal producers across Canada to follow are the VVP, Canada's veal on-farm food safety program and the Code.

Water quality must be tested annually however it is recommended to be tested at least in the spring and fall. Water can be tested through the local Public Health Unit for the presence of bacterial indicators of contamination such as *E. coli* and total coliforms.

Quality

Water quality is also affected by how often watering systems are cleaned and flushed. Feeding and watering equipment must be in good repair, functional, and maintained free of manure and mould.

Mandatory		
Parameter	Maximum levels	Significance for veal producers
Total coliforms	10 CT/100mL	Mostly harmless bacteria found in the digestive tract of people or animals. Indicates bacterial contamination of water.
Fecal coliforms	0 CF/100mL	Indicates level of manure contamination in water. Many strains are pathogenic. E.g., *E. coli*
Fecal streptococcus	0 SF/100mL	Bacteria typically found in the intestinal tract of people or animals. Many strains are pathogenic.
Nitrates	10 mg/L	May indicate contamination from chemical fertilizers, manure, or wastewater treatment.
Nitrites	0.1 mg/L	May indicate contamination from chemical fertilizers, manure, or wastewater treatment.
Recommended		
pH	6.5 to 8.5	Milk replacers dissolve best in neutral pH water—about 7.2. Water treatments need to be selected according to the pH of the water.
Iron	0.1 mg/L	Impacts carcass quality.
Copper	1.0 mg/L	Impacts carcass quality.
Total hardness	>200 mg/L	

Source

Water quality is impacted by the source of the water. Testing should be done whether it comes from a drilled well, a municipal source, or surface water. Drilled wells greater than 24 metres (80 feet) usually provide good quality water. Shallow dug or bored wells are more prone to ground water contamination and higher nitrate levels.

Municipal source water is usually tested for chemicals and bacteria by the municipality according to the provincial regulations.

Surface water is another viable water source option. However, when surface water from ponds, lakes and streams is used, water treatment is necessary to ensure high quality water is being given to cattle.

pH

Water with a high pH level (alkaline) impacts the effectiveness of chlorination as well as other disinfectants. It is also important to note that some water-soluble medications are also affected by a high-water pH causing them not to go into suspension. Similarly, water-soluble medications and some disinfectants in an acidic environment (low pH) have reduced effectiveness. Milk replacers dissolve the best in neutral pH of about 7.2.

Cattle requirements

Access to fresh clean water should always be available. A 180 kg (397 lb) calf will require 10 to 30 litres of water daily.

Water is the most important nutrient, and it is required in the greatest quantity of any nutrient. Water also plays an important role in the digestive process—cattle with an insufficient supply of water will limit their solid feed intake.

Daily water needs depend on many factors including age, diet, environmental temperature, and health status. Methods to ensure water availability during freezing temperatures include electrical heaters, non-freezing water bowls, nipple waterers, and frequent water feedings.

The Code water requirements are:

- Cattle must have daily access to clean water in quantities to maintain normal hydration and health, taking into consideration factors such as environmental temperature and diet
- Neither ice nor snow are suitable as a sole source of water
- Water quality must be tested at least annually to ensure its suitability for cattle, and corrective action must be taken if an issue is identified
- Feeding and watering equipment must be in good repair, functional, and maintained free of manure and mould

It is very important that water is safe and palatable not only for the animals but for the safety of family and employees. Water needs to be free of contamination and have appropriate levels of chemicals and minerals. If the results of your water quality test indicate contamination, you may wish to repeat the test. If the second test is positive you may wish to consult a water quality specialist at the Canadian Water Quality Association https://cwqa.com in order to determine the best way to the address water quality issues, especially if it is the same well for the house and barn.

Dehydration

Calf dehydration

Diarrhea is the single greatest cause of death in unweaned calves in Ontario, resulting from loss of fluids and complications from dehydration. Calves experiencing fluid loss from diarrhea will become dehydrated and develop varying degrees of metabolic acidosis, as their blood reaches a critically low pH.

Young calves have about five to 10 per cent more body fluid than adult animals. Calves are 75 per cent water by body weight and can lose close to 20 per cent body weight per day with diarrhea.

To maintain normal cellular functions, the average water intake rate is 40 to 60 millilitres of fluid per kilogram of body weight daily. The average 45 kg (100 lb) calf requires approximately 4.5 litres of water daily.

Calves subjected to heat stress or scours will require an additional 20 to 30 per cent daily water intake for maintenance of bodily functions.

Causes

The causes of diarrhea are often multifactorial but predominantly come from exposure to pathogens like various bacteria, viruses, protozoa, or parasites in the calf housing area or contaminated feeding equipment. Nutritional scours can be a result of either feeding too much or too little at one meal or caused by milk that is not properly mixed or digested.

You cannot differentiate whether diarrhea is nutritional or infectious based on its appearance.

Signs

When evaluating calves for signs of dehydration the following are common indicators. Calves will have one or all these symptoms. It is important to pay close attention to the youngest calves as they do not have the body reserves to combat dehydration. It is highly recommended before each feeding that calves are evaluated to assess dehydration.

Loose manure (may or may not have blood)	Attitude (dull or depressed)
Lethargy	Loss of appetite
Lack of suckle reflex	Weight loss
Reluctance to stand (does the calf need encouragement to get up or drink?)	Fast or very slow pulse
Sunken eyes	Cold ears and/or cold legs
Dry mouth and nose	Gum condition, sticky/tacky, light pink-pale

For more information on assessing dehydration levels in calves, including when to offer oral electrolytes and when to administer intravenous fluids or call your herd veterinarian, find the “Calf dehydration assessment chart” at
https://calfcare.ca/management/health-and-welfare/calfhood-diseases/scours/combating-dehydration/

Feeding

The best way to feed calves experiencing diarrhea is to offer alternate feedings of milk or milk replacer, and electrolytes. It may be necessary to reduce the size of each feeding, and offer smaller feedings with a nipple more often, to improve digestion.

When feedings are restricted for sick calves, the energy and protein required to fight disease is not available. Many calves will starve as they continually lose nutrients through diarrhea without calories being replaced.

Do not administer milk or milk replacer to calves via an esophageal feeder. This milk will enter the rumen causing further issues.

Do not add electrolytes to whole milk or milk replacer. This will increase the sodium content and increase osmolality.

Electrolytes

Navigating different oral electrolyte options, and when to offer them, can get a bit confusing. They are not created equally—each one boasts different benefits.

When a calf goes into metabolic acidosis due to dehydration, electrolytes must be given to raise blood pH. To hydrate the calf, offer an electrolyte with a sodium concentration between 90 and 130 mmol/L to facilitate water absorption. Electrolytes that are too low in sodium will not adequately restore hydration in the calf, and those with high levels may run the risk of sodium toxicity if free choice water is not available.

Always mix electrolytes according to label directions to keep the correct ratio.

To calculate the quantity of electrolytes to offer, multiply the weight of the calf by the per cent dehydration (which can be found on the “Calf dehydration assessment chart”)

https://calfcare.ca/management/health-and-welfare/calfhood-diseases/scours/combating-dehydration/ and then divide by two to get the litres of liquid needed. For example, if a 100 lb calf is eight per cent dehydrated (100 x 0.08) you would divide eight by two and that would equal four. That would be the number of litres needed per day in addition to normal milk feeding to correct the dehydration. (100 x 0.08) = 8/2= 4 litres.

During hot temperatures, these amounts would be increased significantly. Healthy calves under heat stress will drink between six and 12 litres of water daily just to maintain hydration. Administer oral electrolytes (either by bottle or tube) and alternate milk feedings in the same amount.

Osmolality

When a calf has diarrhea, fluid is pulled from the calf's blood stream into the intestine causing dehydration. The pH balance is disrupted with the losses of sodium and other minerals through the manure.

Osmosis is a process by which molecules pass through a semipermeable membrane, this is important for absorption of minerals and nutrients, as well as for gastrointestinal health.

Osmolality is defined as the concentration of a solution expressed as the total number of solute particles per kilogram. For milk replacer or electrolytes, it would be the total concentration of sugars, such as lactose and minerals like sodium and magnesium.

The ideal osmolality of milk replacer is close to whole milk 300 mOsm/kg. This is optimal for the absorption and digestion of nutrients by calves. If the osmolality of the milk replacer is greater than 500 mOsm/kg then the lactose content, the main contributor to the osmolality value, is too high. High levels of minerals and lactose tend to increase osmolality.

If osmosis is affected in the calf this could lead to a slowing of the emptying of the abomasum, leading to diarrhea in a mild case and abomasal bloat or even death in severe cases. Damage to the lining of the gut caused by severe diarrhea also impairs the calf's ability to absorb nutrients and leads to a "leaky gut". This leads to harmful pathogens leaking from the gut and entering the blood stream causing a host of issues.

Conclusion

Fluid therapy is critical when a calf has diarrhea. Restricting milk intake with diarrhea is **not** recommended. Milk or milk replacer will not make diarrhea worse (if the milk is of good quality). Early detection is key, and prevention is always the best way to avoid challenges.

To quote Albert Einstein,
"intellectuals solve problems, geniuses prevent them."

Starter

When calves are first introduced to solid feed it is referred to as “starter”. The form of the starter is personal preference, some have molasses added which calves love, but attracts a lot of flies. It can also clump in the summer with hot, humid weather, and freeze in the winter. Pellets are easier to feed but can be a challenge for young calves to get used to eating. The pellets can also crumble, making them unpalatable to the calf, so it is even more important to offer fresh calf starter daily.

The purpose of calf starter is to transition the calf from the milk-feeding period to the dry-feeding period. Calf starter is very important to healthy rumen development, good body growth, and successful weaning of the calf.

Calves should be offered small amounts of starter from day one in a shallow bucket to get the calves used to it. Start off with a handful and gradually increase that amount as the calf begins to consume all that is in the bucket. Calves will eat more if they can feel the bottom of the bucket. All buckets should be emptied and refreshed daily with clean feed. Keep calves on starter until they achieve 70 to 80 kg (155 to 175 lb) bodyweight, then gradually switch them to the corn and supplement over one to two weeks. When calves are consuming 1 kg (2 lb) of calf starter a day for three consecutive days, they can be fully weaned.

Calf starter must be palatable and nutritious. Do not use urea in starter feeds because the calf cannot digest it properly. Work with your nutritionist to ensure calves are receiving the energy, protein, minerals, and vitamins they need to meet current requirement standards.

