RESPONSIBLE USE OF MEDICINES IN AGRICULTURE ALLIANCE

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Industry guidance document for veterinary surgeons and farmers on responsible use of antibiotics in sheep

Acknowledgement

These guidelines have been produced by the members of the Sheep Health and Welfare Council (SHAWG) Antibiotic Guardian Group. They meet the RUMA principles for the responsible use of medicines and as such RUMA supports their use and promotion in the UK sheep sector.

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Division of the British Veterinary Association

There is increasing global concern over antibiotic resistance in human and animal populations[i]. Unless urgent global action is taken by all stakeholders, we may soon find that common human and animal diseases, once readily treatable with antibiotics, will be untreatable and fatal. The result will be suffering of millions of individuals within animal and human populations. This also threatens the sustainability of global livestock food production.

Animal welfare is paramount. Where an animal has been diagnosed with a bacterial infection it is vital they receive the appropriate antibiotic treatment. For the UK sheep industry, the action required is for sheep farmers and prescribing veterinary surgeons to refine and reduce their antibiotic use to ensure where antibiotics are used, they are used responsibly.

Before reviewing or implementing any changes to antibiotic use within your flock, you must consult with your veterinary surgeon to ensure your disease control methods are correct and that sheep health, welfare and productivity are prioritised. It is vital that we continue to use antibiotics to treat individual sick animals and, in some circumstances, it may be beneficial to treat groups of infected sheep together. This should always be done under the supervision of your veterinary surgeon.

This guidance document has been written to outline the key steps in ensuring veterinary surgeons and farmers work together to review and achieve responsible use of antibiotics within the national sheep flock.

Contents

USING ANTIBIOTICS CORRECTLY

SMARTER use

Think **SMARTER** and remember to use antibiotics correctly:-

Store antibiotics correctly

Measure weight of animal correctly

Amount of antibiotic correct for animal weight

Route of administration correct

Treatment (drug) correct

Effectiveness – consider change of treatment following culture and sensitivity results

Review flock health management with your veterinary surgeon to refine future use

Incorrect use

Do not give antibiotics to whole flocks or whole mobs of sheep for prevention of disease. This includes entire lamb crops for prevention of neonatal lamb disease (e.g watery mouth or joint ill), entire flocks of ewes for prevention of abortion or lameness and entire mobs of weaned lambs (stores or breeding) for prevention of pneumonia or lameness.

Responsibilities

Veterinary surgeons are legally responsible for prescribing antibiotics for use in animals.

Farmers are legally responsibility for ensuring correct administration, storage and recording of antibiotics use on farm as well as following correct drug withdrawal periods. However, your standards of flock management and stockmanship skills will be critical in your flocks' need for antibiotics.

Flock Management and Flock Health

A fit, well fed and well managed sheep flock should have minimal requirement for antibiotics beyond the necessary treatment of individual sick sheep. The following key steps should be considered to achieve this:-

1. ***Nutrition:*** Keeping your sheep in optimum body condition score and on a good diet that is appropriate for the stage of production all year round. This will maximise their own ability to fight off infections and ensure lambs receive an adequate quantity of quality colostrum.
2. ***Hygiene*:** Keep your flock in as clean and dry an environment as you can to reduce the quantity of disease-causing bacteria they are exposed to. Pay particular attention to:
    a. *Housing:* The cleanliness of the bedding and air quality especially around lambing time
    b. *Handling areas:* Dirty, wet handling areas are ideal for spreading foot diseases. Clean and disinfect after use
    c. *Equipment:* Should be clean and disinfected between each use
    d. *Fields:* Avoid wet muddy areas where possible, especially around gate ways and feeders
3. ***Biosecurity:* -** Prevent introduction of new infectious diseases or new strains of infectious diseases. Draw up and adhere to a biosecurity plan for your farm with your veterinary surgeon.

4. ***Disease Prevention:*** Engage with your veterinary surgeon on creating a health plan for your farm. This should include disease prevention plans and first line farmer treatments for sick animals. The plan should be reviewed regularly (at least twice a year).
5. ***Breeding programs and genetics***: - Where possible, disease resilience should be considered in flock breeding programs.

PRINCIPLES OF ANTIBIOTIC USE ON FARM

Training

Ensure you and your staff are trained in medicines use. This can be arranged through your veterinary surgeon or other recognised body e.g. LANTRA

Treat Quickly

Treating earlier in a disease will reduce the damage caused to the animal, enabling better cure rates and reduce opportunity for disease spread to the rest of the flock. Isolation of diseased animals may also be beneficial.

