

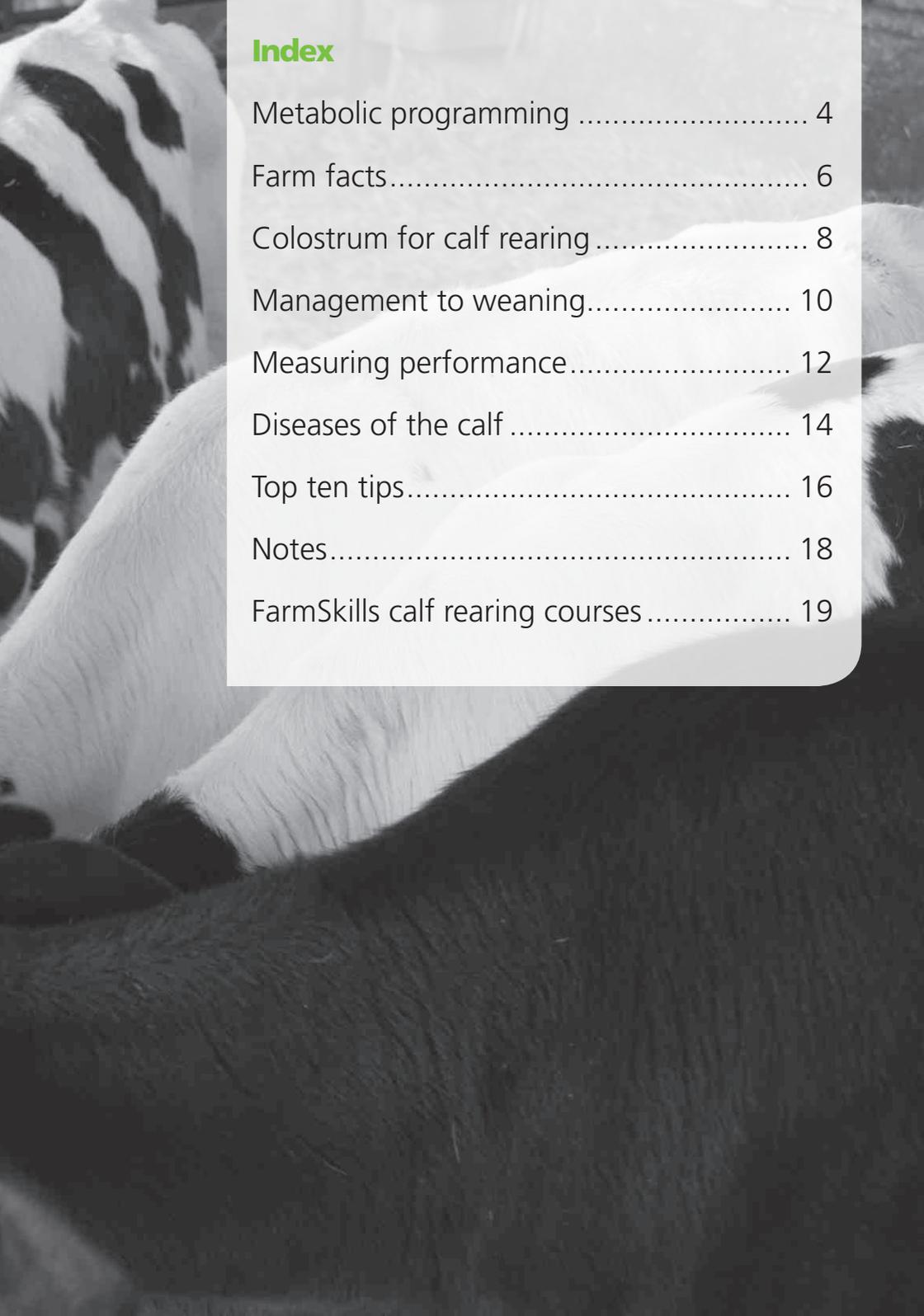
Calf Tracker

**Optimising the health
and performance of your
youngstock for the future**



On-farm management guide





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Metabolic programming

An early window of opportunity to improve your herd performance – don't miss out on optimising your calves performance

What is metabolic programming?