Feeding veal cattle

Depending on the management program, by the time cattle go to market, each calf will have consumed approximately 750 kg (1,653.5 lb) of grain (mostly corn), 230 kg (507 lb) of supplement, 20 kg (44.1 lb) of roughage, 35 kg (77.2 lb) of milk replacer, and 25 kg (55.1 lb) of calf starter. Feed is the most expensive input into a veal business, but the cost of purchasing calves, veterinary bills, bedding, and overhead expenses will also add up. Be sure to include these costs in your business plan and use the COP tool to determine if your business will be profitable.

Bedding

A calf is born with only two to four per cent body fat. The thermoneutral zone of a calf, from birth until four weeks of age, is between 10 and 25°C (50 to 77°F) and from four weeks to weaning, it increases to 0 to 25°C (32 to 77°F).

Thermoneutral zone

This range reflects the temperature where calves do not need any additional energy to maintain their body temperature. This means that if outside temperatures fall below this range then calves need extra nutrition to keep warm and healthy. Think of this as when the calf is most comfortable and in a positive energy state.

Bedding

Calves should be bedded with straw during the colder days when the temperature is below the thermoneutral zone. Straw provides the insulation required to maintain body temperature. Straw is the warmest bedding type.

Straw is absorbent, so it is important to add fresh bedding regularly with caution around adding large amounts of straw at once. Smaller, frequent amounts help with dryness and keeping the top layer from becoming compacted.

Straw bedding provides warmth for young calves and should be used in both indoor and outdoor housing.

During the heat of summer, shavings are acceptable provided it is warmer than 10°C (50°F).

The kneel test

If the bedding looks dry on top, but you're not sure what's underneath, do the kneel test. That means kneeling in the bedding for 20 seconds – if your knees have any moisture after, that indicates the bedding is too wet and another layer of bedding should be added.

Comfort

Wet bedding and cold temperatures can challenge the calf's immune system, causing stress, burning body fat, lowering growth rates, compromising the immune system, and making them more susceptible to disease and even death.

In the cold winter months, bedding is invaluable to ensure calves are using the milk and feed they consume for growth instead of trying to keep warm. Dry, plentiful bedding is just as important in the spring and fall, when the weather fluctuates, and overnight temperatures can still be cold.

When calves spend the bulk of their day, up to 20 hours or 80 per cent of their time, lying down, research suggests that these are indicators of calf comfort and that they are content in their environment, indicating good welfare.

Nesting

Deep straw bedding has been shown to minimize three of the biggest winter calf care challenges: scours, respiratory disease, and reduced growth. How much straw is required will depend on the time of year, if they are housed indoors or outdoors, and whether or not the animals are wearing calf coats.

When providing straw bedding, make sure it is at least eight cm (about three in) deep, and it is clean and dry. That's because calves will actively work to avoid wet bedding if they have the choice.

Straw should be bedded deep enough that the calf can nestle in. This traps warm air around the calf, which will help maintain body heat. For the winter months, straw should be deep enough that when the calf is lying down its legs are generally not visible.

Nesting scores

The University of Wisconsin-Madison has developed a nesting score system to help guide producers in their calf bedding management. Nesting scores should be evaluated when the calf is lying down.

> **Nesting score 1**: the bedding doesn't cover any part of a calf's foot or leg when the animal is lying down. This score is not appropriate for winter but is observed in the summer when calves are bedded with sand or wood shavings.
>
> **Nesting score 2**: the calf is nestled slightly, with the lower leg partially covered by bedding and part of the upper leg remaining visible. In winter, this score would only be appropriate if the calf is also wearing a calf jacket, which increases the nesting score by one. Without the jacket, there is not enough bedding for the calf to nest in and stay sufficiently warm.
>
> **Nesting score 3**: the calf's legs are not visible when it is lying down in the straw. The straw is deep enough to allow the calf to nest, trapping warm air around its body. The ideal depth is 7.6 to 10 cm (three to four in) of shavings, topped with 30 cm (12 in) of straw.

Good bedding and plenty of it is the most economical way to keep calves healthy. Preventing or minimizing illness means avoiding costly treatments and other losses down the road.

Download a copy of *A Producer Guide to Evaluating Nesting Scores* here:

https://calfcare.ca/management/a-producer-guide-to-evaluating-nesting-scores/

Keeping veal cattle clean

Importance of cleanliness in veal cattle

At certain times of the year, it is hard to keep veal cattle clean, however clean cattle are key to food safety, meaning a dirty animal could pose a risk to human health.

As recommended by the VVP, "75 per cent of calves on-farm must have no more than 30 per cent of their abdomen covered in manure." It is good to verify with the packer if shipping direct, there may be additional requirements outlined by the plant. Manure embedded in the animal's coat increases the risk of bacterial contamination of the carcass at harvest and poses a food safety risk.

As farmers, it is our responsibility to produce safe food, and this starts with managing your veal cattle and barns in a way that minimizes manure tags.

Escherichia coli (*E. coli*) 0157:H7

Shiga toxin-producing *Escherichia coli* (*E. coli*), or STEC for short, causes human foodborne illness which can range from mild diarrhea to very severe and life-threatening conditions, even death. There are several STEC strains frequently associated with human illness in North America; the most common is *E. coli* O157:H7.

STEC live within the gut of cattle without causing them illness and are therefore also present in manure and on hides. Throughout processing, if a carcass is contaminated with STEC, it is possible for contaminated meat to enter the food chain and potentially infect consumers.

Meat contaminated with *E. coli* O157:H7 may not look, or smell spoiled but can still make people sick. This pathogen is dangerous to humans, especially those with an immature or weakened immune system, because it produces a toxin that can cause severe illness and even death. Cattle are the primary source *E. coli* O157:H7. Contamination of carcasses with *E. coli* O157:H7 occurs during harvest and dressing procedures, especially de-hiding and evisceration.

Mud and manure caked on cattle is not healthy for them nor for the consumer. Incoming cattle with visible mud or contamination on the hide may have high levels of *E. coli* O157:H7, therefore it is extremely important that veal cattle received at the abattoir are as clean as possible.

To reduce the likelihood of contamination during the dressing and evisceration process, abattoir operators may implement a "mud/dust scoring system" that will help them to identify problem animals at receiving and allow for adjustment to the harvest process to minimize or prevent contamination.

It is important to work with the abattoir on pre-slaughter management practices aimed at reducing the *E. coli* O157 load. Cleanliness of cattle presented for harvest contributes to the production of safe meat, minimizes the risk to human health, improves the shelf life of the meat, increases consumer confidence, and protects industry's reputation and investment.

Product recalls, triggered by suspected contamination of *E. coli* O157:H7, can cost the industry millions of dollars. These recalls are expensive to packers, processors, and retailers, and costs are inevitably passed on to producers. In addition to direct costs, it is estimated that any food safety incident, whether real or perceived, that causes concern in consumers results in reduced prices and lost sales for three to six months or longer.

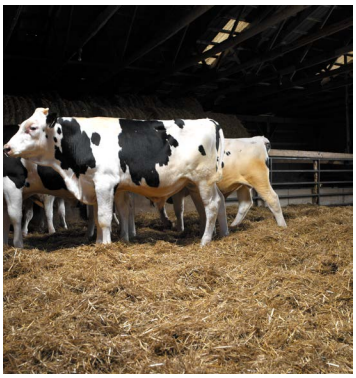
Prevention

Factors influencing how much STEC is carried by veal cattle include: farm management practices, season of the year, whether cattle come from a farm or feedlot, age, fasting or temporary change of ration prior to processing, cleanliness of hides, and transport and handling conditions between farm and processing.

Basic recommended principles or best practices of cattle management to reduce spread of STEC during the production cycle include:

- Keep veal cattle bedded (adjust your bedding needs accordingly to prevent animals from lying in manure)
- Providing clean water, clean feed, and a clean environment that is appropriately drained
- Avoid overcrowding to control hide cleanliness
- Ensure there is an efficient manure removal system, poor systems can create situations where STEC will persist in the herd and spread to younger animals
- Implementing biosecurity management practices to prevent the movement of disease-causing agents on to, and off-farm
- Do not mix other livestock with veal cattle, i.e., sheep and deer are known to be carriers of STEC
- Implement a good rodent control program
- Maintain clean clothes and equipment for farm and feedlot personnel to help reduce the opportunities to transmit STEC between herds or between cattle on the same farm
- Reducing feed volume prior to transportation can help reduce hide contamination that often occurs during transit and holding by reducing gut contents
- Transporting animals in clean trailers and housing them in pens that are well-bedded will decrease the amount of mud, manure, contaminated bedding, and other materials present on hides that increases the risks of carcass contamination during dressing

Tag scoring system



Below is a tag scoring system that was developed by Ramsey & Allen, 1975. This system is still used today. Take the time before shipping your cattle to score them. How do they compare?

1 = no tag, clean hide (0)

2 = small lumps of mud on hide in limited areas of the legs and underbelly (5.7)

3 = small and large lumps of mud in large areas of the legs, side, and underbelly (12.8)

4 = small and large lumps of mud in even larger areas along the hindquarter, stomach, and front shoulder (NA)

5 = lumps of manure on hide continuously on the underbelly and side of the animal from front to rear (23.2)

() is pounds (lb) of mud on animal

Conclusion

Keep in mind when marketing your veal cattle that this is a food product, and you want to ensure you have taken every precaution to ensure food safety. There is no single activity that will control all pathogens in the entire meat production process, but rather a multiple step approach that includes each step from farm-level through transportation and processing. Food producers need to recognize that applying effective controls at all levels are the most effective means to producing safe food and safeguarding the industry.

Feed ratios

Protein requirements

It is difficult to meet the protein requirements of cattle between 90.7 and 136 kg (200 and 300 lb) because it is a challenge to balance consumption and nutrient requirements. That is why cattle often seem to stall during this period. As the calf grows, the protein to energy ratio lowers. Protein helps the calf grow and energy builds muscle, so maintaining the correct ration is vital. If the protein level is too high, the calf's body will use up energy to convert it to nitrate and eventually excrete it out, causing growth to stall.

Feeding ratios

General recommendations state that the calves should be moved up through the ratios based on their age: a 3:1 mix fed at three months of age; 4:1 at four months; 5:1 at five months to finish. This practice is almost universally adopted among Ontario producers.