Treat with Correct Drug

All farmer administered treatments should be agreed beforehand with your veterinary surgeon. Not all drugs are appropriate for every condition and you could be wasting time, money and compromising animal welfare if you use the wrong product.

Your veterinary surgeon will know to avoid the use of the high-priority critically important antibiotics (as designated by the European Medicines Agency and the VMD: fluoroquinolones, systemic 3rd and 4th generation cephalosporins and colistin). These are already used at very low levels within the UK sheep industry and should not be used in sheep except under exceptional circumstances and where culture and sensitivity clearly indicate that there is no alternative appropriate antibiotic.

Treat with Correct Dose

Give the correct dose, the correct route and the correct length of treatment. Failure to strictly follow this will severely affected the chances of an animal recovering and may cause antibiotic resistance on your farm. Do not underdose an animal – always give the correct dose for their weight.

Treat with Clean Needles and Syringes

Using dirty needles and syringes will spread disease between animals and can cause painful abscesses affecting sheep health and welfare and reduce carcasses quality. You may additionally want to consider using injection sites at lower value cuts on carcasses.

Withdrawal Periods

Legally you must observe drug withdrawal periods. This is a critical step to protect human health. Keep good records and consult your veterinary surgeon if you are in any doubt.

Report Treatment Failures or Drug Reactions to Your Veterinary Surgeon Immediately

There are many reasons for such problems to occur. These must be investigated before you administer the product to any more animals on your farm.

Records

Keep your legally required records (see below).

LEGAL REQUIREMENTS

The law on veterinary medicines use in animals does change. Do not regard this document as the definitive source of information. To keep up to date on medicines legislation please refer to the UK Government department DEFRA, and specifically the Veterinary Medicine Directorate (VMD). Details of current legal requirements on veterinary medicines use are on their website[ii] and are found in in the Veterinary Medicines Regulations 2013. Any use or purchase of antibiotics outside this legislation would be illegal.

Prescribing

Only a registered veterinary surgeon can legally prescribe antibiotics to animals.

Storage

- Antibiotics should be stored in accordance with the instructions on the label and packaging – always check the product label
- Antibiotic labels contain information on how long after breaching the container it is safe to use the product. Do not use antibiotics after this date
- Medicines must not be used after their expiry date
- Medicines must be stored securely, in a locked cupboard. Keep medicines out of reach of children, animals and anyone not supposed to handle them

Disposal of unused antibiotics

- Dispose of all expired, partly used or unused antibiotics, containers and equipment properly and always follow any specific advice on the label with regards to disposal. It may be possible to return unused medicines to the prescribing veterinary surgeon or supplier for disposal.
- Sharps must be disposed of in a purpose-made container and removed through an approved route. They should not be put in domestic waste.

Medicine recording requirements for food producing animals

Currently the owner or keeper of food-producing animals is required to keep the documentation relating to the acquisition of all veterinary medicinal products acquired for those animals for five years.

Purchase

When a veterinary medicinal product is bought or otherwise acquired for a food-producing animal the keeper must, at the time, record:-

- Name of the product and the batch number
- Date of acquisition
- Quantity acquired
- Name and address of the supplier

Administration

At the time of administration, the keeper must record:-

- Name of the product
- Date of administration

- Quantity administered
- Withdrawal period
- Identity of the animal(s) treated

If a veterinary surgeon administers a veterinary medicinal product, they must record the above information relating to administration, the batch number and their name in the keeper's records, or provide this information to the keeper in writing and the keeper must then enter it in their records.

Disposal

If the keeper disposes of a veterinary medicine other than by treating an animal, they must record:-

- Date of disposal
- Quantity of product involved
- How and where they disposed of it

All records must be durable, permanent and made available for inspection on request by a duly authorised person.

