

Minimising carcasse losses for better returns



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Introduction

With increasingly tight financial margins in beef and sheep production and processing, it is vital to minimise losses throughout the supply chain.

Farmers can maximise their financial returns by concentrating on efficient animal growth, meeting target carcass specifications and minimising the loss of saleable meat and offal.

Cattle and sheep sold for slaughter are a food product and must be passed as fit prior to human consumption. During post-mortem inspections conducted by Food Standards Agency (FSA) staff, any organ, or part or whole carcass not meeting these requirements will be rejected. This leads to reduced returns and possible non-payment to the farmer as a result of total carcass rejection. The processor will also suffer financial loss and may well incur additional costs for disposing of any rejected meat or offal.

While organ rejection may not affect the weight of the carcass, it is very likely the condition that led to rejection will have affected the production efficiency of the animal, making it more expensive than necessary to feed and finish.

With the increase in export demand for offal, maximising the volume of the 'fifth quarter' elements that can be marketed and sold will influence the overall carcass value. Therefore, good stock husbandry, including appropriate feeding and health management that maximises the amount of saleable meat, will most certainly pay dividends.

This booklet, along with abattoir feedback, will help to minimise carcass losses and thereby generate better returns.

Causes of rejection

At English cattle slaughterhouses in 2021:

- 119,168 livers were rejected because of liver fluke
- 8,577 carcasses had abscesses
- 82,640 carcasses showed signs of pneumonia/pleurisy
- 20,270 carcasses showed signs of bruising and trauma

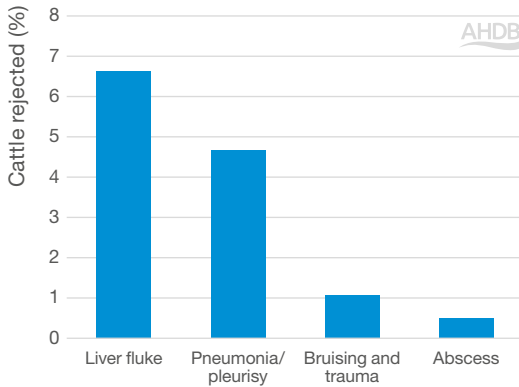


Figure 1. The main causes for rejection at meat inspection for cattle slaughtered in English red meat plants in 2021

At English sheep slaughterhouses in 2021:

- 822,034 livers were rejected because of *Cysticercus tenuicollis*
- 474,187 livers were rejected because of liver fluke
- 600,676 carcasses showed signs of pneumonia/pleurisy
- 219,340 sheep had abscesses
- 97,476 carcasses were rejected because of *Cysticercus ovis*

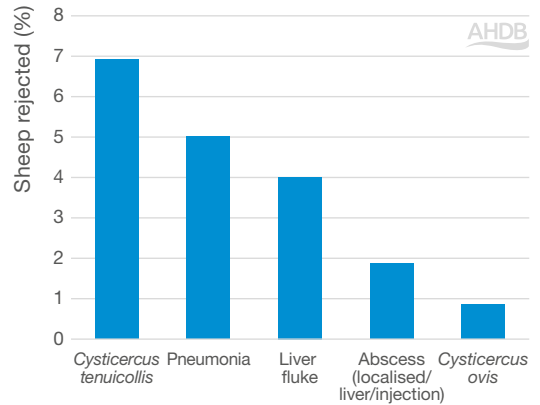


Figure 2. The main causes for rejection at meat inspection for sheep slaughtered in English red meat plants in 2021



Liver fluke

In England in 2021, more than 6.6% of cattle livers and nearly 4% of sheep livers were excluded from the human food chain because of liver fluke (*Fasciola hepatica*) infestation.

The number of rejected, fluke-infested livers has been increasing in recent years. Milder winters and wet summers have created an ideal environment for fluke to thrive and this is now a nationwide issue, with more farms reporting their first cases.