It is important to build a strong framework of bone and muscle early on for cattle to pack gain onto later in life. As a calf grows, its need for protein slowly decreases while its energy requirements increase.

Calculating protein concentrations

Using a 36% protein pellet and corn at 7.5% protein, it is possible to calculate the final protein concentrations of the first and final mixes that will be fed to veal cattle throughout the course of their lifetime using the following method:

- A 2:1 mix contains 2 parts corn and 1 part supplement, out of a total of 3 parts to make up a mix. Taking these values and using the protein percentages above, we calculate:

$$((2 \div 3) \times 7.5\%) + ((1 \div 3) \times 36\%) = 17\%$$

- A 5:1 mix contains 5 parts corn and 1 part supplement, out of a total of 6 parts to make up a mix. Taking these values and using the protein percentages above, we calculate:

$$((5 \div 6) \times 7.5\%) + ((1 \div 6) \times 36\%) = 12.3\%$$

As per the calculations above, we can see that a 2:1 mix contains about 17% protein, while a 5:1 mix contains 12%.

An animal's weight gain is comprised of both protein and fat, and the composition of this gain is more in favour of protein early on in a calf's life. When high energy diets are fed too early, they will deposit more fat than protein. A slow and steady progression from a ration of 17% protein to one of 12% helps to prevent the oversupply of energy and maintain enough protein in the diet for the animal to continue to grow in frame as well as finish.

Fibre

Fibre helps to buffer the rumen and prevent acidosis, a condition that can lead to significant health complications and increased costs. By stimulating chewing and rumination to break down the less digestible fibre particles, the animal creates more saliva, which is then swallowed back into the rumen. Saliva is a natural buffer which counters acidity in the rumen and maintains a healthier rumen pH, thereby preventing acidosis.

For more information:

Feeding fibre (page 50 of this document)

Acidosis (page 43 of this document)

Veal cattle feeding guidelines

Veal Cattle Feeding Guidelines				
Age of calf	**Corn**	**Supplement**	**Straw**	**Mix Ration & Protein %**
Birth to 2 months of age	Follow milk or milk replacer and calf starter feeding guidelines from feed manufacturer(s)			
2 to 3 months	61.1 kg	30.5 kg	1.9 kg	2:1 - 17% protein
3 to 4 months	91.2 kg	30.4 kg	2.5 kg	3:1 - 14.5% protein
4 to 5 months	121.9 kg	30.5 kg	3.1 kg	4:1 - 13% protein
5 to 6 months	151.9 kg	30.4 kg	3.7 kg	5:1 - 12% protein
6 to 7 months	176.6 kg	35.3 kg	4.3 kg	5:1 - 12% protein
7 months to finish	202 kg	40.4 kg	5 kg	5:1 - 12% protein
Total amounts fed	805 kg	198 kg	20 kg	

- Target final veal finishing body weight used for calculations was 341 kg (750 lb)
- Supplement recommendations and protein statements are based on generic 36% protein pellet
- Amounts provided are approximations, and are values for a one-month time frame for one (1) animal based on an average dry matter intake (DMI) of 2.5% bodyweight
- Timeframe and bodyweights are used for DMI calculations based on approximate average daily gain of 2.6 lb per day, targeting a finish by 8 months of age
- Straw inclusion is 2% of total mixed ration
- You should always consult with a professional nutritionist before making changes to your feeding program

Thank you to Holly McGill, Ruminant Nutritionist, for her contributions to this fact sheet.

Pellet quality

There are important management practices to remember when handling protein supplement (or concentrate, the two terms are interchangeable) pellets. Pellets are processed to have a hard surface, so they do not break down and create fines. Fines could include important minerals that the animals need and can cause acidosis. Even with a hardener added to the pellet, the ends are soft and fragile; excessive handling (auguring, mixing, and distribution) and surrounding moisture can contribute to pellet damage.

An area to pay attention to is moisture migration from the corn to the pellet. Moisture from corn at 15 per cent will travel to the pellet, which may be at five per cent. This may result, over time, in softened pellets which will produce fines.

There are many ways to mix, distribute, and store prepared feed on the farm. It is not recommended to make feed too far in advance because of the moisture in the corn. Ideally, a mixed ration should be prepared and fed daily so that feed quality is at its highest. The corn and supplement should be evenly distributed throughout the ration for a consistent feed. This will help with pen uniformity of the cattle.

It is equally important to ensure that the supplement being fed is good quality, with an optimal nutrient supply. Additional pellet options include urea and/or additional fat.

As an added precaution, check your supplement storage bins for potential water leakage. Protection from the elements is very important to maintain the quality of your feed and prevent mould growth.

Mycotoxins

Mycotoxins are toxic compounds produced by certain types of fungi that can contaminate crops like corn. Common mycotoxins include aflatoxin, deoxynivalenol (DON or vomitoxin), and fumonisin. These toxins can have serious health effects on livestock, including reduced feed intake, poor growth, and immune suppression.

Mycotoxin research in veal production

In the late 2000's, the legacy association the Ontario Veal Association (OVA) commissioned a study on the effects of DON on veal cattle growth, health, and carcass quality at levels of nine ppm (mg/kg) DON. The study found that veal cattle can handle diets with up to 10.27 ppm (mg/kg) DON without adverse effects. In fact, those on DON-contaminated diets showed similar dry matter intake (DMI) and even tended to have better ADG and improved feed efficiency compared to those on uncontaminated diets. Final body weights and total weight gain were comparable between the two groups, and no differences were observed in carcass traits.

This study suggests that veal cattle can tolerate moderate amounts of DON in their diet. However, the authors emphasized the need for further research to confirm these results, examine potential meat residues, and explore the effects of varying DON levels.

It's important to note that there are limited studies on this topic, particularly in grain-fed veal production. The concentrations and combinations of mycotoxins in real-world scenarios may differ from those tested in research settings. Therefore, it's challenging to predict with certainty how contaminated corn might impact your veal cattle, and caution is always warranted.

Signs of a problem

- **Off-feed behaviour:** The first sign of a problem will be cattle going off-feed. If this happens, work with both your herd veterinarian and your nutritionist, and consider DON levels as a potential cause
- **Quick action:** Identifying the problem and quickly adjusting the diet is key to minimizing lost growth

Expert insights

James Byrne, Beef Cattle Specialist, OMAFA:

- **Resistance to DON:** Beef cattle are very resistant to DON, unlike other species such as pigs
- **CFIA guidelines:** The CFIA sets a maximum DON level in the total diet of five ppm for beef cattle four months and older, and DON-infected grains should not exceed 50 per cent of the diet
- **FDA guidelines:** The United States Food and Drug Administration sets this level at 10 ppm of the total diet
- **Forage feeding:** Feeding forages significantly reduces the concentration of DON in the total diet

Research findings

BCRC report:

- **Tolerance levels**: Growing-finishing cattle can tolerate much higher levels of DON in their diet without going off-feed
- **University of Minnesota trial**: Steers were fed rations containing up to 18 ppm DON of the total diet through the finishing phase with no effect on gain, feed intake, or feed efficiency
- **North Dakota State University trial**: Cattle were fed up to nine ppm DON during the growing phase and up to 12 ppm during the finishing phase with no effects on performance

Practical advice for veal producers

Monitoring:

- **Close monitoring**: Pay close attention to veal cattle being fed questionable corn as there is always a risk
- **Backup plan**: Have a backup plan in place in case the cattle cannot handle corn with high levels of DON and experience a setback
- **Nutritionist consultation**: Work closely with a nutritionist to ensure diets are designed with DON levels in mind

Mitigation strategies:

- **Blending grains**: Blend contaminated grains with clean grains to dilute the mycotoxin concentration to within acceptable limits
- **Toxin binders**: Add approved ingredients, such as anti-caking agents or yeast products, to bind toxins

Calves under four months:

- **Low risk**: Calves less than four months are unlikely to be affected by DON as their grain intake as a percentage of total diet is typically small

Are there human health effects?

Handling mouldy feed:

- **Respiratory risks:** Mouldy feed can have negative human health effects (respiratory disease) when spores are inhaled during harvesting, handling, feeding, or working around mouldy feed
- **Symptoms:** Symptoms of exposure can include burning eyes, throat, and chest, as well as an irritating cough and fever
- **Health monitoring:** Be aware of changes in health of yourself and others in your operation and seek medical advice if needed. Inform your doctor that you have worked with potentially contaminated feed

Conclusion

By following these guidelines, veal producers can effectively manage the risks associated with feeding corn contaminated with mycotoxins, ensuring the health and well-being of their cattle and themselves.

Further reading

- Corn mycotoxin research trial completed
  https://files.constantcontact.com/c48ae1af001/ef859a14-93e8-4f99-ad52-028f90580fe3.pdf
- Effects of feeding corn naturally contaminated with mycotoxins to grain-fed veal
  https://files.constantcontact.com/c48ae1af001/c69c311e-52c4-486e-b232-ba84ba0fc635.pdf
- Sampling feed to test for mycotoxins https://www.ontario.ca/page/sampling-feed-test-mycotoxins
- Mycotoxin levels and interpretation https://www.ontario.ca/page/mycotoxin-levels-and-interpretation

Balance

Raising calves for veal production is all about balance. Balancing the good and the bad bacteria, keeping the bad in check and encouraging growth of the good. Balancing the immune system of the calf and the disease challenge, keeping calves healthy with optimal performance.

This concept of balancing bacteria may seem simple but why is it so difficult? Keeping the scales tipped in favour of the calf can easily be tipped in the wrong direction by not keeping the feeding utensils and bedding clean.

The struggle of proper hygiene is real, and this is not the first time there has been a struggle with hygiene.

In 1847, Hungarian doctor Dr. Ignaz Semmelweis implemented a protocol of mandatory handwashing for doctors at the Vienna General Hospital to reduce the number of babies dying. Much to the surprise of many it worked, however people were still sceptical. Dr. Semmelweis went on to publish papers and a book about the importance of handwashing and still his peers would not accept that handwashing made a difference. It took until the 1980s for handwashing to be fully accepted as a method of stopping the spread of disease.

We can relate this back to the simple task of washing calf buckets and bottles in the calf nursery. For some, maybe they are not convinced it works. It is hard to accept things you cannot see, and bacteria are one of them. The simple task of washing feeding pails and bottles with hot water and a 10 per cent bleach solution can reduce many problems with calves. There have been many papers and books published on the topic, yet many farms do not consistently perform the simple task.