Use of unauthorised medicines

Medicines that are not specifically licensed for sheep may be prescribed by a veterinary surgeon under the cascade which provides a legal mechanism allowing veterinary surgeons to use their clinical judgement to prescribe a suitable medicine where no authorised medicine exists[2]. The vet responsible for prescribing the medicine must keep specified records and specify an appropriate withdrawal period which will be the longer of the minimum statutory withdrawal period or the period stated on the product's Summary of Product Characteristics (SPC).[2]

AREAS TARGETED FOR IMPROVED RESPONSIBLE ANTIBIOTIC USE

Background

Examination of antibiotic use in the sheep sector, led by the RUMA Target Task Force[iii], identified the following three areas of concern with regards to prescribing practices for sheep. In some cases these involved whole flock prophylactic treatment for these three specific disease management areas: -

1. **Control of infectious lameness**
2. **Prevention of enzootic abortion**
3. **Treatment of lambs against neonatal bacterial infections**

The Sheep Veterinary Society has produced Good Practice Guidelines[iv] which detail their view on responsible antibiotic use for these three target areas. The primary recommendations are that, in order to **replace**, **refine** and **reduce** antibiotics in these target areas, vets and sheep farmers should work to **plan** ahead **prevent** disease and **protect** their flocks.

The following section of this guidance document is based on the aforementioned Sheep Veterinary Society Good Practice Guidelines.

Good Practice Guidelines for Control of Infectious Lameness

Lameness in sheep is a common and serious welfare problem for many sheep flocks with estimates that two-thirds of the total antibiotics prescribed to sheep is primarily used for lameness issues[v]. In the UK, lameness is largely due to infectious bacterial causes e.g. interdigital dermatitis (ID/scald/strip), footrot and contagious ovine digital dermatitis (CODD).

It is entirely appropriate to promptly treat all sheep that are *clinically affected* with one of these infectious bacterial conditions with an antibiotic injection and antibiotic foot spray. Indeed, it may also be entirely appropriate to isolate and treat whole groups of clinically affected sheep within a flock.

The important challenge for lameness in sheep flocks is to *reduce* the number of new clinical cases of lameness that need antibiotic treatment. This can be achieved through the use of the five point plan[6].

THE FIVE POINT PLAN[vi]

1. Cull badly or repeatedly affected animals
2. Quarantine incoming animals
3. Treat clinical cases promptly
4. Avoid transmission of infection on farm
5. Vaccinate against footrot bi-annually

Plan ahead

The Five Point Plan[6] is the current sheep industry accepted standard for lameness control. It usefully summarises the tools which are available for lameness control on

sheep flocks. Some or all of these can be applied on an individual farm basis following detailed veterinary investigation and formation of a farm specific plan. This should include: -

- Correct diagnosis of the causes of lameness in a flock
- Assessment of farm specific risk factors. For example, seasonal trends, hygiene, housing, handling areas and field management
- Design and application of farm specific disease control measures

Prevent disease

The primary source of *Dichelobacter* and *treponemes* (the causative agents of scald, footrot and CODD) are infected sheep, although the bacteria will survive on pasture and equipment to some degree. Reducing the amount of bacterial challenge on farm to lower the risk of transmission between infected and non-infected sheep can be achieved in the following ways:-

- Optimise hygiene of buildings and handling areas by keeping them as clean and dry as possible and use appropriate disinfection. For high sheep-traffic areas outside, such as gateways and around troughs, it may be appropriate to use lime or hard core
- Avoid trimming hoof horn as this both delays recovery and increases the risk of spreading bacteria between feet and sheep
- Ensure good hygiene of equipment that contacts sheep feet by cleaning and disinfecting hoof trimmers/knives and gloves/hands between sheep
- Biosecurity. Effective quarantine procedures are absolutely essential in preventing the introduction of different types of *Dichelobacter* or treponemes that are new to the flock
- Reduce the numbers of infected sheep in the flock by isolation, prompt treatment of clinical cases and culling of repeat offenders

Protect the flock

Protection of the flock can be achieved through:-

- Breeding lameness-resilient sheep and the culling of persistently lame sheep - two practices which require meticulous flock record-keeping
- Vaccination against footrot. As with all vaccinations, the footrot vaccine is not a panacea and it cannot be relied upon in isolation. However, research, clinical experience and farmer testimonies suggest that footrot vaccination has a significant role to play in reducing a flock lameness issue to manageable proportions

Inappropriate antibiotic use

Whole-flock antibiotic use for lameness control has been shown not to be sufficiently effective to justify its high use of antibiotics and cannot be advocated. However whole-group treatment of *clinically-infected* sheep following careful segregation of lame sheep can be beneficial and should be considered.

Foot bathing. The lack of published evidence to support the benefit of antibiotic foot bathing, insufficient guidance on effective dose or appropriate disposal and high use of unauthorised products means footbathing cannot be considered as an appropriate or responsible use of antibiotics.

