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Improving Lamb Survival

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The sheep industry in the UK continues to lose large numbers of newborn lambs, as well as many lost before birth due to causes such as infectious abortion and inadequate feeding of ewes. This is not only of concern economically for producers but is unacceptable in terms of animal welfare. Practical ways to reduce these losses and therefore prevent unnecessary suffering should be considered by producers in consultation with their veterinary surgeon and other advisers.

Sheep up to a year old are particularly vulnerable to environmental stresses and diseases compared with older sheep. Lambs are born without antibodies to protect them against disease and only after they have received a good supply of antibody rich colostrum will they have any protection against infection. Even after the early lamb stage, lambs are very vulnerable to many diseases including gut and skin parasites.

Nationally about 15% of lambs born annually are lost, which represents a significant welfare problem and financial loss for the industry. Most lamb losses occur around lambing time.

The major causes of lamb death are:

- Abortion and Stillbirths
- Exposure and Starvation
- Infectious Diseases
- Congenital Defects
- Predators and Misadventure

Many lambs could survive with better planning, good preparation, well organised lambing routines and facilities, good stockmanship, possibly increased supervision and staffing numbers around lambing time and early recognition of problem lambs.

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For example:

● Hygiene

Disease spread within and between flocks can be reduced by the application of simple, common sense quarantine rules as part of a farm biosecurity policy (for further guidance see Code of Recommendations for the Welfare of Livestock: Sheep, booklet PB5162 and Biosecurity Guidance leaflet PB7350).

● Infectious disease

Besides good hygiene and strategic use of disinfectant, disease incidence can be reduced with attention to the application of health programmes.

● Abortions and stillbirths

An appropriate disease investigation and vaccination programme can reduce losses and it is possible to purchase disease free stock. Your veterinary surgeon is best placed to advise on what programme suits your flock best.



Aborted lambs.

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● Exposure and starvation

Attention to ewe condition, feeding and management plus early recognition and correct treatment of lambs at risk will increase the lamb survival rate.

● Misadventure and Predators

Turning out weakly lambs and mis-mothering can lead to high losses.

The Ram

Ram management is also important and rams should be in condition score 3.5 to 4 at the start of tupping. Raddling can give a very good indication of how lambing dates are likely to be distributed through the flock. This information can be valuable for grouping ewes according to nutritional needs.

Feet, teeth and genitalia of rams should be examined 6–8 weeks before tupping starts. If appropriate, a semen check may also be carried out. Your veterinary surgeon can advise on where this service can be obtained.

Conformation of rams and their characteristics should be carefully matched to the ewes to ensure ease of lambing, health of progeny and suitability for the farming system.

When fitting crayons check the holder has smooth edges and that pins are bent correctly. Select crayons according to weather conditions and wool type, check harnesses regularly and change raddle colour every 9 to 10 days.

1) THE EWE FROM WEANING TO LAMBING

A written health and welfare programme for all animals should be prepared for every flock, which must cover the yearly production cycle.

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It should be developed with appropriate veterinary and technical advice, and reviewed annually. Training and advice regarding husbandry procedures to maximise lamb viability and growth should also be sought. The aim should be to have fit, well fed ewes, with antibodies well primed by appropriate vaccination. They should then have every chance of producing strong vigorous lambs. By spending time, money and effort on the ewes, from weaning time until they lamb, many of the troubles that lead to lamb losses can be avoided.

● A fit ewe

To produce lambs with adequate birth weights, have enough colostrum and be able to maintain milk yield in early lactation, a ewe must have enough body reserves at lambing without being too fat.

Body condition scoring is a useful technique for measuring the body reserves of ewes. (For details please see Defra booklet PB1875, **Condition Scoring of Sheep**)

At tuppings, to achieve the maximum lamb conception rate, the aim should be to have lowland ewes in condition score 3.5 and hill ewes in condition score 2.5. Ideally, ewes should lose no more than half a condition score between tuppings and lambing. Do all you can to avoid changes in condition during the first 6 weeks of pregnancy. During this period embryos are extremely vulnerable to fluctuating nutrition in the ewe.