If labour is the issue, will skipping washing the buckets and bottles really save you time? Not taking the time to wash them may seem like it is saving time but in the long run it is costing you time and money to care for the sick calves and lost production, affecting the bottom line.

In addition to washing the feeding tools, it is equally important to keep the bedding clean and dry. This will keep the bad bacteria low and not encourage growth. If in doubt whether the bedding is clean enough, try the kneel test. How clean are your knees?

All too often we forget calves are babies with a naïve immune system. It is our job to keep them alive and help them thrive. If we keep it simple, clean and disinfect the feeding utensils after each use, and keep calves well-bedded and dry, we will be on the right track to healthy productive calves.

If you are looking to take cleanliness one step further, find helpful information for washing feeding utensils here: https://calfcare.ca/wp-content/uploads/2020/11/Producers-should-follow-protocols-for-cleaning-Milk-Producer-December-2019.pdf

Conclusion

Work with what you have and make the best of it – keeping the balance really comes down to a few simple points: clean and dry.

There is a quote that summarizes this point,
"One who maintains cleanliness, keeps away diseases."

Mixing feed

Proper mixing of the feed is important. The correct balance of ingredients entering the gut initiates good digestion and use of nutrients. A well-mixed uniform ration will enhance performance and improve animal health.

It is advisable to start with large volume ingredients than add according to particle size, ending with the smaller-volume ingredients.

Mixers vary in efficiency and mixing time with different feed formulas. It is recommended to avoid under- or over-mixing and best to review the mixer's calibrations to become familiar with its operations.

Mixer efficiency is affected by many factors, including the type of mixer, wear and maintenance, feed build-up in the mixer or on the blades, and the size of the batch you are mixing. Research shows the optimal mixing time can only be determined by testing the mixer. Also, some mixers will not mix well regardless of how long you run them.

It is good practice to determine optimal mixing time by conducting a mixer efficiency test. This should be performed at least twice a year and any time the mixer is adjusted, new parts are installed (ribbons, screws, or paddles) or procedural changes are made.

Mixer efficiency tests involve analyzing 10 sequenced samples from the mixer per mixing time at equal intervals between initial and final discharge. The feed formula used, and the ingredient or nutrient tested (such as a drug or salt) should be appropriate for the test.

Mixing medicated feed

Extreme caution must be taken when mixing medication into feed. It is highly recommended a mixer performance test be completed before making medicated feed batches to ensure the mixer is working optimally to evenly distribute the medication. Always have a prescription from your herd veterinarian for the medication you are mixing and be familiar with the dosage and inclusion rate (grams or kgs per tonne).

Verified Veal Program

The Canadian on-farm food safety program for veal has requirements and a protocol for mixing medicated feed.

- All equipment dedicated to the handling and distribution of feed for grain-fed veal must be visually inspected weekly to ensure equipment is free of organic material build-up
- Feed mixers and distribution equipment in veal operations may not be used for mixing feed for other species
- When medicated feed with a withdrawal period is mixed on-farm, the **Grain-fed Medicated Feed Mixing and Distribution Protocol** must be followed to avoid hazards such as the wrong animal health product being used, the wrong dosage administered, and the medicated feed being given to the wrong group of animals
- Sequencing, flushing, and cleaning procedures must be followed to prevent residues in the next batch of feed

Bunk management

A lot of interaction occurs around the feed bunk or trough. Dominant cattle control the feed space and timid ones hang back, darting in for a quick gulp of feed when they can. One of the keys to proper digestion is calm eating. Ideally, cattle need quiet time to feed, chew, and swallow. Overcrowding causes the cattle to eat protectively, which means sneaking to the bunk and eating fast. These cattle eat less regularly and don't chew. Limited bunk space invites pushing and shoving. Running out of feed encourages gorging when the bunk has been filled. If cattle are forced to gulp down the feed, they will not chew it properly and produce the necessary saliva, which can lead to bloating.

The Code requires that feed must be provided in ways that prevent competition resulting in injury or limited access to feed by some animals in the group.

Feeding strategies to improve health and welfare:

- Provide feed ad libitum
- Avoid long periods of fasting between feedings
- Offer fibrous feed (straw) to increase chewing
- Keep a consistent feeding schedule
- Clean and sanitize feed and water equipment

Some considerations for feeding ad libitum are 20 to 30 cm (eight to 12 in) of manger space per animal, which is most typical. In extreme cases, where all cattle try to eat at once, allow up to 55 cm (21 in) of bunk width per animal.

As a feed bunk guide there should be a maximum throat height that ranges from 35 cm (14 in) for a 100 kg (220 lb) animal to 45 cm (18 in) for a 300 kg (660 lb) animal. Adjustable neck rails will reduce feed wastage and accommodate animals of different sizes (Source: OMAFA fact sheet, 2006).

Bunk space is one of the most critical aspects to feeding cattle. All cattle in the pen should be able to eat at the same time. If that is not possible, then the group size should be reduced.

Feed quality

Feed should be properly stored to prevent spoiling, mould, or unpleasant odours. It is important that the feed is appealing to the cattle to keep them eating. Any feed that is 'off' will prevent the cattle from eating and create metabolic issues that are difficult to reverse.

Cleaning the bunk

Old feed should be cleaned out of the bunk once a day or more often if the feed gets wet. It is important that feed is fresh to prevent overeating when fresh feed arrives. Keeping the feed fresh also prevents contaminating the new feed with spoiled feed.

Fines are of particular concern in the bunk. Veal cattle consuming fines could increase the risk of acidosis. It's best to clean the fines out, and if there are a lot of fines, to check the pellet quality.

Filling the bunk

When entering the barn first thing in the morning there should be some feed remaining in the bunk. Avoiding an empty bunk should be an integral part of bunk management. There should be feed leftover, but not too much, causing waste.

Veal cattle are the most aggressive at eating in early morning – if the bunk is empty that is lost gain. An empty bunk may also encourage gorging when the feed arrives, causing metabolic issues. Having some feed in the bunk in the morning will help to gauge how much to increase or decrease the feed for the day by. If there is always feed in the bunk then they are being fed too much, causing wasted feed and costing money.

See *Figure 1: Scoring the feed bunk.*

Rumen health

To improve digestion and gut health, it is important to keep the fermentation in the gut active and to do that there needs to be a consistent supply of feed, specifically grain. Feeding veal cattle should be boring; the same feed should be delivered at the same time every day. This will improve health and ultimately profitability.

Water

Along with any good bunk management program should be a better water management program. It is a scientifically proven fact that the more fresh, clean water cattle have access to the more grain cattle will consume, resulting in a higher ADG. A waterer checklist in the barn is a good start to improve the cleanliness of the water bowls, especially if it has been identified as an area to improve.

Record-keeping

The most accurate method to track bunk management is to keep records. Recording things like feed not eaten, fines, overall manure appearance, and if the bunk is empty are good areas to begin assessing to get an overall idea of how bunk management is working. This will help in deciding if feed should be increased or decreased. It can also be used to track performance.

Scoring the feed bunk

A simple feed bunk scoring system was developed at South Dakota State University that may help if the cattle are not performing as expected.

Figure 1

Score	Description	
0	No feed remaining in the bunk.	If you have a bunk score of 0 three days in a row, then the cattle should be increased by 0.5 to 0.75 lb of dry matter.
0.5	Scattered feed remaining; most of the bottom of the bunk is exposed.	Less than 5% feed remaining.
1	Thin, uniform layer of feed remaining. About one kernel deep.	If you have a bunk score of 1 or higher, estimate the amount of feed left in the bunk and adjust the feed delivery accordingly.
2	25 to 50% feed remaining.	10% feed remaining.
3	>50% feed remaining. Crown of feed is thoroughly disturbed.	25% feed remaining (and less than 3 in depth of feed).
4	Feed is virtually untouched. Crown of feed is still noticeable.	50% feed remaining (and more than a 3 in depth of feed).
Goals		The goal is to see a bunk score of 0.5 one or two days a week.

Conclusion

Managing the feed bunk will lead to improved health and increased ADG, which results in more money on the bottom line. Buyers look for consistent finished veal cattle; this is achieved with a good feeding program that includes a well-managed bunk. As veal cattle like consistency, so do the consumers buying veal – they want the same eating experience every time. Take some time to observe and analyze your veal cattle and choose one area to improve and focus on that, you may be surprised on the return. Good bunk management can be worth an extra $10 to $20 at the end. Can you afford not to manage the bunk?

Bursitis

Best practices for veal cattle foot and leg health

The surfaces that veal cattle stand, walk, and lie on significantly impact their well-being.

Proper flooring and bedding choices influence animal comfort, movement, thermoregulation, and overall health.

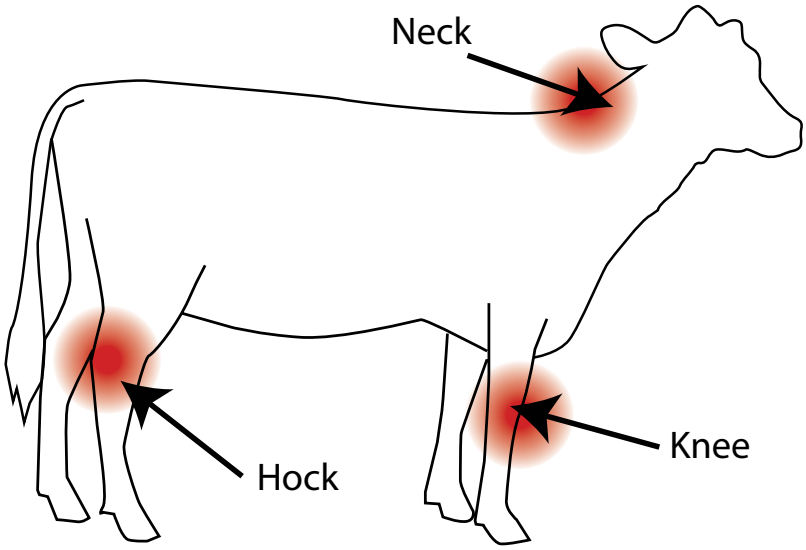
Maintaining healthy feet and legs in veal cattle is an integral part of proper care and management directly impacting productivity. Healthy cattle grow efficiently, resulting in better production outcomes. Following the requirements and recommended practices found in the Code can help to maintain optimal growth rates and reduces losses due to lameness or other health issues.