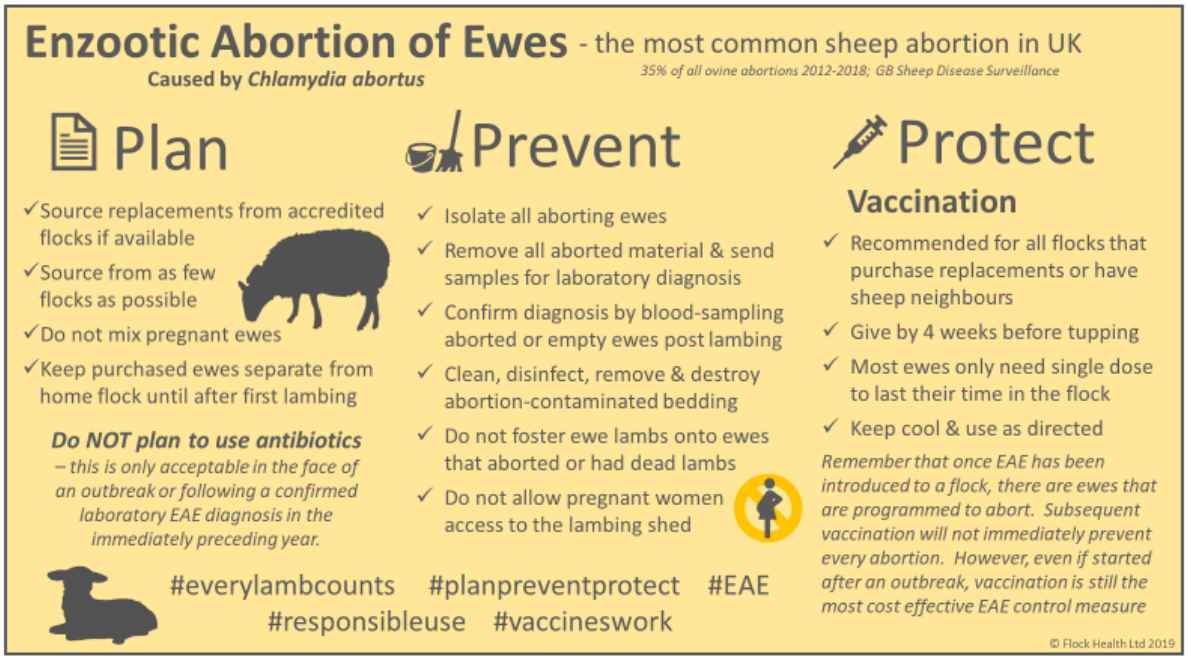
Good Practice Guidelines for Prevention of Enzootic Abortion

Abortions and stillbirths cause significant losses to UK sheep flocks with 30% of total lamb losses attributed to the period between scanning and lambing[vii]. Enzootic Abortion of Ewes (EAE, caused by *Chlamydia abortus*) is the most commonly diagnosed cause in the UK (35% of all ovine abortion 2012-2018; GB Sheep Disease Surveillance).

Effective vaccines are available against EAE and should be used as the first line in protecting flocks that are at risk. Whole flock, prophylactic antibiotics are not considered necessary nor appropriate for control of EAE in sheep flocks.

Plan, Prevent, Protect principles with respect to control enzootic abortion are shown in Figure 1

Figure 1: Plan, Prevent, Protect to control enzootic abortion



Plan ahead

Replacement ewes are the primary source of infection in EAE-naïve flocks. If it is necessary to buy in replacements, an effective biosecurity plan is required. The following is recommended:-

- Source replacements from EAE-accredited free flocks
- Alternatively, animals should be sourced from as few flocks as possible and from flocks with a known disease history. A flock vaccination strategy should be designed and implemented
- In addition, ewes from different sources should not be mixed for the first time whilst they are pregnant. Purchased ewes should be kept separate from the home flock until after their first lambing
- Diagnosis of the cause of abortion is essential for ongoing control, to this end, veterinary assistance should be sought. Aborted material should be taken for laboratory diagnosis and aborted ewes clearly identified so that serology can be undertaken

Prevent disease

An aborting ewe is the primary source of infection for *Chlamydia abortus.* Therefore to reduce the risk of infection from any aborting ewe:-

- Isolate the ewe from the rest of the flock as soon as possible
- All aborted material should be immediately removed, then destroyed or sent for laboratory investigation
- Clean, disinfect, remove or destroy contaminated bedding
- Ewe lambs intended to be kept within the breeding flock should not be fostered on to ewes that either aborted or produced dead lambs

All human personnel should also be protected from aborting ewes. It is not advisable for pregnant women to be involved with either ewes or lambs around lambing time.