Levels of rejection can vary widely depending on the season and the farm.

Once infected, animals can carry liver damage throughout their life, resulting in reduced performance. However, this is often only evident when the liver is examined at slaughter.



Significant cost to farmers

It is estimated that the loss to the meat trade in 2021 was over £1 million. However, lower growth rates, lower feed conversion efficiencies and higher levels of death, particularly in cases of acute infection in sheep, mean that the costs are far greater to the farmer.

On-farm costs are estimated to be £113 for each case in cattle and £7.40 for each case in sheep. This gives an on-farm cost to English farmers of about £17 million per year, but this could be significantly higher.

Liver fluke can also lead to lower fertility in breeding stock and can predispose animals to other performance-affecting diseases.

Fluke use mud snails as intermediate hosts. These are found in pasture, particularly in damp, muddy areas. Wet, mild weather increases the risk to all farms, even those with no previous history of the problem.

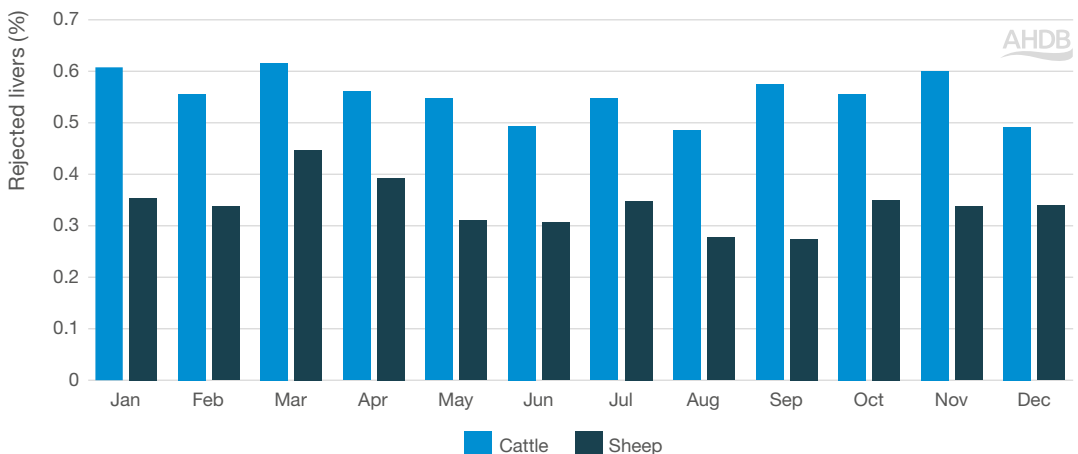


Figure 3. Monthly liver fluke rejections for cattle and sheep slaughtered in England in 2021

Reducing liver fluke infection

Liver fluke can be difficult to control. However, a combination of management practices and a well-planned anthelmintic programme will provide the best opportunity to reduce losses. Strategies include:

Identifying a potential problem – make use of risk-based warning systems, such as that provided by the National Animal Disease Information Service (NADIS) and ask the abattoir whether there are more liver rejections than normal.

Infections can also be detected by screening a group of stock for fluke eggs in the dung, or via blood testing.



A cattle liver showing the damage fluke do to the bile ducts within the liver tissue

Taking early action – but avoid blanket anthelmintic treatment because this might not be necessary and can therefore be a waste of money. It may also encourage the development of resistance to the product used.

Treating with an appropriate flukicide – use the right treatment for the right stage(s) of liver fluke. Check the details of the product selected and ask for advice if in any doubt.

In autumn, when the risk is high and immature fluke are present, triclobandazole (TCBZ) is the drug of choice, unless it has been established that there are TCBZ-resistant liver fluke on the farm. In this case, seek advice on suitable alternatives.

If the risk is lower, alternatives can be used, for example a post-housing treatment of cattle.

