

Early Life Effects: The Science

Pregnancy is an important time

Research into human health has shown that what a woman eats or drinks during pregnancy can affect her developing baby. For example, smoking and drinking during pregnancy is dangerous for fetal development. There are many other 'prenatal factors'. Stress during pregnancy, such as a family tragedy, can have an impact on the child which lasts throughout their lifetime. In fact, adult human health issues such as cardiovascular disease, diabetes, and even some mental health problems can all be affected by events experienced within the womb.

The same effects can also occur in animals. Research conducted over the last two decades reveals how stress, ill health or substandard nutrition during pregnancy might be a hidden cause of reduced performance in sheep, pigs, cattle, poultry and even farmed fish. Prenatal effects could be a hidden risk factor for many farm health and welfare outcomes, but they are often overlooked. In this leaflet you will find some of the most common prenatal risk factors for farmed beef cattle.

Management in the early life stages affects health, welfare and productivity later on

The mother provides all of the resources that a fetal animal requires to grow and develop properly. Reduced maternal nutrition means that the pregnant animal has less protein and energy to supply the developing fetus with all it needs. Even when receiving an otherwise adequate diet, small deficiencies of key micronutrients and vitamins could alter brain development and leave progeny permanently impaired.

Stress hormones (such as cortisol) can pass across the placenta, affecting placenta functions and impairing fetal development in the brain and elsewhere. In some cases, exposure to increased levels of stress hormones before birth can lead to permanent changes in brain function and impaired immune systems. Often this leads to the offspring themselves showing a greater reaction to stressful events, flighty behaviour or other temperament issues, even as adults.

Debilitating ill health during pregnancy can also have a negative effect on the offspring. Not only is ill health stressful for the mother, but sick animals often fail to feed, causing nutritional problems in their developing fetus.

What to look out for

When cows experience stress in pregnancy you will often find: reduced birth weights and low offspring survival; reduced growth rates; impaired immune function (increasing disease risk); increased stress reactivity, and altered behaviour patterns.

It is important to remember that negative effects of maternal stress or poor nutrition are not just seen at birth and in young calves. Research in humans and laboratory animals has shown that variation in the prenatal environment can cause changes to the information coded by some genes, a consequence which will stay with the offspring throughout their whole lifetime. In some cases, these gene expression changes can be passed on to the next generation. For unborn animals, a poor start to life may affect their reproductive function when they are mature.

Many negative outcomes could have their origin in the period before birth and could last for a lifetime

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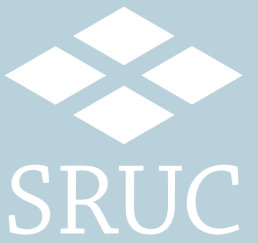
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Managing cows during pregnancy to improve calf health, welfare and performance.

This leaflet outlines the factors that will help ensure that your animals have the best start in life. A herd of healthy, high producing cattle starts with healthy, happy mothers.

Cow nutrition, health, housing, environment, husbandry procedures, and social environment can all affect calf development and production quality. If you are seeing reduced birth rates, low calf survival and reduced calf growth, consider the examples in this leaflet as possible areas for improvement. Prenatal effects could be a hidden risk factor for poor performance on farms.

Key Points:

Management of cows during pregnancy can affect their unborn calves.

Good nutrition and maintaining cow body condition can benefit calf survival and performance.

The social environment, and other sources of stress, may affect unborn calves.



Exposure to disease and parasites during pregnancy is debilitating for cows.

- Cows which have been exposed to disease and parasites can have lighter calves.
- 16% of farms surveyed by SRUC reported outbreaks of fluke in the past year

70% of UK farms provide pain relief for lameness.

- Difficult calvings, mastitis, lameness and surgical procedures are all painful for cows.
- Stress hormones caused by pain can affect calf development.

Calves whose mothers are not transported during pregnancy are calmer.

- American researchers found that calves from transported cows showed higher levels of stress hormones when restrained.
- Gentle handling and minimising the number of times a cow is restrained can improve cow welfare.

Maternal nutrition is one of the most important influences on offspring health.

- The cow's diet is a fetal calf's only source of energy. Low body condition scores are associated with low calf birth weight.
- Only 4% of beef farms surveyed by SRUC body condition score their cows by hand. 60% of farms assess condition by eye.



Muddy coats may be a sign of poor bedding conditions.

- 72% of beef farmers house their cattle indoors during the winter, most often on straw which needs frequent bedding up to keep clean.
- Muddy cows may be lying in damp conditions, making them less likely to be clean, warm and comfortable.

Extremes of temperature can affect birth weight.

- Cattle are generally hardy animals but studies have found cows exposed to winter weather can give birth to lighter calves.
- If outwintered, cattle need access to windbreaks and shelters in their field, especially if there's no option to house them.

48% of cows are kept in the same social group throughout the winter housing period.

- Disrupting the social group, i.e. through mixing cows into new groups after handling, can be a stressful event for cows and could affect calf development.

Weaning is a stressful period for cow and calf.

- Weaning is a necessary part of beef production, but some techniques are less stressful and so better for good cow and calf welfare.
- 8% of surveyed farmers practice gradual weaning, 14% practiced fenceline weaning and 21% practiced interval weaning.