Protect the flock

The following vaccination strategies are recommended -

Vaccination against enzootic abortion, is much more effective when administered before any exposure to disease so in high risk flocks it is advisable as a precautionary measure.

Flocks that are at high risk of introducing EAE are those that buy in replacement ewes from flocks of unknown status. Even closed naïve flocks with close neighbours of unknown status with adjacent lambing fields, could also be considered as at risk and precautionary vaccination would be advisable. EAE vaccine (live or inactivated) should be given to the whole flock at least four weeks before the ewes are put to the ram.

In the face of an outbreak of enzootic abortion, an inactivated vaccine (if available) could be used to reduce the spread of disease in the flock. However, if this has not been undertaken, then it is very important to vaccinate the flock before their next tupping with either a live or inactivated vaccine. This vaccine will prevent spread and will prevent some abortions in the following year though once EAE has been introduced to a flock, there are likely to still be some abortions in year immediately following its introduction.

Inappropriate antibiotic use

Evidence suggests that in some areas of the country some farmers are still using prophylactic treatment of all ewes as a routine in late pregnancy to control EAE abortion. An questionnaire survey undertaken in 2015 suggested that this practice was routine for 10% of sheep farmers[viii].

It is not acceptable to use antibiotics to control abortion on an ongoing basis. Antibiotic treatment of ewes in late pregnancy, generally using a long-acting oxytetracycline, may help to reduce the number of ewes that abort but it does not reduce the shedding of Chlamydia, nor reduce the incidence of infected ewes within a flock. Neither is this a cost-effective approach when compared to vaccination over the medium to long term.

In the immediate face of a new outbreak, if it is not possible to use an inactivated vaccine, it is acceptable to treat the affected group of ewes with injectable long-acting oxytetracycline. It is also acceptable to use this antibiotic treatment for later lambing ewes within the flock, when they reach the period between day 90 and day 126 of that pregnancy or at the same stage for the affected group of ewes during their following pregnancy.

It is not acceptable to use routine antibiotic treatment in the period of late pregnancy as a control measure for abortion in general - i.e. in any flock **unless** in the face of an outbreak or if there has been a confirmed laboratory diagnosis of Chlamydia in the immediately preceding year.

Good Practice Guidelines for Neonatal Lamb Bacterial Infections

Lamb morbidity and mortality due to the bacterial, infectious syndromes of “Watery Mouth Disease” and “Joint ill” are common on UK sheep farms. Over the past 30 years, many farms have come to rely on prophylactic use of antibiotics to whole crops of neonatal lambs for their control.

Current Sheep Veterinary Society Guidelines[4] state that ‘in no flock, will it be appropriate for all lambs to be treated routinely from the start of a new lambing season’.

Routine whole lamb crop prophylactic use of antibiotics is no longer considered a sustainable nor acceptable solution in most cases. That said, the welfare of the flock is of paramount importance, and a change in disease control policy on a farm should not be implemented without careful veterinary involvement in a farm specific risk assessment and management through the health planning process.

Figure 2: Administration of oral antibiotic to neonatal lamb - this practice is no longer acceptable on a routine basis

Watery mouth

Watery Mouth Disease (WMD) is an endotoxaemia of neonatal lambs. The disease is characterised by dullness, depression, salivation from the mouth, with or without abdominal distention and is typically associated with *E coli* infection.

Non-antibiotic control measures centre around ensuring an adequate **quantity** of **quality** ewe colostrum **quickly** to the new born lamb and establishing good ewe and environmental hygiene. Ensuring ewes receive adequate nutrition during pregnancy and are in an appropriate body condition prior to tupping are essential to ensuring both quantity and quality of ewe colostrum.

Treatment strategies for clinical endotoxaemia include the use of non-steroidal anti-endotoxic drugs, fluids and injectable antibiotics.

Joint ill

Joint ill or septic arthritis is a painful, bacterial infection in the joints of neonatal lambs. Lambs can often appear dull, weak or unable to stand before swelling and lameness develops.

Common control measures have previously involved whole lamb crop prophylactic administration of antibiotics. However, recent research and clinical experience has emphasised the role of high environmental, equipment, and personal hygiene standards at lambing time and an adequate **quantity** of **quality** ewe colostrum **quickly** to the new born lamb.