Management practices – be aware of the risk of re-infection if animals are put back on high-risk grazing areas. Use tactics such as moving to low-risk areas (i.e. those that are not wet and muddy), fencing off high-risk areas, or housing. If animals have to remain in a high-risk area, monitoring for infection is essential and further treatments may be needed.

Quarantine all incoming stock. Avoid using combination fluke and worm products, unless they are necessary, to reduce selection for resistance in worms.

It is important to seek veterinary advice on product selection and timing, preferably as part of a regular testing and treatment protocol documented in the herd and/or flock health plan.

Dose with care and do not over or underdose. Be prepared to split groups if there is significant variation in the weight of animals.

For further information about products see the **Parasite control guide**, the **Controlling worms and liver fluke in cattle for better returns manual** or the **Disease directories** available at ahdb.org.uk/beef-lamb

Parasite infections

Carcase rejections caused by parasite infections spread by dogs and foxes can lead to significant losses in sheep.

In 2021, *Cysticercus ovis* was found in 0.8% of sheep (97,476), meaning more than £11 million was lost to the English sheep industry.

In the same year, 6.9% (822,034) of livers were rejected because of *C. tenuicollis*, costing the industry nearly £682,288.

The disease stems from the canine adult tapeworm *Taenia ovis* and is transmitted to sheep when infected dogs or foxes shed eggs onto pasture via their faeces. These eggs can survive on grass for up to six months.

Within several weeks of ingesting the eggs, sheep begin to develop infective cysts. If dogs eat raw meat or offal from an infected sheep they will develop adult *T. ovis* worms and shed eggs in the faeces, which continues the cycle.



Put signs on footpaths – keep dogs on a lead and worm your dogs as they can harm sheep

Cysticercus ovis

C. ovis, or sheep measles, produces small cysts that are typically found in the heart. In more pronounced cases it extends throughout the muscles of the carcass, particularly in the hard-working muscles such as the diaphragm and cheek (masseter) muscles.

Generally, infection has a limited effect on the health of the sheep and it cannot be detected until slaughter. However, identification usually results in rejection of the entire carcass, hence the high costs associated with this condition.



Cysts characteristic of *C. ovis*

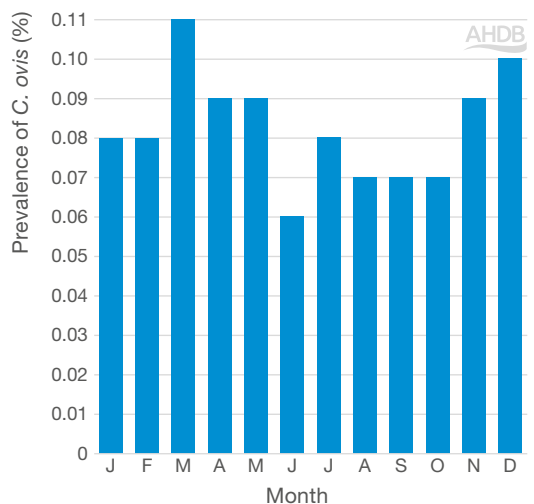
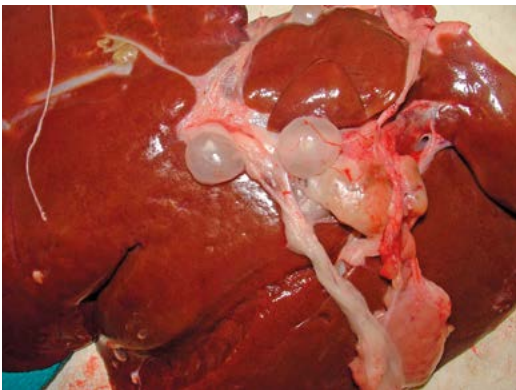


Figure 4. Prevalence of *Cysticercus ovis* in sheep slaughtered in England in 2021

Cysticercus tenuicollis

C. tenuicollis, or bladder worms, originate from another canine tapeworm known as *Taenia hydatigena*. This parasite has a similar lifecycle to *C. ovis*. The larvae develop and penetrate the sheep's intestine before spreading to the various tissues surrounding the abdominal organs and liver.