Metabolic programming is an entirely natural phenomenon that has been proven to exist in both animals and humans. It is caused by influences outside the genome changing the expression of genes. In simple terms, how an animal is managed in early life can pre-programme the metabolism of a calf to determine her lifetime production.

Example: Why is the queen bee so much bigger than worker bees?

Bee colonies consist of thousands of non-reproductive female workers, a few hundred males and a single reproductive individual, the queen. The queen and worker bees share the same genome – they are all genetically identical. However from a larvae stage the queen is fed ten times more than the workers. This leads to rapid growth, a longer life span (three years versus two months) and maturation of the reproductive organs which allows the queen to lay up to 200 eggs per day.

What does this mean for you and your stock?

You can optimise the performance of your stock by ensuring they have the best possible start in life. The first eight to ten weeks of life is the critical period when gene expression can be influenced after this the opportunity has been missed. Metabolic programming activates the pathways of a young calf which can help to improve performance and efficiency during the animals' productive life. This activation requires a feeding programme which provides adequate levels of digestible nutrition in a safe form.

Example: Calves fed 2 litres of colostrum versus 4 litres of colostrum.

Measure	2 litres Colostrum	4 litres Colostrum
Average daily gain (kg)	0.8	1.03
Average age at conception	14 months	13.5 months
Survival through second lactation (%)	75.7	87.1
Milk yield through to second lactation (litres)	16,015	17,042

Inadequate colostrum intake reduces lifetime production.

Example: Feeding more milk replacer influences mammary gland development at eight weeks of age.

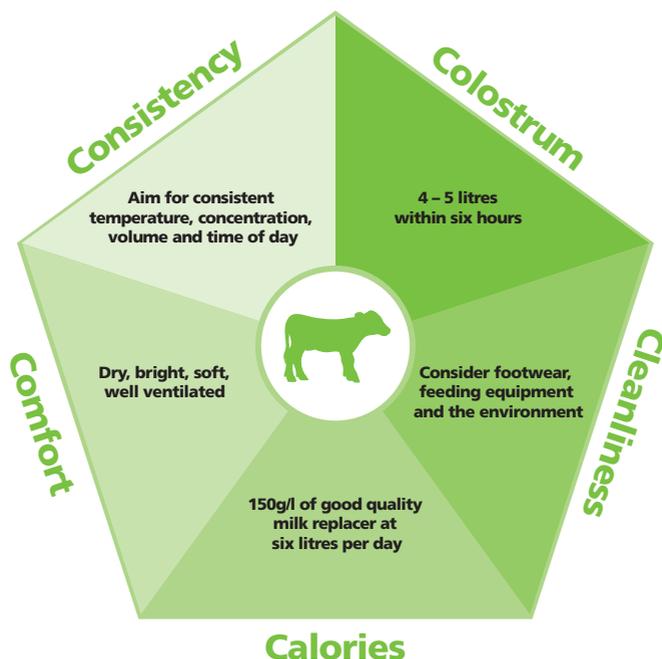
Measure	Control group fed 600g replacer/day	Enhanced group fed 1300g replacer/day
Average daily gain (kg)	0.39	0.82
Mammary gland (g)	75.48	337.5
Parenchyma (% of body weight)	0.002	0.008

An enhanced milk powder diet increased growth rate and mammary gland development at eight weeks of age.

Summary

A dairy calf fed to optimal levels will: grow quicker, be more resistant to disease and increase its productive potential as an adult cow. Have a look at the **Five C's** below which are critical for calf health.

Five C's



Farm facts

Please use these pages to fill in some brief background to the calf rearing enterprise on your farm.