Throughout pregnancy ensure ewes do not fall below condition score 3 (lowland) or 2 (hill) before they are due to lamb. Routine condition scoring and correct feeding will ensure ewes lamb down in optimum condition. You may need to change the quantities or type of feed provided to ewes if they lose condition.

It is also essential to check the feet, teeth and udders of ewes before putting them to the ram for serving.

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● A Healthy Ewe



Fit healthy ewes.

The flock health plan must include details of all routine vaccinations and treatments as follows:

- All ewes should be routinely vaccinated against clostridial diseases as they are an ever present risk to sheep. Some shepherds have abandoned clostridial vaccination to help reduce veterinary costs but inevitably one or other of the clostridial diseases will cause significant losses in the future if ewes go unvaccinated. Pasteurellosis and infectious abortion vaccination should also be considered if these diseases have caused losses in the past. The passive immunity conferred to young lambs by colostrums may have to be supplemented by vaccination as they get older;
- Control of internal and external parasites;
- Treatment and control of lameness;
- All veterinary medicines and vaccines should be stored and administered according to the manufacturer's directions; and
- All treatments should be recorded in the farm medicine book.

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Dead lambs at full term, abortions and weakly lambs can be a sign of infection or nutritional deficiency. If you think any of these problems may affect your ewes or your flock is at risk, you should consult your veterinary surgeon and consider preventative measures.

● A Stress Free Ewe

The whole reproductive process from conception to birth can be influenced by stress. This can be due to factors such as:

- High stocking density – in buildings or at grass;
- Disease;
- Excessive handling or disturbance;
- Transport;
- Excessive use of dogs;
- Isolation from the flock; and
- Too large group sizes where some ewes may not have free access to supplementary feeding.

The results are often ewes not coming on heat or delayed oestrus with a reduction in the number of eggs shed at ovulation. Stressed ewes can also show a reduction in oestrus behaviour and libido. Loss of fertility occurs as stress on the animal increases. The result may be a decrease in the number of ewes conceiving and the number of lambs born.

Lower milk yields, reduced milk quality and poor let down of milk are found in stressed ewes at high stocking density and there are also signs of impaired maternal behaviour. These effects may be particularly evident in younger and less experienced animals. The effect of this will also reduce lamb survival.

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● A Well Fed Ewe



Ewes feeding.

In the last 6 weeks of pregnancy, 75% of foetal growth occurs, making heavy demands on the ewe's metabolism.

- Aim to increase the ewe's energy intake using the best quality forage available and supplement with a good quality, high-energy concentrate.
- Adequate protein supply is critical during the last 2–3 weeks before lambing for foetal growth.
- High quality protein ingredients will ensure good udder development and a plentiful supply of colostrum.
- Silage and hay should be analysed and a ration formulated for optimum performance.

Feed ewes according to their condition and numbers of lambs carried as indicated by scanning. If possible, identify thin ewes below the target score before lambing and feed more generously.

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Example rations for ewes in late pregnancy (concentrates are 12.5MJ/kgDM)

A 70kg **Lowland** ewe, condition score 3.5 at start of feeding

Weeks before lambing	8	6	4	2	1
Twins on silage (11.0 MJ/kg DM ad-lib) – Concentrates (kg/day)	Nil	Nil	0.3	0.4	0.6
Twins on Hay (9 MJ/kg DM) ad lib – Concentrates (kg/day)	0.2	0.4	0.6	0.8	0.9
Twins on good quality straw ad lib – Concentrates (kg/day)	0.5	0.7	0.8	0.9	1.1

A 55kg **Hill** ewe, condition score 2.5 at start of feeding

Weeks before lambing	8	6	4	2	1
Single on Hay (9 MJ/kg DM) ad lib – Compound (kg/day)	0	0.2	0.3	0.5	0.5
Twins on Hay (9 MJ/kg DM) ad lib – Compound (kg/day)	0.2	0.4	0.5	0.7	0.8

● A Scanned Ewe



Ewe being scanned.