Different flooring types significantly impact the well-being of veal cattle. A requirement of flooring is that is must be designed and maintained to minimize slipping and injury.

To evaluate if the flooring type is working in the barn, animals should be evaluated for bursitis at the time of shipping to calculate the overall foot and leg health of the group.

Bursitis

Bursitis is an inflammatory reaction within a bursa. A bursa is a closed, fluid-filled sac that works as a cushion and gliding surface to reduce friction between tissues of the body. The main area observed when assessing bursitis in veal cattle is the hock, the joint on the back leg of a bovine.



Bursitis is generally characterized by swelling, local heat, and pain on palpation (to touch the area). Research suggests that veal cattle have more bursitis and carpal joint swelling on hard flooring (concrete slats, perforated concrete) than on soft flooring (rubber slots, slats with rubber cover, or perforated rubber mats). In one epidemiological study on young veal cattle, a higher risk for bursitis was reported for calves on wooden slats (1.5 times higher) and on concrete (four times higher) compared to straw or rubber at two weeks before harvest.

The research also states that a space allowance of less than 1.8 m^2 (19.4 square feet) per animal is associated with a higher prevalence of bursitis.

Monitoring bursitis

As finished veal cattle are being loaded on trucks, special attention should be paid to the hocks. A requirement in the Code is that corrective action is necessary if the number of animals with bursitis exceeds 15 per cent in three consecutive cycles before shipping.

When doing daily pen checks keep an eye on veal cattle for injuries related to flooring or facility design (e.g., hairless patches, lameness, knee and hock swelling) for early detection.

Improving rates of bursitis

Below are a few best management practices to consider when improving the rates of bursitis.

- Choose non-slip but not overly abrasive flooring types
- Avoid bare concrete slatted flooring; provide softer options with good drainage (e.g., rubber-coated flooring, perforated rubber mats, or access to bedded areas)
- Aim for less than 10 per cent bursitis prevalence in finished veal
- Ensure solid flooring slopes appropriately for effective drainage
- Have a section of the pen that provides a bedded area for cattle

By following these practices, veal producers can promote optimal foot and leg health, ensuring the well-being of their animals. The choices made regarding flooring directly influence animal comfort. Proper management practices, as outlined in the Code, provide a framework for maintaining optimal conditions.

Conclusion

Implementing these best practices not only enhances the welfare of veal cattle but also contributes to better growth rates and reduces the incidence of lameness and other health-related losses. Regular inspections, appropriate corrective actions, and consistent adherence to recommended guidelines ensure a high standard of care.

By prioritizing the well-being of veal cattle through proper flooring and bedding management, veal producers can achieve sustainable and efficient production, benefiting both the animals and the industry.

Feeding for finish

Feeding corn

Corn is by far the most common feed for veal cattle. However, the type of corn used is key to ensuring lower feed costs and improved ADG.

As shown in the table below, whole kernel corn produces the lowest feed to gain ratio (this is an indicator of how efficiently an animal converts feed into body mass). A uniformly larger whole corn kernel works best. This requires cattle to learn to chew the grain before swallowing. This increases saliva production which can help prevent acidosis.

Processing Method	DMI (lb)	ADG (lb)	Feed/Gain (lb)
Whole	19.22	3.19	6.07
Dry Rolled	21.00	3.15	6.68
High Moisture	19.91	3.04	6.69
Steam Rolled	18.21	3.13	5.82

Owens, F. et al. 1995, Oklahoma State University

Cattle fed other grains, or combinations of grain, will not attain the desired finish at the required weight. Good-quality corn, which is air dried and free from fines, is best. Try to secure enough to take cattle up to finishing weights without having to change to different batches of corn. High moisture corn (HMC) can be fed, but caution is required. It should be fed daily because it will spoil quickly. Also, the starch in the HMC breaks down more quickly than in dry corn, which could lead to acidosis and possible bloating.

Protein supplements

The ration should always include a high-quality protein supplement. Least cost formulas mean cheap ingredients and should be avoided if you want to market consistent, well-finished cattle.

Typical supplements range from 32 to 40 per cent protein. Protein quality is critical for a young calf, because of its age and diet, and limited rumen capacity. Rations containing natural protein ingredients with a high by-pass value produce the best performance.

Most feeding programs involve offering a constant amount of supplement mixed with the amount of corn (or other grain) that the cattle will consume daily. As cattle size and corn intake increase, the corn to supplement ratio gradually widens.

For more information on feeding ratios refer to page 28.

Although this is the more practical method, a higher rate of gain and better feed efficiency will be obtained when requirements are more specifically met by formulating rations based on actual cattle weights and desired performance.

Returning to the example, the crude protein (CP) percentage of a 100 per cent dry matter ration will typically be 18.5 per cent for a 90 kg (200 lb) animal. The equivalent corn to supplement ratio would be 2.5:1 when a 36 per cent supplement and dry shell corn are used. As fed, this ration would be about 16.5 per cent CP.

As the size of the veal cattle increases, the corn to supplement ratio typically widens to a max of 5:1, resulting in a ration that has 15 per cent dry matter CP, or 13 to 14 per cent on an as-fed basis, when a 36 per cent protein supplement and dry shell corn are used.

It may seem like a lot of supplement, but protein is what adds the finish on veal cattle. Reducing the quantity of protein supplement fed will cause the quality of the finished veal to suffer.

For further information consult with a feed company specializing in veal supplements for the optimal feeding program.

Feed additives and minerals

It is important to include ionophores (monensin) in the diet of grain-fed veal cattle. Monensin improves feed conversion by five per cent, but more importantly, decreases the occurrence of acidosis and bloat by reducing methane production in the gut.

Free choice ionized salt and minerals should be available at all times to help with any deficiencies in the diet.

Acidosis

What is acidosis?

Ruminal acidosis is a common metabolic disorder that has significant economic implications in the grain-fed veal industry. Feeding excessive amounts of rapidly fermentable carbohydrates to ruminants, in conjunction with inadequate fibre, can cause acidosis.

Why is it important?

If left untreated, acidosis could lead to rumenitis, laminitis, liver abscesses, reduced feed intake, sudden death syndrome, off-feed syndrome, and clostridial infections (Vermeire, 2012). All these conditions are affecting your bottom line; you cannot afford to overlook acidosis in your operation.

Symptoms to watch for:

- Depression/lethargy
- Off-feed
- Elevated heart rate
- Diarrhea
- Poor body condition
- Reduced growth/weight loss
- Elevated temperature
- Bloat
- Reduced rumen contractions
- Liver abscesses (at harvest or post-mortem)

Avoiding acidosis

Healthy and productive cattle have a ruminal pH of 6.5 to 7. If the ruminal pH changes too much (gets too low or too high), cattle begin to experience symptoms that impact health and reduce performance.

How?

Cattle have a specific balance of microbes living in their rumen. These microbes help cattle to break down feed and absorb nutrients. At any time, cattle have both 'good' and 'bad' microbes in the rumen. When ruminal conditions are ideal (at the right pH), the 'good' microbes thrive, and so do the cattle. However, when ruminal conditions change, the 'good' microbes become less effective or die, leaving room for the 'bad' microbes to grow.

When the pH of the rumen falls, 'bad' acid-producing microbes become more active, which makes the pH fall further, and rumen more acidic, in a harmful cycle.

If the rumen becomes too acidic (pH falls below 5.5), the rumen can stop moving. This reduces appetite as well as production – cattle that do not eat and digest cannot grow. When the rumen becomes very acidic, acid is absorbed out of the rumen and into the blood stream. This form of acidosis, metabolic acidosis, can cause shock and death.

Why does the rumen become acidic?

The rumen becomes more basic (pH increases) when cattle are deprived of feed. This change can harm 'good' rumen microbes. Some of these 'good' microbes are essential to helping cattle cope if the rumen becomes too acidic. So, if the rumen becomes basic and good microbes are harmed, once the rumen returns to normal, the 'bad' microbes can take over, creating a more acidic rumen. These shifts in pH are undesirable.

For example, an animal that was transported for several hours went without feed, and the rumen became more basic (pH increased). This harmed 'good' rumen microbes. When the animal gets off the trailer, it consumes a large meal of concentrates. This can cause the rumen to become more acidic, falling below the ideal range. Now the animal has an acidic (low pH) rumen and the microbes that would have helped them bring the pH back to normal were harmed when the animal was off feed. In this way, cycles of feed deprivation followed by overeating greatly increase the risk of acidosis.

Any other situation that causes cattle to eat large meals of concentrates, such as competition for bunk space, can also increase the risk of acidosis.

Controlling rumen pH

Feeding high-grain diets without access to fibre can also cause the rumen to become more acidic. Fibre in the diet can reduce the risk of acidosis. Fibre needs to be chewed and ruminated more than concentrates. This chewing and ruminating creates saliva, which is swallowed and ends up in the rumen. Saliva makes the pH of the rumen less acidic (this is called buffering).

Feed that is easier to digest, such as cracked corn, requires less chewing, leading to less saliva buffering, and a more acidic rumen. Including fibre in the diet provides other benefits, such as encouraging rumen development and rumination, and reducing abnormal behaviour. Reducing the risk of acidosis is another reason to consider providing forage to veal cattle.

Chewing is the key

There is a science behind the eating process and how it affects the metabolism. Chewing is the key to digestion. Cattle need to chew to produce saliva, which contains enzymes and bicarbonate that aid in digestion. Non-grain-fed cattle chew on hay or silage to produce saliva, whereas grain-fed cattle chew on corn. The corn that you feed must be whole-shelled corn without fines. Too many fines in the feed reduces chewing and therefore saliva production, which may result in bloat. Fines should be screened out and avoided.

When doing pen checks, check the manure to see the amount of corn in it. If you see a lot of whole corn in the manure, this means the animal has not chewed enough. To determine why the animal is not chewing enough, assess the pen for overcrowding, determine if the weight range of animals in the pen is too varied, or there is not enough bunk space available.

Like most metabolic disease, for every animal you identify, there are several more who are experiencing the disease but not showing symptoms.

Keep an eye on the manure of your herd. Any changes should be quickly addressed.