Aside from liver rejections, heavy infestation in lambs can cause haemorrhages or peritonitis. Moderate to heavy infections can result in loss of appetite, leading to longer finishing periods, increased feed costs and loss in value because animals do not reach target specification. Sheep may also become weak, leaving them prone to other infections.



Liver with *C. tenuicollis* or bladder worm cyst



Serpentine tracks indicative of *C. tenuicollis*

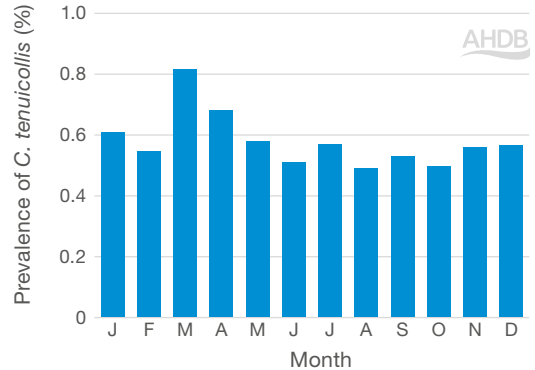


Figure 5. Prevalence of *Cysticercus tenuicollis* in sheep slaughtered in England in 2021

Strategies to minimise parasite infections

Once a sheep is exposed to tapeworm eggs, it is impossible to prevent the development of cysts. Therefore, it is essential to prevent exposure to the tapeworm.

Farmers are advised to:

- Ensure all farm dogs are routinely wormed at the correct dose with a product specifically for tapeworms
- Ensure dogs visiting farm premises are appropriately wormed, or that they do not access sheep grazing areas
- Consider fencing off public footpaths, where practical, to keep other dogs from accessing sheep grazing
- Ensure deadstock are quickly removed and disposed of correctly to prevent scavenging of carcasses by dogs or foxes

Abscesses

In England in 2021, over 1.8% of sheep carcasses (219,340) and almost 0.5% of cattle carcasses (8,577) contained abscesses.

Injecting livestock is a common cause of abscesses, which can form at injection sites. Using dirty needles, or not correctly administering the injection, can exacerbate the problem.

Abscesses must be trimmed out of the carcass, which takes time and reduces meat yield, as well as potentially devaluing the primal cut or carcass. This is particularly the case in lamb carcasses, where trimming often results in downgrading.

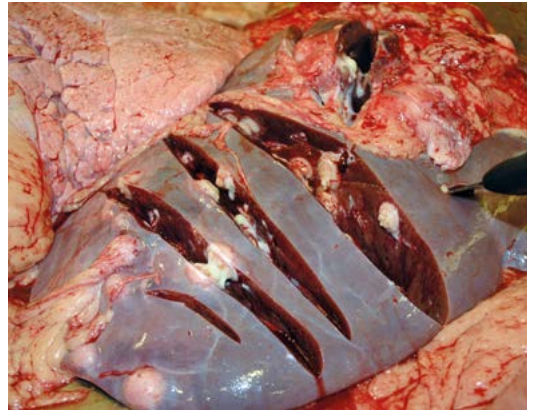
Most abscesses are avoidable if injections are carried out with care, paying particular attention to good hygiene practice.



Examples of abscesses in the flank of cattle

Liver abscesses

In cattle, acidosis can lead to the formation of abscesses in the liver. The risk of acidosis increases when the starch and rapidly fermentable carbohydrate content of the ration rises. This leads to the rumen becoming too acidic and causes digestive upset and damage to the liver wall.



Liver showing severe abscesses

The presence of abscesses in the liver leads to rejection of the liver at the abattoir and affects on-farm productivity through lower liveweight gains.