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Pregnancy scanning can be very useful and should take place between 60 and 80 days of pregnancy. The benefits of scanning are:

- flock can be grouped to ensure optimal feeding as rations can be fed which match ewe needs. This reduces the risk of oversize singletons and undersize multiple lambs;
- can help make best use of limited housing;
- the better in-bye grazing can be given to hill ewes with twins;
- rations for prolific flocks can be targeted at the more prolific and/or thinner ewes; and
- additional staff can be provided at the lambing period.

● A Housed Ewe



Housed ewes.

Housing protects both sheep and shepherd during the stressful time of lambing. The housing period also allows pastures to recover, particularly on more intensively grazed holdings. While the protection

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provided is likely to reduce lamb losses, it is important to realise that housing can bring other problems. There is an increased risk of exposing lambs to conditions which allow the spread of infectious diseases. There is also an increased risk of mismothering.

The basic requirements of housing are the provision of:

- well ventilated but draught-free conditions;
- an adequate pen lying area;
e.g. 1.3m² per ewe for a 70 kg lowland ewe pre lambing increasing to 2.0m² post lambing; and
1.0m² per ewe for a 45 kg hill ewe pre lambing increasing to 1.8m² post lambing.
- adequate trough space. The minimum for:
 - ad lib forage 12–15cm / ewe (6");
 - rationed concentrates 30–45cm / ewe (12–18");
- a clean, dry bedded area; and
- an adequate supply of fresh clean water.

If housing space is limited give priority to the following categories of ewes:

- older ewes;
- first crop ewes;
- ewes expecting multiple lambs; and
- ewes below target condition score.

Heat stress may be a problem in housed sheep (see Defra booklet PB2111 **Heat Stress in Sheep**). Winter shearing is an option for lowland flocks when ewes should be housed for a minimum of 8 weeks after shearing in draught-free and dry conditions before turning out. Aim not to turn out before mid/late March avoiding cold, wet and windy conditions.

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2) AT LAMBING



Ewe lambing.

Studies of maternal behavioural in ewes have confirmed that different breeds show a greater readiness to groom or lick their lambs. There are breeds that are recognised as being significantly poorer mothers than others. There is also a great variation between ewes of the same breed in this aspect of maternal behaviour.

In general it is thought that the increased selection for production traits may lead to a decline in mothering ability particularly in highly selected breeds of sheep. The level of labour input and close supervision should be appropriate for the breed of sheep and management system.

● Labour

Aim to staff at a maximum of 250 ewes per person over the main lambing period, the levels of labour should reflect the number of ewes likely to lamb in a given time period. More labour may be required for flocks which are synchronised. This should, for bigger flocks, enable night cover during the busiest period. Ensure staff are competent in general sheep stockmanship, proficient in lambing techniques and fully

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briefed on the routines to adopt. Make provision for staff hygiene and comfort during lambing. Details of all the recommended items of equipment and supplies needed at lambing are given in Appendix 1.

● Lambing pens

- Provide one pen per 8 ewes.
- Place pens on a dry, well drained site with easy access.
- Provide outdoor pens with shelter.
- 2m x 1m minimum.
- Provide clean feed and water at least twice daily.
- Clean, disinfect and provide new bedding between each occupation. Adding a small amount of hydrated lime under the bedding can also help to reduce infections.