Calving pens

When do you move cows into the calving pen?.....

What makes up the flooring?

Concrete Straw Rubber matting Earth Sand Sawdust Other

How long are calves left with the cows?

Removed ASAP Less than 24 hours 24 hours or more

Do you dip calves navels?

Strong iodine Oxytet spray Other disinfectant/antiseptic No navel dipping

Colostrum policy

How do calves receive colostrum?

Left with the cow to suck

Bottle fed then tubed what remains

Tubed without an attempt to bottle feed

How much colostrum do calves receive in the first 24 hours?

As much as they can drink off the cow Estimated litres fed

Over how many feeds is colostrum fed?.....

What sources of colostrum do you feed?

Only the dam's colostrum Frozen and thawed cows colostrum Colostrum substitute



Birth to weaning

After separation from the cow, in the first week of life, how are calves housed?

Group pens Individual pens Hutches
Group hutches/igloos left with cow for a period Other

How long do they stay in this housing?

Until weaning Seven days or less More than seven days

If moved or mixed before weaning, what sort of housing are they moved into?

Calf shed Large hutch/igloo

What are calves fed from 24 hours old?

Milk replacer Mixture of milk replacer & waste milk Waste milk Milk from the tank

How are calves fed?

Bucket Bucket with teat Milk bar teats Automatic feeding system

How often are they fed?

Once a day Twice a day Three times a day Ad-lib

What would be peak volume of milk fed?.....

If on milk powder how many grams is fed per litre of milk?.....

What is the protein content of the milk powder you are feeding?.....

How is water provided to your pre-weaned calves?.....

What forage is provided?

Bedding straw Feeding straw in racks Hay in racks Silage in racks

What concentrate feed is provided to pre-weaned calves?

Calf niblets Coarse mix Rearer nut

What % crude protein is this concentrate?.....

How much do you target them to eat at weaning?.....

What size group are calves kept in up until weaning?.....

What sort of weaning system do you use?

Gradual Step down Abrupt

Weaning

Describe the diet for calves post-weaning, including the % crude protein of the concentrate ration they are fed?.....

.....

Colostrum for calf rearing

Colostrum is the fuel of life and making sure your calves get enough is the cornerstone to all successful calf rearing enterprises. However, it is not as easy as you might think to succeed. Here we highlight the 'Four Q's' of colostrum management to ensure calves get off to the best possible start in life.

Colostrum management – adopting the critical Four Q's

Colostrum supplies the calf with essential nutrients and antibodies. New-born calves have no protective antibodies to resist disease challenges, therefore it is essential that antibodies are absorbed via colostrum. If you miss out any of the following *Four Q's* to colostrum management then you should not be surprised to see poor health, low growth rates and high mortality in calves.

1. Quality

Colostrum quality can vary enormously between animals, so only feed high quality colostrum, ideally tested using a colostrometer. A **minimum** of 100g of IgG antibodies fed to the calf is likely to result in adequate passive transfer.

Colostrum quality can vary for many reasons including; the age and breed of the cow, the length of the dry period, milk yield and hygiene factors.

Good quality colostrum should be frozen ready for future use when the dam's colostrum is of poor quality or unsuitable for use. Discuss with your vet the options for freezing, storing and thawing colostrum to ensure quality is maintained and potential disease transmission eliminated.

A colostrometer (shown right) should be used to test milk quality.



2. Quantity

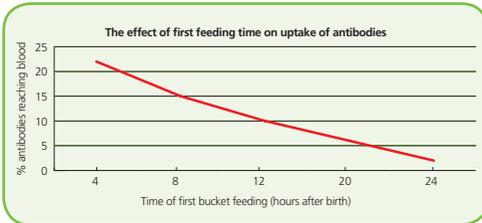
A minimum of three litres in the first six hours, split into two feeds if necessary.

Remember, a calf requires approximately 30 minutes of continuous sucking to consume three litres of milk from the cow.