Tips to avoid acidosis in cattle:

- Do not grind cereals into fine particles – crack the grain
- Offer moist cereals like crimped or treated grains
- Always have a source of long fibre available (e.g. straw) in racks to provide structural fibre – intakes are likely to be 0.5–1.5 kg/day
- Never let ad-lib feed hoppers run out so animals gorge on high energy feeds when they are filled up
- If not feeding cereals ad lib, feed small meals throughout the day. Avoid individual meal sizes greater than 2.5 kg/head/feed for dry cereals

Injection best practice

Products should be stored and injections administered according to manufacturers' instructions.

For best results, follow these key guidelines:

- Always use a clean, sterile syringe and needle. If using a multiple injection gun, ensure the needle is disinfected and changed regularly. Never insert a used needle into a medicine bottle
- If the site to be injected is dirty, clean the skin and swab with an alcohol-impregnated wipe or cotton wool. Avoid injecting animals that are wet
- Before injecting, check the product expiry date. Read and follow the directions of the product to be used. Some products must be shaken first. Adhere to the withdrawal periods on the data sheet to ensure stock is not marketed too soon after the injection has been given
- Use the correct size of needle according to the size of the animal and site of injection
- Ensure the animal is adequately restrained before attempting the injection

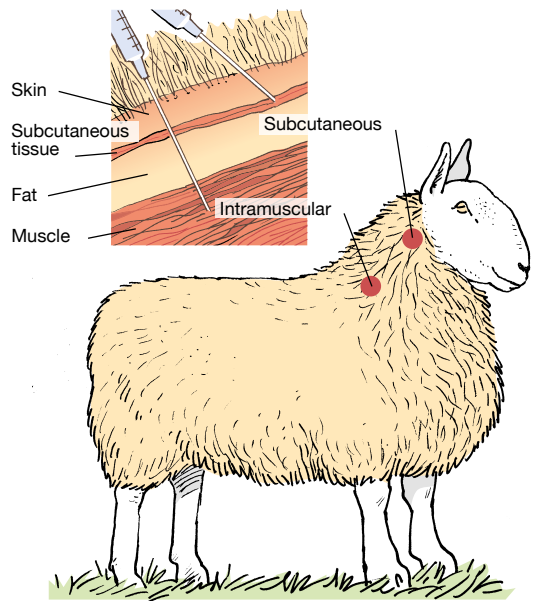
Intramuscular injections

The main site for intramuscular injection is the muscle mass of the neck. This ensures no valuable cuts of meat are damaged, particularly the hindquarter cuts, and the constant movement of the neck ensures good dispersion of the product.

Draw up the solution for injection into the syringe. Disconnect the needle and hold the hub firmly between thumb and middle finger. Insert the needle into the muscle with a sharp slap action, pushing it in to the hub. Connect the syringe to the needle, draw back to check there is no blood and then slowly inject the contents of the syringe over 10 seconds. Do not

inject too quickly because this may cause the animal pain.

Never insert the needle when connected to the syringe because this makes it more difficult to insert it to the correct depth with a single movement. The syringe hub is the weakest point and will often snap if the animal moves, rendering the contents of the syringe useless and creating potential animal welfare and meat safety issues. After the injection, gently massage the injection site.