For more information, read these articles:

"Avoiding acidosis" https://calfcare.ca/management/feeding/avoiding-acidosis

Feeding fibre to young veal cattle https://vealfarmers.ca/wp-content/uploads/2020/12/TheConnection-Summer-Feeding-fibre-to-young-veal-cattle.pdf

Bloat

A variety of factors can contribute to bloating in cattle, including feed ingredients, feed temperature, changes in feed, dirty feeding equipment, the amount fed (gorging), feeding frequency, water availability, weather, fines, stress, and possibly pneumonia, although it is worth noting that any of these in themselves do not cause bloating.

Susceptibility to bloat is variable and genetics may play a role. Some cattle may be predisposed to the condition, with some of them becoming chronic bloaters. As the gut develops in the pre-weaned calf, bloat can affect either the abomasum (the last of the four stomach compartments) or rumen (the first of the four stomach compartments).

Abomasal bloat in the pre-ruminant calf often progresses rapidly and can be life-threatening. The rapid growth of organisms will result in the production of excessive quantities of gas that cannot escape the abomasum. This causes organs to become compressed and reduces blood flow, resulting in asphyxiation and heart failure. The abomasum may become distended within one hour of feeding and death can occur minutes later.

When adult cattle bloat, gas becomes trapped in the rumen. Often, passing a tube through the mouth into the rumen can release the gas and provide relief. However, when calves bloat, because gas is trapped in the abomasum, this means that tubing them will not help release the gas, as a tube cannot pass from the mouth through the entire stomach and into the abomasum. It is also ill-advised to insert a needle into the calf's side to release the gas, as this could cause stomach contents to leak into the calf's abdomen. This can lead to infection and sepsis (a bacterial infection in the bloodstream). Sepsis causes organ damage and inflammation throughout the body, which can kill the calf, sometimes very quickly. Work with your herd veterinarian to create a protocol for managing bloat in calves, which may include instructions to call your herd veterinarian immediately if you notice a calf with signs of bloat. Not all calves will respond to treatment and catching cases before they turn deadly can be a challenge. Preventing bloat is the best way to prevent calf loss.

The common factors contributing to abomasal bloat include over-feeding milk or drinking milk too fast, combined with the presence of fermenting bacteria. When excessive gas is produced, the pH of the abomasum becomes more acidic as the sugars are processed, and this results in deleterious effects on other bacteria. The result is an unbalanced gut condition that causes bloating.

Prevention

While there is no consensus on exactly what causes bloat, there are several management practices that can increase or decrease the risk of calf bloat. Here are a few tips to prevent bloat on your farm:

Milk and/or milk replacer fed consistently

The feeding amount, schedule, mixing, water temperature, and milk temperature at delivery (aim for 38°C (100.4°F)) should all be consistent each day. Weigh the powder using a scale (don't measure in a cup), and measure water carefully. Make changes gradually when required and be sure all staff is trained to feed consistently.

Milk replacer concentration

High osmotic concentration (ratio of solids in a liquid) in electrolyte products and milk replacers can cause bloat. Adding more milk replacer powder than directed by the label can lead to high osmotic concentrations. Always follow label directions unless otherwise directed by your herd veterinarian or nutritionist.

If looking to increase milk replacer offered to calves to improve growth or to help them thrive in winter, switch to a milk replacer formulation specifically designed for that purpose. Do not just increase the amount of conventional powder in the same volume of water, this will affect the concentration, leading to nutritional scours.

Feeding temperatures

Milk and milk replacer should always be fed at body temperature, 38°C (100.4°F). In winter, attention should be given to outside conditions. If calves are fed outside, milk and milk replacer will need to be prepared warmer than body temperature to adjust to cold temperatures. It is recommended to use a thermometer and check the milk temperature before feeding to ensure it is being fed at the correct temperature.

Offer water

The availability of fresh, clean water can reduce the risk of bloat.

Feed multiple times a day

A large, single daily feeding can upset calves' digestive tracts. Two feedings are better, but three or more smaller, consistent meals are best if this works with your operation's schedule. Automatic feeders are great for offering calves multiple meals without added labour.

Feed colostrum

Failure of passive transfer can increase the risk of bloat. See https://calfcare.ca for many articles on the importance and benefits of colostrum.

Feed quality

Feeding plant-based milk replacers could also cause digestive problems in calves. Calves less than three weeks old should be fed whey protein-based milk replacers, while older calves can be fed plant-based formulations with more success.

Careful electrolyte supplementation

If calves are being fed electrolytes, the best practice is to add electrolyte feedings between milk meals. Do not mix milk/milk replacer and electrolytes. When calves are being fed electrolytes to replenish lost fluids, condensing milk replacer and electrolytes into one meal will not benefit the calf. Feed milk and electrolytes in separate feedings.

Ruminal bloat

Talk to your herd veterinarian about detecting ruminal bloat and treatment options, which can be as simple as inserting a tube into the esophagus down into the rumen to release the gas or drenching with a baking soda-type product.

Tips to help control the onset of ruminal bloating include:

- Feeding 10 per cent roughage in the diet
- Using straw as a bedding source
- Routinely feeding a sodium bicarbonate product
- Never allowing the feed bunk to go empty

Conclusion

Bloat in calves is most frequently seen in the first one to two weeks of life. Calves may refuse milk, have a distended abdomen (right side or both sides), grind their teeth, kick at their belly, become depressed or lethargic, have droopy ears, and may die suddenly. The time between the first signs of bloat and death can be very quick. Any calf that dies suddenly without explanation should be necropsied (examined by your herd veterinarian after death) to determine the cause of death and prevent additional cases. In the case of bloat, there are several ways to adjust calf management to prevent additional cases as listed above.

Sudden deaths caused by bloat can be an avoidable if careful attention is paid to calves. Being sure to have set calf care routines and ensuring they are followed consistently and completely will improve overall calf health, welfare, and growth.

Clostridium Perfringens

All too often when a young calf dies everyone is left wondering what happened? The calf appeared fine at last check but then it dies. Upon post-mortem it is discovered the calf died from enterotoxaemia, referring to a systemic disease caused by the absorption of a toxin from the intestine. The term gastroenteritis is also used as a diagnosis.

What is it?

Gastroenteritis is primarily caused from a bacterium causing an infection in the gut, mostly resulting from poor hygiene. Infection can also be a result of the toxin the bacteria produce. Regardless of the term used, the cause is most always *C. perfringens*.

C. perfringens is a bacterium in the gastrointestinal tract of calves. It is anaerobic, meaning it does not need oxygen to survive, and it is passed through the feces.

It is naturally occurring, always present in the GI tract, and can rapidly reproduce and produce toxins in the gut, which can lead to shock when absorbed into the bloodstream.

C. perfringens can occur in calves less than two weeks of age up to two months of age, when calves are fed primarily milk.

Identification

Early detection of *C. perfringens* can be difficult. Sometimes the calf looks “off” during feeding. In some cases, dark bloody feces are observed, but not always. The abdomen can be distended (swelled from internal pressure, like gas). This pressure/pain could cause the calf to kick at their belly and there may be a reluctance for the calf to lie down. In some cases, the calf refuses to eat and may be off feed. In most cases, these signs are subtle and hard to detect.

There are five types of *C. perfringens* A, B, C, D and E, categorized for the toxin they produce. *C. perfringens* type B and C are the most common bacterium in calves.

Cultures alone are not enough to diagnose because *C. perfringens* because it is naturally occurring in the GI tract, so the results should be used in combination with clinical signs and the presence of lesions in the tissues. For a true diagnosis, toxin identification should be performed.

Prevention

Work with the herd veterinarian for proper diagnosis as the symptoms can present like other diseases. It is all about balance. It is a safe assumption most calves have one form or another in their GI tract and every effort must be made to keep the bacteria from multiplying and causing death.

- Minimize exposure:
  - Sanitation is key to reducing a buildup of pathogens, reducing challenges for calves will keep the toxins in check, not tipping the scale in their favour
- Enhance immunity:
  - If purchasing calves directly from dairy farmers, ask if the cows have been vaccinated
  - Ensure the calves have received four litres of colostrum within six hours of birth, *C. perfringens* antibodies are passed through colostrum
  - Vaccination programs
- Mange feeding practices:
  - **Calves like consistency**
  - Every effort should be made to maintain consistent feeding schedules and diets
  - Milk should be fed at the same temperature (38°C) each feeding, avoid feeding cold milk
  - If a new feed is introduced, it is important that it is gradually introduced at increments of 25 per cent, 50 per cent, and 75 per cent then complete change over several feedings

Treatment

Treatment is challenging because the symptoms are most likely because of the toxins produced vs. the bacteria itself. Antibiotics only work on bacteria and not the toxins so treating with antibiotics are most likely not going to be successful.

Early detection is key if any treatment is to be successful. Supportive care with oral or IV fluids and anti-inflammatory products may be prescribed by the herd veterinarian.

Vaccination

It is highly recommended that a treatment plan be developed with the herd veterinarian in the event it may be needed.

Getting calves off to a healthy start includes purchasing calves from vaccinated dry cows that have had four litres of colostrum within six hours of birth. With young calves, a vaccination plan will need to be developed with the herd veterinarian to ensure the calves are vaccinated at the appropriate age and boosted when needed with products that will help calves stay healthy and not let *C. perfringens* take over.

If *C. perfringens* is a problem on your farm, talk to your herd veterinarian about ways to support the calf's immune development and reduce the risk of disease.

Conclusion

C. perfringens is a challenge for some farms. The bacteria are already present in the GI tract, keeping them in check is the trick. The best way to do that is by ensuring a positive environment for the calves which includes cleaning and disinfecting the feeding equipment regularly and maintaining a regular feeding schedule. A few minutes extra each feeding could pay back in folds.

Feeding fibre

Why feed fibre?

Feeding fibre can improve feed efficiency and rumen function and reduce the occurrence of abnormal oral behaviours (oral stereotypies) like tongue rolling and sucking on inanimate objects like pen bars. It can also reduce the risk of ruminal acidosis and bloat.

Fibre decreases the rate of fermentation and increases rumen motility, chewing duration, and saliva production, which acts as a buffer to acidity in the rumen.

Poor rumen function can lead to ruminal acidosis. Veal cattle with ruminal acidosis may go off-feed or show large day-to-day variation in feed intake, and/or their manure may appear grey. See the fact sheet on acidosis on page 43.

Rumen

The rumen is made up of two layers: the epithelial layer and the muscular layer. The muscular layer is responsible for rumen contractions and gives support to the epithelial layer, which in turn provides absorption of nutrients. The end products of rumen fermentation, particularly volatile fatty acids (VFAs) like propionate and butyrate, provide the stimulus needed for development of the epithelial layer. These VFAs are produced when grain is consumed.