● Hospital area

- Provide electric light, power points and hot and cold water.
- Ensure floors and walls are easy to clean and disinfect.
- Provide one adopter pen and one isolation pen (2m x 1m) per 50 ewes.
- Provide at least one lamb warmer box (see diagram in **Appendix 3**). For prolific flocks in exposed areas, one per 50 ewes may be needed.
- Organise an aftercare unit for weak lambs. Infra-red lamps overhead are useful for extra heat.
- Provide small group pens for ewes to mother-up and get well established. This is important for ewes with weakly or fostered lambs or those whose lambs have had hypothermia.
- Create small well sheltered paddocks adjacent to the lambing area to aid close observation before turning out sheep with problems.

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● Assistance at lambing

Most ewes will lamb without difficulty. Careful, quiet and regular observation is important to detect problems during lambing. Try to leave ewes alone for no more than an hour between observations, however this depends on whether the flock is housed and on the size of the flock.

Ideally a lambing assistant should have at their disposal:

- disposable gloves;
- disinfectant;
- lubricant;
- antibiotic treatment (as prescribed by your veterinary surgeon); and
- respiratory stimulant drops (as prescribed by your veterinary surgeon).

IF IN DOUBT OR DIFFICULTY SEEK VETERINARY ASSISTANCE IMMEDIATELY. DO NOT PERSIST WITH A LAMBING PROBLEM FOR MORE THAN 15 MINUTES. DO NOT USE FORCE.

● Adoption

Successful methods are:

- Wet adoption – e.g. introduction of a lamb to a single bearing ewe at the point of birth. It is important to cover the orphan lamb well with birth fluids and to remove the ewe's own lamb from sight until the orphan is accepted. It is also possible to remove the single lamb completely to be replaced by two matched orphans. In this case, ensure the single lamb is fed colostrum immediately (see details below);
- Skinned lamb – this tried and tested method needs to ensure the orphan lamb is well covered over its rear by the skin jacket; and

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- Adopter crate – this method may be difficult and time consuming, particularly if the ewe has rejected the lamb on initial contact, but perseverance often pays off.

These can be useful techniques for rearing orphan lambs helping to avoid expensive artificial rearing. Ewe and lambs should be kept in well supervised small groups until bonding is complete.

● Colostrum

Check that ewes, and those animals lambing for the first time in particular, have adequate colostrum supplies and that lambs get a sufficient quantity. The table in Appendix 2 gives details of the amount of colostrum required.

Colostrum is essential for new born lambs as it:

- Gives immunity to disease;
- Provides a highly concentrated source of energy;
- Acts as a laxative; and
- Is an essential feed within 6 hours of birth.

Allowing the lamb to suck colostrum from the udder is an important part of the maternal bonding process.

If colostrum quantity or quality is poor from the ewe herself, lambs should be given extra colostrum. Colostrum from other ewes in the same flock is ideal. Set up a colostrum bank with colostrum from your own ewes. Freeze in small quantities (50ml) and thaw as required. Cows' colostrum can be used but you should discuss the potential risk of causing anaemia using this method with your veterinary surgeon. Details of feeding colostrum using a stomach tube are given in Appendix 2. Your veterinary surgeon can also advise on this technique which must only be attempted by competent staff.

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Colostrum by stomach tube.

3) PREPARE FOR TURNOUT

Ewes form a selective bond with their lambs within 2 hours of birth that is based entirely on smell. This rapidly develops to include other senses. Inexperienced ewes, lambing for the first time, do not have this ability immediately at birth, this appears to develop within 6 hours of birth. Once these changes and the maternal learning experiences are developed they remain with the ewe for life.

It is vital to set up a routine for new born lambs. Everyone involved in lambing should follow the same routine and be provided with the necessary equipment close to hand.

- Has it sucked?
- Navel treated?
- Is navel dry and healed?
- Have mother and lamb(s) bonded?
- Is it marked/tagged?
- Was colostrum fed?
- Are castration and tail docking necessary? If so, has lamb recovered?

If castrating or tail docking wait until lambs are at least 24 hours old and are suckling well.

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● Turn-out



Ewes and lambs at grass.