3. Quickly

Ideally, colostrum should be fed as soon as possible after birth, and within six hours at the latest. At birth, the calf's gut is permeable which means it can absorb the large antibody molecules directly into its bloodstream. Over the first 24 hours the gut rapidly 'closes' and these molecules can no longer be absorbed, so it is essential that the calf absorbs sufficient antibodies as soon as possible, after birth. The graph below demonstrates that a calf absorbs about half the antibodies that it can during the first six hours of life.



Continue feeding colostrum for at least the first three days of life if possible, as this has been shown to have other benefits encouraging early gut development and laying a solid foundation for fast efficient future growth.

NOTE: Giving a small amount of colostrum to get the calf going is not advised because of the effect on gut closure. Even worse is to give some milk as an interim measure because gut closure will be accelerated while no significant amount of antibodies will be gained. It is better to wait a few hours if necessary until a proper feed can be given.

With an understanding of these factors it is easy to understand why cross suckling and even natural suckling may result in inadequate immunity – passive transfer failure occurs in an estimated 30% of calves.

It is safe and appropriate to give a calf colostrum once it is dry, holds its head up strongly and is able to swallow.

4. Quietly

If calves are stressed while being fed colostrum, then they won't absorb the antibodies as efficiently as those that are calm. This means a stressed calf will require more colostrum in order to achieve the same level of immunity. Colostrum can be fed by bottle or stomach tube – ensure it is done gently, patiently and observing good hygiene to minimise the possibility of stress or infection.



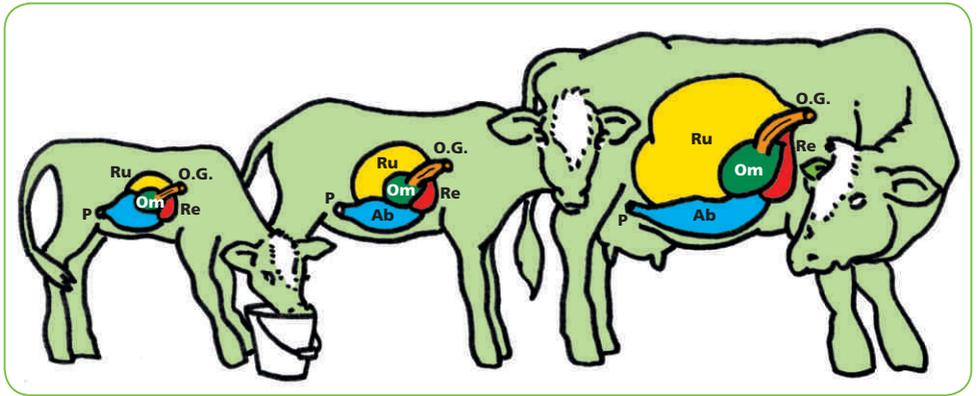
Management to weaning

Our calf rearing aims to weaning are:

- 1. To produce a well grown calf who is a competent ruminant at weaning**
- 2. To prevent and control any health problems**
- 3. To achieve this at minimum cost**

Development of the bovine stomach is summarised in the illustration below. Rumen development is critical to ensure efficient and optimal performance in adult cows. The rate of development is affected by the physical and chemical make-up of the feeds consumed.

Development of the bovine stomach compartments from birth to maturity.



P = Pylorus

Ab = Abomasum

Ru = Rumen

Om = Omasum

O.G. = Oesophageal Groove

Re = Reticulum

The solid feed and water enters the rumen while milk bypasses it. The amount of concentrate feed consumed dictates the rate of rumen development, as shown in photographs below.

Rumen and reticulum of four week old calves fed milk and hay (left) and milk and grain (right).



Images reproduced by kind permission of Pennsylvania State University.

As calves get older, fibre is beneficial to develop rumen muscular strength, to encourage cudging and acid buffering as well as in order to maintain a fibre mat in the rumen which promotes gradual healthy fermentation within the rumen. This is relatively unimportant prior to weaning.