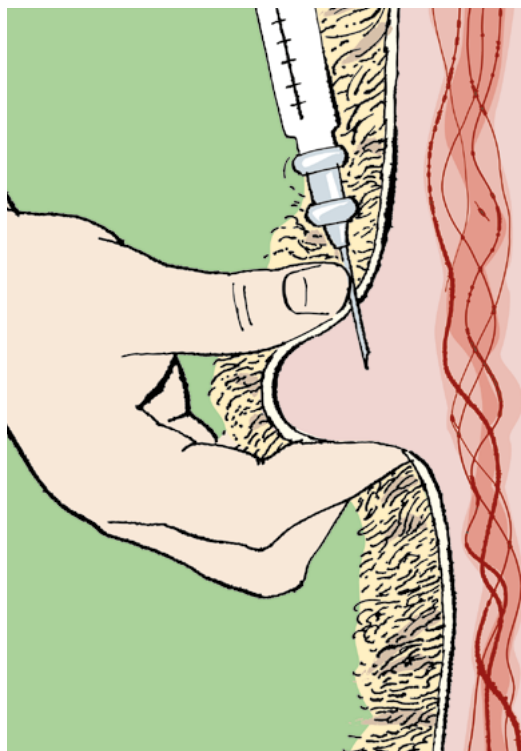
Subcutaneous injections

Subcutaneous injections are administered in areas where the skin is loose (mainly the neck or behind the shoulder). Grasp a fold of skin and slide the needle through the skin, parallel to the animal's neck or trunk. This method will avoid penetration of the underlying muscle.

The needle should be inserted several inches from the operator's hand to avoid accidental self-injection. The plunger of the syringe should always be pulled back after entry to ensure the needle is not located within a blood vessel.

If a large dose is to be delivered, it is advisable to split it between two injection sites. After the injection, briefly massage the site to improve the dispersal of the injected material.

For further information, see the **Beef and Sheep disease directories** at ahdb.org.uk/beef-lamb



Correct storage

Every medicine has its own specific storage instructions, which can be found on the back of the box or bottle. These should be followed closely as many medicines are sensitive to light and temperature. The active ingredient in the medicine will be compromised if it is not stored correctly, causing it to be less effective, if not completely ineffective.

Make sure medicines are stored in the correct location, either a medicine cabinet or fridge, rather than leaving them in farm vehicles, sheds or near livestock pens or handling equipment.

The fridge temperature should be between 2°C and 8°C. This should be checked regularly using a thermometer, as a recent survey found that many farm fridges were either too warm or too cold.

For fragile medicines such as live vaccines, being stored at the incorrect temperature can destroy the vaccine and render it totally ineffective.

For more information, see the **Using medicines responsibly manual**.

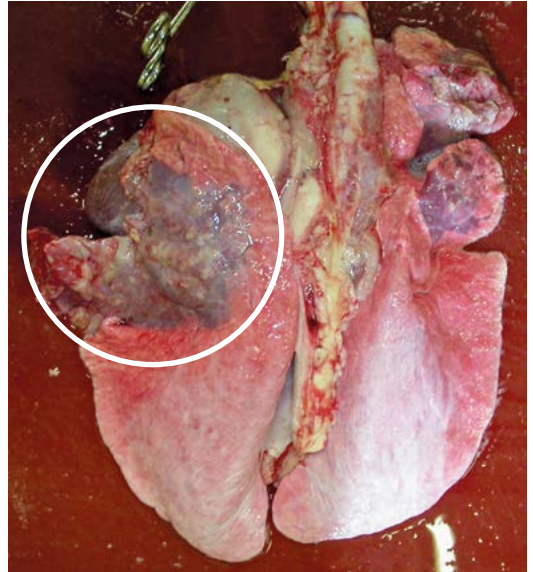
Pneumonia/pleurisy and Pasteurella

In 2021, 5% of sheep carcasses and 4.6% of cattle carcasses slaughtered in England showed evidence of pneumonia/pleurisy.