Lambs should only be turned out if:

- they are dry;
- they are sucking well;
- they are well-bonded to their mother;
- the weather is not cold, wet and windy; and
- the ewe has an adequate milk supply.

Take your time – turn out small groups and watch them mother-up before leaving them.

Put some form of common mark on each family group turned out. Have plenty of spray marker paint available.

Once lambs are outdoors:

- ensure close supervision, particularly for the first few days;
- ensure shelter from the wind (straw bales if no hedges);
- ensure ewes are well fed to maintain milk supply; and
- supplementary feed for ewes may need to contain additional magnesium.

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MIS-MOTHERING IS A MAJOR CAUSE OF HYPOTHERMIA AND STARVATION. CLOSE, REGULAR SHEPHERDING SHOULD BE A PRIORITY TO PREVENT THIS ESPECIALLY WHEN LAMBS ARE VERY YOUNG.

4) HYPOTHERMIA/STARVATION

Lambs can lose body heat very quickly. Unless they are well fed they can, particularly in cold, wet and windy conditions, become hypothermic. Hypothermic lambs are lethargic, tucked up, tend not to follow the ewe readily and may show signs of distress. These lambs can quickly deteriorate and die. Early, mild hypothermia is difficult to detect without taking the lamb's temperature and will quickly develop into severe hypothermia if not treated.

LAMBS WITH ONLY MILD HYPOTHERMIA STAND AN EXCELLENT CHANCE OF FULL RECOVERY WHEN PROPERLY DRIED AND FED.

Any lamb showing signs of lethargy or distress should have its temperature taken.

Above 40°C	INFECTION LIKELY – DISCUSS SUITABLE RESPONSE WITH YOUR VETERINARY SURGEON
39–40°C	NORMAL
37–39°C	MILD HYPOTHERMIA
Below 37°C	SEVERE HYPOTHERMIA

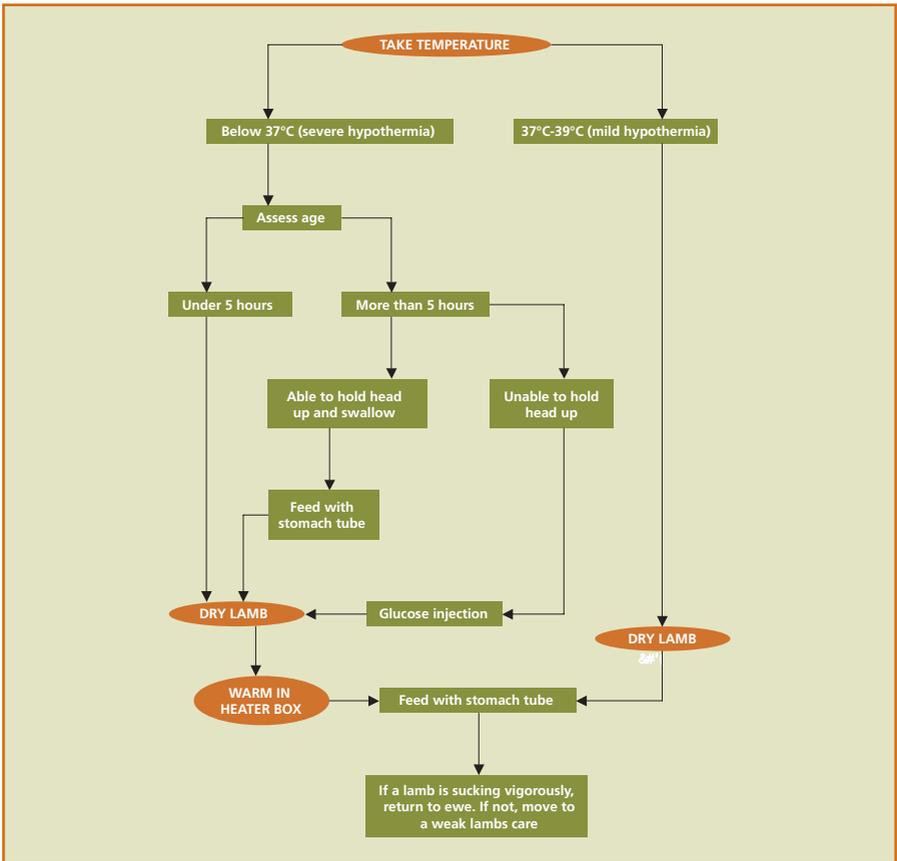
The action you must take to help a hypothermic lamb then depends on its TEMPERATURE and AGE.