The inclusion of chopped straw in the diet, either fed alone or within a concentrate ration or silage ration can achieve the levels of fibre required.



A clear illustration of the importance of concentrate compared to fibre is given by photograph shown below which demonstrates that the rumen papillae development in a four week old calf fed grain and milk is more advanced than that of a 12 week old calf fed milk and hay.



Images reproduced by kind permission of Pennsylvania State University.

Fresh water should be available 24/7 from the first week of life for development of rumen function and to increase intake of concentrate ration. The water in milk does not play a role in rumen development as it passes directly into the abomasum.

Measuring performance

If you don't record it you can't measure it!

To help identify the strengths and weaknesses of any business we need to record information. This allows us to identify areas where the business could improve its performance and therefore the profitability of that business. To keep the paperwork to a minimum we have set some basic KPI's and the data required to allow us to provide you with useful information about your calf rearing business. These key bites of information can be used to benchmark your calves against others being reared in the same vet practice as you and across the UK, using our unique system.

We are looking for five key indicators of calf health:



1. Growth rate to weaning/eight weeks old

You require a start weight and start date which may be either birth weight or arrival weight and an end weight and end date. Within a dairy herd where birth weights are pretty uniform you may be able to use an average birth weight. This can be done with the weigh band included in your calf rearing pack or with scales. However you weigh your calves, it needs to be done with the same equipment at birth and at weaning.



2. Total mortality rate from birth to weaning

Number of calf deaths from 24 hours old to weaning divided by the number of calves born alive/on-farm within the same period.



3. Pneumonia rate

Number of cases of pneumonia divided by the number of calves born/on farm over the same period of time (a three month period will give a good idea of what is going on).



4. Scour rate

Number of cases of scour divided by the number of calves born/on-farm over the same period of time (a three month period gives a good idea of what is going on).



5. Total proteins

This is a simple blood test which indicates the level of colostrum transfer which has taken place. A blood sample is taken from calves from one to eight days old. Readings over 5.5g/L indicate that the calf has received adequate colostrum.

Handy hints

- Birth and weaning weights can easily be done as you feed colostrum and wean calves, or at the end of your routine visit with your vet. Once you get in the routine of recording them it's a simple task that provides valuable information.
- Total protein bloods can be done whenever the vet is on farm for another job and only takes a minute or two.
- Pneumonia, scour and mortality rates can quickly be recorded as a tally chart either on the wall in the calf shed or on a laminated sheet as provided in your calf box.



After you have recorded the details discussed on page 12, with your vet, you can calculate the KPI's for your calf rearing system.

KPI	Your farm	Target
Growth rate to weaning (kg/day)		0.8 kg/d
Mortality rate (24 hours to weaning)		<2.5%
Pneumonia rate		<5%
Scour rate		<5%
Total proteins (% TP over 5.5g/L)		>90% over 5.5

Benchmarking is a really valuable tool for famers and vets as it allows you to compare yourselves against your peers and it allows us to compare the systems we work with day to day. We have developed a unique online system which will allow us to compare your results against a large number of calf rearing systems in the UK.

Pneumonia



Pneumonia is estimated to cost the UK cattle industry £80 million a year. Immediate treatment expenses are often absorbed but the long term impact on performance should not be underestimated.

In the beef industry, reductions in food intake, conversion efficiency and live weight gain can impact heavily on profits. Those rearing dairy heifer replacements, which have been affected by pneumonia, can expect a two-week delay to first service and a 2 – 4% reduction in yield in the first lactation.

The cause of pneumonia in youngstock is multi-factorial. The following aspects should be considered in the prevention of disease.

Colostrum

Ensure calves receive adequate quantities of good quality colostrum; avoid from Johne's cows and those on antibiotics.