Prior to weaning the rumen must develop to be able to absorb and metabolize VFAs. Calves that do not eat dry feed will not develop a functional rumen. It is the grain that develops the rumen and allows the calf to transition from a milk–based to a corn–based diet.

Rumen papillae

Papillae are finger-like projections used for absorption of nutrients by the calf. Milk or hay do little to develop the papillae of the rumen. Grain is key to the development of rumen papillae. Feeding hay decreases the amount of grain a calf will consume and slows the rate the rumen will develop papillae. With a good starter management program papillae development can occur by three to four weeks of age and takes three weeks to develop fully.

Why hay is not a good option for grain-fed veal cattle

Feeding hay to veal cattle is not a good use of hay. In general, veal that are on a finishing ration are not adapted to digesting cellulose which comes from hay. This leads to feed inefficiencies and affects the bottom line.

Not only does hay take up rumen capacity it hinders the development of the rumen. Hay is also lot more expensive than chopped straw and can further increase COP by reducing feed efficiencies.

The Code requirement

The Code is the Canadian veal industry's standard of care. The requirement in the Code for fibre states:

If a significant number of cattle in a cycle are performing oral stereotypies or showing signs of ruminal acidosis, the feeding program must be adjusted in terms of provision of fibre and/or method of milk delivery.

The Code recommended practices are:

a. when appropriate (based on consultation with a nutritionist or the herd veterinarian), offer fibrous feeds to calves from two weeks of age

b. provide fibre as long forage or chopped to not less than 1 cm (0.39 in.) particle length

c. feed fibre off the ground to prevent contamination

d. whenever possible, assess the occurrence of abomasal ulcers. When these are found to occur, adjust the feed program in consultation with a nutritionist or the herd veterinarian

Fibre sources

Not a lot of research has been completed in this area; what is known is primarily based off beef and dairy research.

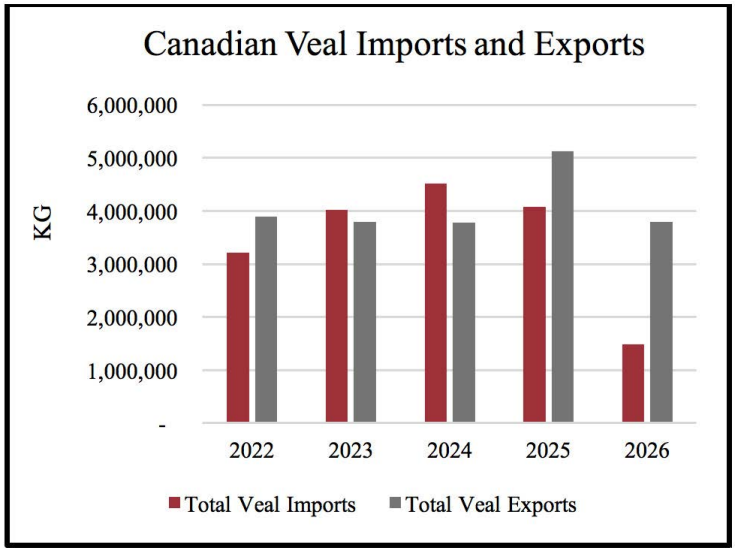
In the Code there is a listing of potential fibre sources in Appendix E (https://www.nfacc.ca/veal-cattle-code-of-practice#appendixE) , examples of Fibre Sources and their Relative Abilities to Stimulate Chewing. Long straw is the most suitable to stimulate chewing.

Conclusion

Feeding veal cattle is a challenge. It is part of veal management that needs daily attention to ensure there is enough feed and the right kind of feed. When the feed ration is not balanced, it can lead to unrealized losses both economically and through average daily gain. It is important if you are not already working with a veal nutritionist that you consult with one to ensure feed efficiencies are being maximized and rumen health maintained.

Imports

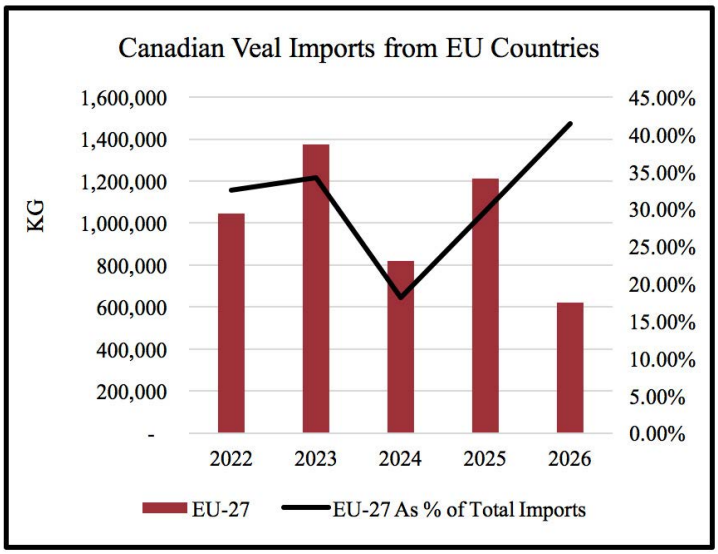
Among the strategic objectives of VFO are to “advocate for veal on government policies that impact producers” and “increase consumption and drive demand for Ontario veal”. Understanding trade markets, especially imports, represents an opportunity for veal producers. Every pound of imported veal consumed by Canadians means one less pound that needs to be produced here in Canada. Ontario veal producers are competing in a global marketplace. The average Canadian consumes 0.82 kg (1.8 lb) of veal per year and in collaboration with the Canadian Veal Association (CVA), VFO is working towards ensuring all that veal is Canadian.



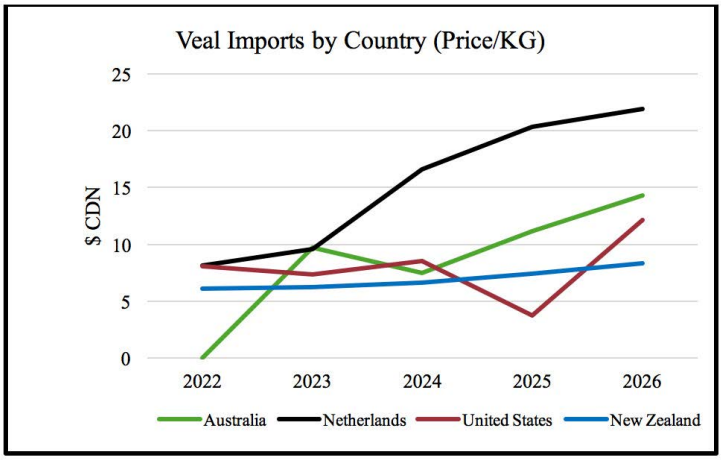
Rise of EU imports

In 2025, exports of Canadian veal totaled just under 5.1 million kg (11.2 million lb) and were valued at $53.8 million CAD. During 2025, approximately 4 million kg (8.8 million lb) of veal worth $45 million dollars was imported into Canada. Veal is a specialty protein with a small market of Canadian’s overall meat consumption, and as such even minor changes in trade volumes can cause large impacts across the industry.

One of the most notable changes in the veal marketplace is the ever-increasing volume of imports of veal from the European Union (EU). Prior to 2016 virtually no veal was imported in Canada from the EU. Since 2020, the Netherlands has been the second largest country of origin for veal imports into Canada, following New Zealand. Imports from other EU countries such as France and Italy have also increased significantly. Following a decline in 2024, veal imports from the EU in 2025 represented nearly 30 per cent of the total import volume. Thus far in 2026, EU veal imports represent nearly 42 per cent of the total import volume.



This is concerning as EU imports command the highest price per kg. Since 2023, veal imported from the Netherlands has been consistently valued well above imports from other countries. In 2025, veal imported from the EU was worth over double the per kg price than imports from the United States and New Zealand. Unfortunately, Agriculture and Agri Food Canada (AAFC) does not report on which cuts are being imported. However, anecdotally VFO is aware that these are higher quality cuts (cutlets, scaloppini) that compete directly with Ontario veal. However, while EU imports are rising, because of non-tariff trade barriers imposed by the EU, exports of Canadian veal (and all Canadian red meat) to the EU remain at near zero levels.



With Canadian veal cattle currently being in short supply, veal processors are required to import veal to meet demand. Maintaining a consistent supply of veal cattle is critical to the success and growth of the Canadian veal industry. Producers can take advantage of strong market prices to further invest in their operations. These investments can help ensure a consistent supply of veal cattle to processors, build a stronger local veal industry, and reduce Canada's reliance international imports. Throughout the trade and market uncertainty VFO continues to be a strong advocate for producers, working with our industry and government partners to build a strong, innovative, and resilient veal sector.

Data is retrieved from the Agricultural Industry Market Information System (AIMIS) of Statistics Canada. All data is as of August 2026.

Assessing welfare

Veal cattle welfare

The Code is the veal industry's standard of care. It is expected that all veal producers follow the Code requirements. As a veal producer it is your responsibility to know those requirements.

Veal welfare assessment

As a veal producer, you are constantly striving to improve animal welfare on-farm by adjusting management practices according to current research to meet or exceed industry standards for the care of veal cattle.

Have you considered walking through your barn with a different set of eyes? Have you taken the time to assess welfare on your farm and ensure you are following the requirements of the Code? While most farms are already following the requirements, a welfare assessment can help you benchmark the level of welfare on your farm and identify your farm's strengths and areas that need work to provide the best welfare for your herd.

The welfare assessment is simple to complete. You can do it yourself or ask an advisor such as your herd veterinarian to complete it with you. The standards and information you need are all included in an assessment booklet produced by VFO. For an electronic copy visit https://vealfarmers.ca/downloadable-resources/

Animal care responsibility

As a producer you hire family or outside help to assist in the barn with the veal cattle. It is good practice to have everyone working in the barn sign an Animal Care Code of Conduct, found at https://vealfarmers.ca/wp-content/uploads/2021/11/Animal-Care-Code-of-Conduct.pdf. This customizable document explains that responsible farm animal care and handling among employees and service providers on the farm will be enforced, and that it applies to every person who handles or comes into contact with an animal. The document should be reviewed with new employees and signed and then reviewed quarterly/annually thereafter. Everyone has a responsibility to ensure they treat animals humanely at all times, as well as report immediately any concerns about welfare.