The flow diagram takes you through the steps required based on these two factors. Followed correctly, your chances of successfully saving the lamb are high.

Details of giving a glucose injection to a weak lamb are given in Appendix 4.

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WEAK LAMB



Appendix 1

SHEPHERD'S STORE

Restock in good time – consult your veterinary surgeon on medicines required

PARTURITION EQUIPMENT

Soap
Paper towels
Buckets

VETERINARY SUPPLIES

Clostridial vaccines
Worm drench (discuss worming programme with your veterinary surgeon)

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PARTURITION EQUIPMENT

Disinfectants
Lubricating fluid
Disposable gloves
Lambing ropes/noose

SURVIVAL KIT

Stomach tubes and 50ml
Syringes
Bottle and teats
Colostrum/colostrum
Substitutes
Navel dipping cup/spray
Vacuum flask
Infra-red lamps
Spring balance

SURGICAL EQUIPMENT

Prolapse harness
Rubber rings and
Applicator (if castration
and docking necessary)
Foot-paring knife and
Secateurs
Clinical thermometer
Sterile syringes and
Needles

VETERINARY SUPPLIES

Foot-rot vaccines
Bottles of:
Calcium borogluconate
(with added glucose)
Magnesium sulphate solution
(25%)
Glycerine
Glucose (dextrose) solution
(40%)
Antiseptic pessaries
Antibiotics (as prescribed)
Syringe and needles for above
Iodine solution
Antiseptic or antibiotic spray
Hypochlorite solution
Multi-vitamins
Respiratory stimulant drops
(as prescribed)

MISCELLANEOUS

Torch and spare batteries
Record sheet/cards
Ear tags and applicator
Marking sticks
Aerosol colour sprays (various)
Drench bottles
Spare clinical thermometer
Hydrated lime

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Appendix 2

FEEDING COLOSTRUM USING A STOMACH TUBE

Do not use a stomach tube on very weak or unconscious lambs. There is a risk of the tube entering the wind-pipe.

1. Thaw frozen colostrum gradually (not in a microwave).
2. Warm the required quantity to blood heat. DO NOT OVERHEAT
3. Sit down and hold the lamb making sure your tube and colostrum are to hand.
4. Slide the tube into the side of the mouth. DO NOT FORCE. (Softening plastic tubes in warm water will help).
5. Slide tube down until 50–75mm (2–3") remain, or until resistance is felt.
6. If the lamb shows signs of distress remove and try again.
7. When the tube is in place, attach syringe of colostrum and depress the plunger SLOWLY (25 seconds).
8. Leave the tube in place and repeat until all colostrum is given. The table below details the amount required per feed. Lambs must be fed 4 or 5 times in the first 24 hours.
9. Remove tube and syringe.
10. Wash and sterilise tube and syringes. Leave in hypochlorite solution until required again.

