

# 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 factors 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 are often overlooked. In this leaflet you will find some of the most common prenatal risk factors for sheep on farm.

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

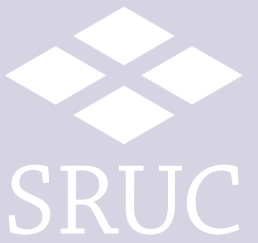
It is important to remember that negative effects of maternal stress or poor nutrition are not just seen at birth and in young lambs. Research in humans and laboratory animals has shown that variation in the prenatal environment can cause changes to the information coded by some genes, a consequence 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.**

For more information contact:  
Kenny Rutherford  
Animal and Veterinary Sciences Research Group, SRUC, Edinburgh  
0131 6519345  
kenny.rutherford@sruc.ac.uk

Acknowledgements  
Funding for this work has been provided by Defra and the Scottish Government

[www.sruc.ac.uk/earlylife](http://www.sruc.ac.uk/earlylife)



## Managing ewes during pregnancy to improve lamb health, welfare and performance.

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

Ewe nutrition, health, housing, environment, handling, and social environment can all affect lamb development and production quality.

If you are seeing reduced birth rates, low lamb survival and reduced lamb 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:

*Good management of ewes during pregnancy can benefit their unborn lambs.*

*Competition between ewes for feed, space, and other social factors can affect unborn lambs.*

*Disease can be a big stressor for pregnant ewes, affecting lamb survival and performance.*



**The cost of treating footrot in pregnant ewes can be offset through improved ewe body condition and resulting lamb performance.**

- Many forms of ill health and painful conditions can affect ewes.
- Over 70% of UK farms use antibiotic spray to treat footrot.

**Disease and parasite exposure during pregnancy can affect lamb vigour.**

- Sheep scab can have a huge effect on ewe condition and lamb development.
- 13% of farms in the UK have had a fluke outbreak in the past year.

**Rough handling of ewes during pregnancy can alter brain structure in lambs.**

- Researchers in Norway found that ewes who were overly fearful of humans had more easily stressed lambs.

**Defra codes state that lowland ewes need at least 1.2m<sup>2</sup> floor space per ewe during pregnancy and hill ewes need 1m<sup>2</sup>.**

If ewes don't have enough space to lie down, they can become more aggressive, which is stressful for the ewes.

- Floor space needs increase after lambing.

$$\text{Stocking Density} = \frac{\text{Total Space}}{\text{Number of Ewes}}$$

**37% of UK sheep farmers assess ewe condition score by hand.**

- Poor body condition during late pregnancy means ewes are less able to give fetal lambs all the food and nutrients they need for growth and development.
- Feeding 100g soya/day per lamb carried in the last 3 weeks of pregnancy will improve ewes' immune systems when they need it most.

**Temperature can have an effect on prenatal lamb development.**

- Fully fleeced housed ewes that are too hot will give birth sooner than partly shorn ewes.
- Look for signs of faster breathing for heat stressed ewes and frozen fluids on the face for cold stressed ewes.

**57% of farmers keep their ewes in the same social groups throughout gestation.**

- Disrupting social groups can be stressful as ewes have to form new relationships and compete with new ewes.
- Stress hormones can pass through the placenta to unborn lambs, affecting development.

**Ewes with plenty of space at the feedface show less aggression.**

- Competing for feed is stressful for ewes and this can harm lamb development.
- Defra regulations suggest a minimum of 30 to 45 cm space for each ewe, depending on breed. Feed blocks can help shy feeders access food.



How do you provide pain relief for severe cases of lameness?

Does your flock treatment plan give your pregnant ewes the help they need?

What is your stocking density?

Do your ewes show signs of being too hot or too cold?

What can you do to help all your ewes access feed?

Some mixing is necessary, but when could you limit mixing your ewes?

Could your handling methods be improved to reduce stress for ewes?

How does body condition score change during pregnancy in your flock?

Health

Housing

Environment

Social

Husbandry

Nutrition