Housing

Calves are susceptible to chills from draughts and damp conditions, assess housing at calf level and review if being transported. Calf jackets should be considered in the first month of life. Avoid mixing airspace between recently purchased or older animals.

Infectious disease

Circulating viruses, such as BVD, will predispose calves to pneumonia. Discuss screening with your vet.

Stress

Disbudding, castration and movements between groups will result in stress.

Vaccination

Vaccines are a cost effective way of improving calves immunity to specific pathogens. Talk to your vet to find out what options may benefit your calves.

Be vigilant

Monitor calves regularly for early signs of disease and act promptly.

For more information, please refer to the XLVets pneumonia factsheet.



Scour



With up to half of all deaths in the first month of life being associated with scour, it is arguably one of, if not the, biggest contributor to financial and productive loss in young calves so minimising the incidence of scour is essential.

Hygiene

All scour causing bugs whether they are bacteria, protozoan organisms, or coccidian all thrive in damp warm conditions such as calving or calf pens. Maintaining a clean calving area and calf accommodation is vital to minimise the burden of these bugs. Using an appropriate disinfectant for the bugs present and allowing buildings to dry out prior to re-bedding to reduce build-up and spread is essential.

Would **you** eat, sleep and drink from the facilities provided? If not, how do you expect new born animals to survive in them, let alone thrive?

Colostrum

A recent survey revealed that more than two-thirds of dairy calves do not receive sufficient, quality colostrum within twelve hours of birth. Without the dams' antibody cover, calves exposed to scour causing bugs, are highly likely to succumb to disease.

Nutrition

A calf's immune system requires adequate energy from the feedstuffs we provide for it to function properly. Therefore ensuring a calf's nutritional requirements are met will reduce the risk of them succumbing to disease such as scour.

Managing sick individuals

Sampling sick individuals is essential to diagnose the causative bug so that appropriate management advice and vaccine protocols can be given. Prompt treatment and isolating scouring calves will reduce spread; ensure no leeching from soiled bedding and always feed sick calves last.

For more information please refer to the XLVets scour factsheet.



Top ten tips for successful calf rearing

1. Successful calf rearing starts before birth



Ensure that the health and nutrition of the dam is right and that your calving facilities are good.

2. Colostrum is key

This cannot be over-stated as it is the foundation for everything else you do.

3. Consistent feeding regime

Promote good digestion and health; promote good oesophageal groove function.

4. Provide adequate nutrition



Do not underfeed milk, set target growth rates, consider whether there are potential health and lifetime performance benefits from growing calves faster.

5. Concentrate feed more important than fibre for rumen development

Provide clean straw to minimise consumption of soiled bedding but ensure water and concentrate ration are available ad-lib.

6. Wean gradually – one step weaning



Adopt one-step weaning – ideally one week before weaning halve the volume of milk fed but do not change the concentration. For example, if feeding 3 litres twice daily, then drop to feed 1.5 litres twice daily.

7. Clean, dry, fresh environment

If your buildings provide this you are off to a good start; moisture is perhaps the biggest danger to calf health.

8. Ventilation is tricky for young calves

Seek advice from your veterinary surgeon.

9. Consider calf jackets



As calves are burning energy once the environment temperature drops below approximately 12°C. Calf jackets also allow more ventilation without causing calves to be chilled.

10. Set targets

Growth, health and cost of rearing. Chest circumference for calves, weight and height for older heifers.

FarmSkills heifer rearing courses

Calf rearing **part 1:**

- Plan and prepare for successful heifer production.
- Maximising calf survival rates through good management.
- Understanding calf development and optimise growth from birth to weaning.

Calf rearing **part 2:**

- Planning for service.
- Care of the pregnant heifer.
- Disease management and routine preventative health measures.



Practical **workshops** delivered by vets on farm and tailor made for you.

To find out more about these courses or to book onto a course in your area contact your XLVets practice or visit www.farmskills.co.uk



**For further information or advice
please contact your veterinary surgeon.**