This document ensures that all employees understand your farm's expectations for animal care and that everyone is responsible to hold themselves and others accountable for providing the highest standard of animal care. If anyone questions the animal care at your facility, having documentation demonstrating all staff are aware of expectations and that your farm routinely conducts animal welfare assessments can demonstrate the high level of care cattle receive.

Conclusion

Assessing welfare may sound like an onerous task but it is something that is done subconsciously every time you enter the barn. Reviewing the veal cattle assessment booklet helps to formalize where your farm is at in regard to welfare. Assessing the level of welfare on your farm on a regular basis will help you evaluate the effectiveness of management changes and ensure your farm continues to improve animal care. Setting goals to improve is the best way to make those improvements. Have a plan, write it down with timelines and do what you can as you can afford to make major changes. Producers with a written plan for improvement are more likely to make change.

A focused assessment will help you take a bigger picture approach to the overall welfare of your herd to identify areas for improvement, track progress and keep staff (and yourself) accountable.

Deadstock

Deadstock (dead farm animals) must be managed responsibly to protect public health, the environment, and comply with provincial regulations. This fact sheet outlines approved disposal methods and key requirements under ***Ontario Regulation 106/09: Disposal of Dead Farm Animals***.

Deadstock disposal isn't just a duty—it is the foundation of a responsible farm.

Why proper disposal matters

Proper deadstock disposal is essential to protect the environment and public health, minimize nuisance complaints, and ensure compliance with provincial regulations. Improper disposal poses serious risks, including contamination, safety hazards, and community disturbances. It is also a provincial offence under *Ontario Regulation 106/09: Disposal of Dead Farm Animals*. Enforcement Officers from the Ministry of Environment, Conservation and Parks (MECP) have the authority to investigate violations and issue fines accordingly.

On-farm disposal options

Dead farm animals must be disposed of within 48 hours unless an exception applies. Disposal sites must be located away from water sources and aquifers. If immediate disposal is not possible, cold storage at 4°C (39.2°F) or lower is permitted.

Approved disposal methods:

Composting – Must follow regulated composting guidelines

- Max volume of deadstock: 600 m^3
- Not allowed on organic soils, porous sandy soils (hydraulic soil A/AA), or soils with a depth <0.9 m to bedrock

Burial – Must meet specific depth and location requirements

- Max weight of deadstock: 2,500 kg (5,511.6 lb)
- Lowest point of burial pit must be at least >0.9 m above the uppermost identified bedrock layer or aquifer

Disposal Vessel

- Leakproof, scavenger-proof container
- Max volume: 10 m^3
- It can be installed under, partially, or above ground into which deadstock is placed to decompose

Incineration – Requires an approved incinerator

- Must have Environmental Technology Verification (ETV) Certificate or Statement
- Max disposal: 1,000 kg (2,204.6 lb)/day

Collection Services – Licensed collectors can transport deadstock

Disposal and transportation requirements

Delivery to a licensed disposal facility (rendering plant) or an approved waste disposal site (landfill) must occur within 48 hours after animal death if off-farm disposal is the preferred option.

Transportation requires a vehicle that is leakproof, easily cleaned and decontaminated after use, and the animals are kept hidden from public view. Farmers may transport their own deadstock, but if not, only licensed haulers are permitted. A permit from the CFIA is required for transporting dead cattle, including Specified Risk Material; contact CFIA at 1-800-442-2342 for details.

Visit https://ontario.ca/page/licensed-deadstock-operators-ontario to find licensed deadstock operators.

Some municipal landfills may accept non-ruminant deadstock. Call the disposal facility prior to arranging transport to ensure they can accept your deadstock.

Approved renderers		Approved private landfills	
Atwood Resources	519-291-0418 Admin.ari@xplornet.com	Waste Management-Twin Creeks Environmental Center, Watford, ON	519-849-5810
Darling Ingredients	800-263-0323	GFL Moose Creek Landfill	613-538-2776
		Ridge Landfill Waste Connections of Canada, Blenheim, ON	519-676-5000

Emergency disposal authorization

If emergency conditions prevent standard disposal, use the contact numbers below to obtain Emergency Authorization from OMAFA:

Business hours: Call Agricultural Information Contact Centre at **1-877-424-1300**

Evenings/weekends: Call Spills Action Centre at 1-800-268-6060. OMAFA or MECP staff will respond the next business day

Record-keeping

For veal producers, record-keeping is a fundamental part of business success. Producers must maintain records of disposal methods used. Maintaining mortality records is not only a best practice, but also a requirement under the Code and helps assess herd health over time. Copies can be found here: https://vealfarmers.ca/record-keeping-templates/

Visit Deadstock Management in Ontario for full regulatory details and guidance.

https://www.ontario.ca/page/deadstock-management-farm-animals-ontario

Mycoplasma

Mycoplasma bovis (M. bovis) refers to a group of bacteria that can infect cattle. Unlike other bacteria, M. bovis lacks a cell wall, making it resistant to many common antibiotics. This unique feature makes it harder to treat infections caused by M. bovis.

How does it affect calves?

M. bovis can cause various health problems in dairy calves, including:

- **Respiratory issues**: The most common symptom is pneumonia. Infected calves may have difficulty breathing, cough, and nasal discharge
- **Joint infections**: Calves may develop swollen joints, leading to lameness and difficulty moving
- **Ear infections**: Infected calves might have droopy ears, head tilts, and ear discharge

M. bovis is particularly important as it causes chronic respiratory disease and arthritis in dairy calves. It is a key player in bovine respiratory disease complex (BRD) and chronic pneumonia and polyarthritis syndrome (CPPS). CPPS is responsible for 25 to 40 per cent of beef feedlot calf mortality and has surpassed shipping fever as the leading cause of death loss in high-risk fall-placed feedlot calves in Canada.

How does it spread?

M. bovis spreads through direct contact with infected animals or contaminated equipment. It can also spread through airborne droplets when infected animals cough or sneeze. Calves are particularly vulnerable during stressful periods, such as weaning or transportation, when their immune systems are weakened.

Recognizing the symptoms

Early detection is crucial. Monitor for the following signs:

- Coughing and nasal discharge
- Laboured breathing
- Swollen joints or lameness
- Head tilts and ear discharge
- Poor growth and weight gain

If any of these symptoms are noticed, it is important to act quickly to prevent the spread of infection.

Diagnoses

The herd veterinarian can diagnose M. bovis using laboratory tests, usually by taking a nasal swab from an affected calf. Polymerase chain reaction (PCR) tests are now available, which can detect M. bovis within hours. A PCR test identifies genetic material from the pathogen, making it a fast and accurate diagnostic tool. This quick and precise diagnosis is key for effective treatment.

Treatment and prevention

Treating M. bovis can be challenging due to its resistance to many antibiotics. Some antibiotics can still be effective, and supportive care such as anti-inflammatory medications and good nutrition can help improve recovery. Consult with the herd veterinarian for the best course of treatment based on the specific type and severity of the infection.

Prevention is crucial. Implement strong biosecurity measures, maintain high standards of hygiene, and minimize stress during critical periods. Recently, a new vaccine specifically targeting M. bovis in calves has become available. It is the first and only modified live bacterial vaccine against respiratory disease caused by M. bovis. It is worth discussing this option with the herd veterinarian to learn more.

Monitoring and management

Regular monitoring is key to early detection and effective management of M. bovis infections. Keep detailed records of symptoms, treatments, and outcomes. Work closely with the herd veterinarian to develop a herd health plan tailored to the farm's specific needs.

Conclusion

M. bovis is a challenging but manageable threat to dairy calf health. Understanding the symptoms, working with the herd veterinarian, and implementing strong biosecurity and management practices can protect calves and maintain a healthy, productive herd. Early detection and prevention are the best tools in the fight against M. bovis.

For more information

As part of your research into starting a grain-fed veal farm, you are encouraged to talk to experienced veal producers, visit their farms (while following strict biosecurity protocols), and attend industry events and meetings. No two veal farms are the same and a lot of valuable information will be learned from each visit and event.

Find the *Code of Practice for the Care and Handling of Veal Cattle* here:

https://www.nfacc.ca/codes-of-practice/veal-cattle

Find OMAFA veal resources here:

https://www.ontario.ca/page/veal-farming

References available upon request.

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Find us online:

vealfarmers.ca
calfcare.ca

Find us on social:

@OntarioVeal https://x.com/OntarioVeal
@CalfCareCorner https://x.com/CalfCareCorner
@CalfCareCorner https://www.facebook.com/CalfCareCorner/

@Finishing grain-fed veal in Ontario https://www.facebook.com/groups/255346782132741
@Marketing of male dairy calves in Ontario https://www.facebook.com/groups/951354425261290

Calf Care Corner https://www.youtube.com/channel/UC5BAAoMgAE8VDh0X5d4-bmA
OntarioVeal https://www.youtube.com/user/OntarioVeal

Disclaimer: This resource is for educational purposes only. Veal Farmers of Ontario is not responsible for any business or management decisions made by consulting this resource.

Abbreviations

ADG	Average Daily Gain
AAFC	Agriculture & Agri-Food Canada
BCRC	Beef Cattle Research Council
BRD	Bovine Respiratory Disease complex
CFIA	Canadian Food Inspection Agency
C. Perfrigens	*Clostridium Perfringens*
CPPS	chronic pneumonia and polyarthritis syndrome
COP	Cost of Production
CVA	Canadian Veal Association
DMI	Dry Matter Intake
DON	Deoxynivalenol
EU	European Union
GI	Gastro-Intestinal
HMC	High moisture corn
MCEP	Ministry of Environment, Conservation & Parks
M. bovis	*Mycoplasma bovis*
OBCFPP	Ontario Beef Cattle Financial Protection Program
OFA	Ontario Federation of Agriculture
OMAFA	Ontario Ministry of Agriculture, Food & Agribusiness
OVA	Ontario Veal Association
PCR	Polymerase chain reaction
ppm	Parts per million
the Code	*Code of Practice for the Care and Handling of Veal Cattle*
S. Dublin	*Salmonella* Dublin
STEC	Shiga toxin-producing Escherichia coli
VFA	Volatile Fatty Acid
VFO	Veal Farmers of Ontario
VVP	Verified Veal Program
VCPR	Veterinary-Client-Patient-Relationship