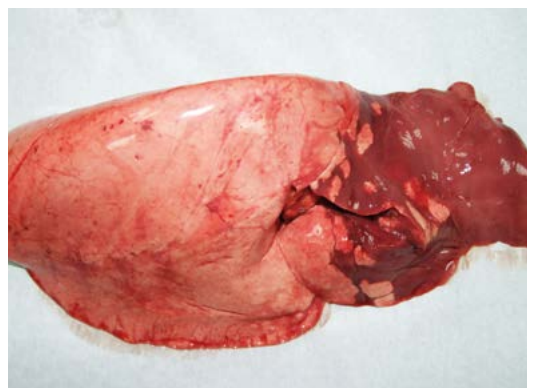
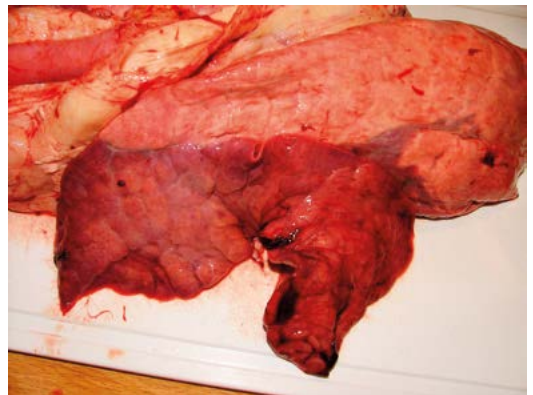
Stock that have suffered respiratory diseases during their lifetime can show lesions or infected lobes in the lungs, leading to rejection of these organs at slaughter.

Pneumonia in cattle and Pasteurella in lambs pose a significant risk of death. Research has shown that cattle with infected lungs have a reduced daily liveweight gain, lower carcass weight and poorer carcass classification than cattle with healthy lungs.

Vaccination programmes for Pasteurella in lambs and Infectious Bovine Rhinotracheitis (IBR) and Bovine Respiratory Syncytial Virus (BRSV) in cattle should be considered as part of the farm health plan. Building design that promotes good ventilation and airflow is critical to preventing respiratory diseases in stock.



Lungs with evidence of pneumonia infection (circled)



Sheep lung with evidence of pneumonia infection

Other factors affecting the carcase

Bruising and trauma

More than 20,270 cattle carcasses slaughtered in England in 2021 showed signs of bruising and trauma.

Bruised carcasses can be visually unappealing, which deters buyers, particularly in lambs. They may require trimming, which reduces carcass weight and may exclude them from certain high-value markets.

Inappropriate use of sticks can cause severe bruising in cattle, as can wool-pull in sheep, particularly in spring lambs, which bruise very easily. Take care in loading, transit and unloading, ensuring appropriate stocking densities are followed.



Obvious bruising on the side of a cattle carcass (top) and lamb carcass showing bruising caused by wool-pull (bottom)

Hide and skin damage

Skin price can have a large effect on lamb value. Quality affects the skin price so ensure stock are handled and clipped or dagged carefully to reduce damage.

Consider the impact of poor handling systems, holding pens and fences. Maintain handling systems to prevent injuries or bruising. Horned cattle within a group can increase the risk. The presence of ectoparasites such as lice, ticks and flies can also reduce the quality of hides and skins.

Stress

Carcasses from agitated cattle, particularly young bulls, are susceptible to a meat quality condition called Dark Firm Dry (DFD), sometimes referred to as 'Dark Cutters'.

Stress in the 24–48 hours prior to slaughter depletes glycogen stores in the muscles, resulting in meat with an abnormally high pH and a dark red colour. Appearance is an important factor when consumers buy meat.

Although not a safety issue for consumers, DFD meat will be sold at a discounted price. It also has a shorter storage life than meat that has a normal pH. It has been estimated this condition can reduce carcass value by as much as 50p/kg or £160 per carcass; however, this is a conservative estimate.



The meat on the left has come from an animal that suffered pre-slaughter stress

Avoid stressing cattle by:

- Handling them quietly and calmly
- Not mixing animals from different groups
- Taking special care with bulls

Carcase contamination

Dirty fleeces and hides increase the potential for carcass contamination and potential risk to human health from food-borne illnesses.

Faeces can carry pathogens such as *Escherichia coli* 0157:H7, *Clostridium perfringens*, *Salmonella* and *Campylobacter*, which, if transferred to the carcass surface during dressing, can result in food-borne illness.