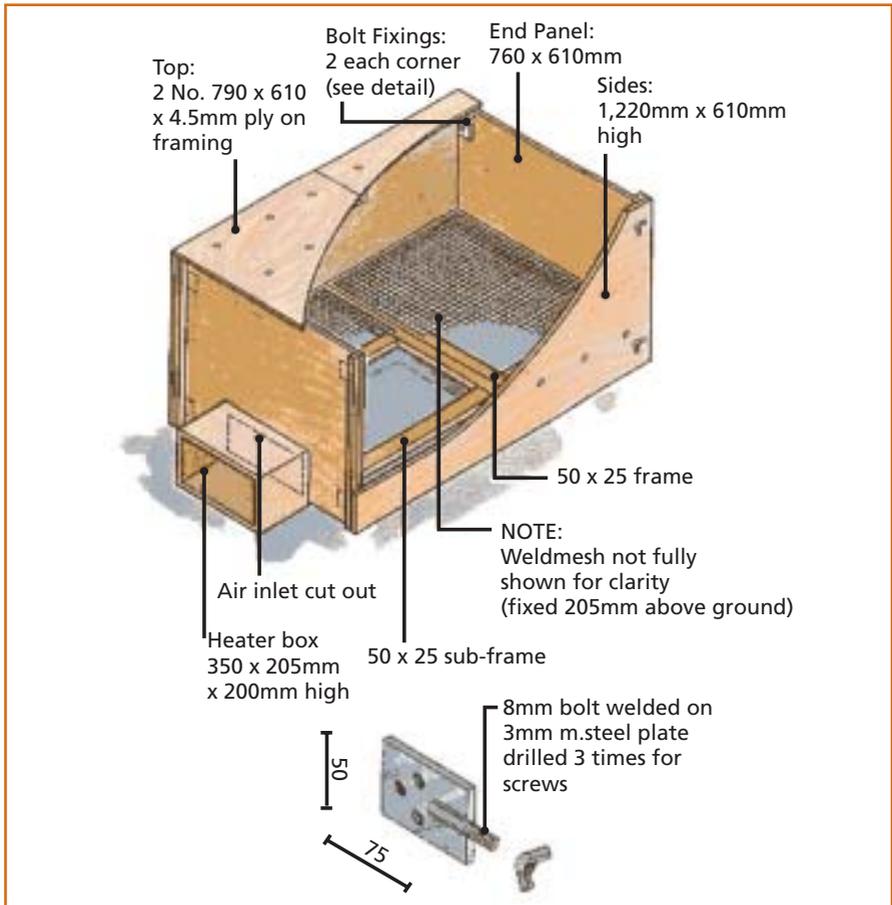
Amounts of colostrum for lambs*

Lamb size/weight	per feed	per 24 hours
Single 5.5kg (large)	250ml	1000ml
Twin 4.0kg (medium)	200ml	800ml
Triplet 2.5kg (small)	150ml	600ml

*Increase by 20–30% if outdoors in cold, wet, windy conditions.

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Appendix 3



Lamb warming box.

Appendix 4

GLUCOSE INJECTION

IF YOU ARE NOT FAMILIAR WITH THIS TECHNIQUE YOU SHOULD ASK YOUR VETERINARY SURGEON TO DEMONSTRATE IT TO YOU.

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Lambs over 5 hours of age with severe hypothermia and which are unable to hold their heads up need a rapid source of energy before they can be warmed and fed. This is because they have exhausted their built-in fat reserves and without energy are unable to cope with digesting any colostrum you may give them.

1. Dry the lamb.
2. Inject a 20% glucose solution before warming the lamb (see overleaf).
3. Warm in a heater box.
4. Feed colostrum by stomach tube once the lamb's temperature reads 38°C.
5. Return to the ewe but supervise for a day or two and repeat if necessary.

WARNING: If you warm these lambs before injecting glucose you may kill them.

GIVING A GLUCOSE INJECTION

- Meticulous hygiene is essential. You will need:
- sterile syringes;
- new, disposable 1" x 19g needles;
- 10ml of a 20% glucose solution/kg body weight (dilute 40% glucose with an equal volume of recently boiled cooled water); and
- to ensure the final solution is at blood heat.

METHOD

1. Dry lamb.
2. Hold by front legs.
3. Swab injection site with antiseptic.
4. Inject glucose.
5. Put lamb in warmer box until temperature reaches 38°C.

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