For all forms of “joint ill”, early detection and treatment is essential and it is always appropriate for involvement of a veterinary laboratory for diagnosis to identify the causative pathogen and the most appropriate antibiotic for treatment.

Clinical cases that are not treated promptly will respond poorly to antibiotic therapy. It is appropriate that severely lame lambs, that show insufficient clinical improvement within five days of treatment, are euthanised.

Plan ahead, prevent disease and protect the flock

A summary of the 'Plan, Prevent, Protect' approach for lambing time is shown in Figure 3.

Further strategies to prevent joint ill disease in neonatal lambs

Treat lambs' navels within 15 minutes of birth and again after a couple of hours with an appropriate disinfectant and astringent agent (eg strong iodine solution (10 percent) with alcohol). As long as the entire navel is covered, either a spray or dip can be used. Any dip solution should be changed and the cup cleaned regularly to prevent spreading disease.

Place ear tags in surgical spirit prior to application, this will disinfect the tags and help reduce the chance of introducing infection.

Figure 3: Plan ahead, prevent disease and protect the lamb crop from neonatal bacterial infections

Appropriate antibiotic use

First line treatments of either joint ill or watery mouth cases should be planned with your veterinary surgeon ahead of lambing and reviewed in the farm's flock health plan. Treatment should be prompt, full courses should be given, and ideally based on culture and sensitivity analysis.

Shepherds, who have been used to giving prophylactic antibiotic treatment to all lambs within a flock, should engage with their veterinary surgeon to undertake careful risk assessment for different groups of lambs in the flock. Good management and planning is the key to reducing the risk of disease. Control measures should be discussed between the farmer and veterinary surgeon well ahead of lambing time, ideally at mid pregnancy, to give sufficient time to assess and implement new actions.

Antibiotic treatments should be targeted only towards highest risk individuals, following a proactive flock health plan. Figure 4 gives suggested criteria for categorising the risk associated with lamb, ewe and environmental factors. It is not expected that every lamb

is separately risk assessed but this simple table can be used as a tool to categorise the risk for different groups of lambs.

Investigation of suspected treatment failure should be based on bacteriological culture and monitoring of the sensitivity of the pathogen to the antibiotic used on an individual farm. The VARSS report[ix] indicates that there are significant levels of resistance in *E. coli* isolates from sheep, with higher levels in neonatal lambs.

BCS = ewe body condition score

Figure 3: Neonatal lamb risk assessment tool for bacterial infection

Neonatal Lamb Risk Assessment

Lamb factors	1	Single	
		Twin	
		Triplet, Quad or Quin	
	2	Size - ideal (4-8kg)	
		Size - not ideal but not extreme	
		Size - too small (<3kg)	
	3	Birth - simple, unassisted	
		Birth - assisted but OK	
		Birth - difficult	
	4	Colostrum - filled self from ewe	
		Colostrum-unknown or artificial	
		Colostrum - insufficient	
Ewe factors	5	BCS - OK/ideal	
		BCS - not ideal or too fat	
		BCS - too thin	
	6	Ration - checked & good	
		Ration - not checked	
		Ration- low energy/protein	
	7	Ewes - clean & sound	
		Ewes - dirty or several lame	
		Ewes - dirty & several lame	

Environmental Factors	8	Outside	
		Inside	
	9	Stocking rate - low	
		Stocking rate - high	
	10	Shelter - good	
		Shelter - poor	
	11	Weather - good	
		Weather - not good	
	12	Bedding - clean & dry	
		Bedding - dirty or wet	
		Bedding - dirty & wet	
	13	Early stage of lambing time	
		Mid-end of lambing time	
	14	Little or no disease so far this season	
		Disease in other groups this season	
		Disease in this group this season	

Answer each question with a tick in the box. Orange indicates increased risk with a cumulative effect. Yellow indicates possible increased risk. Green indicates low or minimal risk.

Inappropriate use

- Whole-flock injectable or oral antibiotic treatment of lambs in order to prevent Watery Mouth Disease or Joint-ill is very rarely appropriate as a routine management action
- Use of unlicensed medicines, unauthorised for use in food-producing animals, unless justified by your veterinary surgeon under the “cascade”
- Use of the high-priority critically important antibiotics (fluoroquinolones, systemic 3rd and 4th generation cephalosporins and colistin, as designated by the European Medicines Agency and the VMD) Box 2. These are already used at very low levels within the UK sheep industry and should not be used in sheep except under exceptional circumstances and where culture and sensitivity clearly indicate that there is no alternative appropriate antibiotic.

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