Farmers taking animals to the abattoir have a duty to ensure their stock are presented in a clean and dry manner. Equally, abattoir operators must implement cleanliness standards for incoming stock as part of their legal responsibility as a Food Business Operator.



Beef and sheep categorised as dirty, which will need special attention at the abattoir

On arrival at the abattoir, animals are assessed for cleanliness and any animal deemed too wet or dirty cannot be killed unless extra steps are taken to ensure slaughter and dressing can be carried out hygienically.

Delivering dirty stock to the abattoir can also increase processing costs, elements of which may be passed back to the farmer.

Costs include:

- Cleaning/clipping dirty animals
- Reduced slaughter-line speed
- Reduced carcass value caused by any additional trimming required
- Reduced value of by-products, i.e. hides and sheep skins
- In extreme cases, loss of the entire carcass

Preventing animals from becoming dirty in the first place is ideal, but cannot always be achieved, particularly in wet weather and when finishing sheep on roots and forage crops.

Steps should be taken to reduce the amount of loose dung produced and, where possible, to prevent fleeces and hides from getting excessively muddy. Plan an appropriate parasite control programme with your vet, provide free-access straw or hay when grazing stock on lush or wet fields and move ring-feeders often to prevent soil poaching.

Management considerations for slaughter cattle

Ration – consider changing animals on a ‘wet’ silage or brewers’ grain-based ration to a drier ration pre-slaughter. Alternatively, provide cattle with free access to straw fed from a ring-feeder, or include long chopped straw in mixer wagon rations.

Where cattle are being finished on intensive cereal diets, make sure the ration is correctly balanced for protein, energy, vitamins and minerals and use cereals that have been lightly rolled, not ground.

Bedding – provide adequate straw and bed-up frequently.

Clipping – to remove visible signs of dirt. This should only be carried out as a last resort as it can be stressful for the animal and dangerous for the farmer. It can also damage and devalue the hide.

Reduce dung contamination during transit – research has shown that contamination is reduced in cattle fed on straw and water only for up to 36 hours prior to slaughter.



Management considerations for finished sheep

Ration – for sheep approaching finishing and being fed on a ‘wet’ diet of silage, roots or brewers’ grains, consider changing to a drier ration, e.g. a higher cereal mix.

Where sheep are grazing roots and forage crops, make sure the land is light and free-draining and dag before turning out. Provide hay at all times. Move racks, troughs and feeders often to avoid creating boggy areas. Leave large enough dry lying areas and sufficient shelter for the whole flock in poor weather.

Housing – bed-up sheep regularly with adequate clean, dry straw. For animals finished off grass, house overnight prior to sale, if possible, to reduce gut fill.

Weather – try to ensure sheep are dry prior to slaughter, as wet fleeces increase the spread of bacteria.

Belly clipping – particularly relevant if sheep are coming off roots or dirty/wet ground. However, over-zealous clipping can damage and devalue the skin. Leave belly clipping as close to sale as possible and keep on clean, dry bedding.

The FSA has produced practical advice on how to present clean animals for slaughter. For further information visit: [food.gov.uk/business-guidance/cleaner-cattle-and-sheep](https://www.food.gov.uk/business-guidance/cleaner-cattle-and-sheep)

AHDB Beef & Lamb has produced a video on presenting clean livestock to slaughter, which can be found on our YouTube channel, **AHDB Beef & Lamb**.

Beef and sheep publications

Improving pasture for Better Returns
Assessing the business for Better Returns
Improving soils for Better Returns
Managing clover for Better Returns
Making grass silage for Better Returns
Using brassicas for Better Returns
Managing nutrients for Better Returns
Planning grazing strategies for Better Returns
Minimising carcass losses for Better Returns
Growing and feeding maize silage for Better Returns
Using medicines responsibly

See the AHDB website ahdb.org.uk/beef-lamb for the full list of publications for beef and sheep producers.

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