



Title: Responsible use of antibiotics on sheep farms

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- Afternoon everyone. And welcome to this webinar, Responsible Antibiotic Use in Sheep brought to you by RCVS Knowledge. RCVS Knowledge's mission is to advance the quality of veterinary care for the benefit, I felt like also the public and society. We do this by championing the use of evidence-based approach by vet medicine and inspiring a culture of continuous quality improvement in practise. And making our resources available to the profession and the wider public. So do have a look below is a great free resources. We are a separate organisation to our CVS. This webinar which is part of the Farm Vet Champions project kindly funded by VMD will be recorded. And we're very lucky to have Fiona lovatt, as clinical lead for Farm Vet Champions at RCVS Knowledge, and Fiona will be talking to us this afternoon. Fiona is an RCBS recognised specialist and she powers on production, a diplomat of the European College of Small Ruminant Health, and works on a very part-time basis as a clinical associate professor at Nottingham University. She's also past president of Sheep Retina Society. And currently chairs the UK Sheep Antibiotic Guardian Group having represented the sheep industry on the Rheumatologist Taskforce since 2016. So I can't think of anybody with better experience to talk to us about this subject this afternoon, over to you Fiona.

- Brilliant, thank you. Thank you, Pam. Yeah, it's a real pleasure to present this webinar for the Farm Vet Champions. It's really Farm Vet Champions are really close to my heart. And to, for me to be able to start with presenting the sheep one is just, it's just great. So thanks for joining us. I'm speaking today on behalf of the Sheep Vet Society but I run my own consultancy business. We do sometimes work for pharmaceutical companies but as totally independent I don't have any declarations of interest. My colleague Phillipa has contributed to this presentation. It's edited by RCVS Knowledge, and it's been reviewed by Rachel Foster for Market Vets, Davinia Hinde from Bainbridge Vets, both vets in practise Amanda Carson, Sheep Veterinary Society come president.

So our learning objectives. So by the time you've been through this module we're expecting participants to be able to define key areas in sheep, whether it's a risk of inappropriate antibiotic use, and to explain, plan, prevent, and protect principles to ensure good practise in each one of those areas. But most importantly, we'd like people to be able to establish these principles for direct application in the flocks that are under their care. And we'll also be talking about antibiotic usage in actual data terms of amount of antibiotic usage.

So, I'll crack straight on with what we've called the hotspots. So these are the key areas in sheep medicine and they directly relate to the RUMA targets for the sheep industry. So, and I'll take each one in turn. Neonatal lambs particularly we'll be thinking about watery mouth and joint ill. Ewes around lambing time, particularly thinking about abortion. Treatment and control of lameness, foot rot and CODD. And the control of pneumonia in store lambs which is a new hotspot in terms of

rheuma targets. We've been dealing with the top three for the last four or five years, and we've added the control of pneumonia.

So this might be a typical picture in your practise. It's lambing time and farmers were on the phone wanting a couple of bottles of penicillin, a whole creative box tetracycline, few oral doses for baby lambs and in the sheep farmer's mind it's lambing time. So of course I need antibiotics. And my question to everyone listening is, is that reasonable? Is lambing time an acceptable reason for us to mass prescribe antibiotics to sheep farmers? If we think about neonatal lambs, the first one. And we look at Edinburgh University students. This was four, five years ago. They reckoned over two thirds of farms regularly used prophylactic oral antibiotics and a quarter sheep farms using prophylactic injectable antibiotics. A further study since then based at Nottingham. I'm a PhD student, I worked with, we took questionnaire from large farmers who supply one of the large retailers. And back in 2016, a quarter of flocks were prophylactically treating all the neonatal lambs. And at that time, 10% of those flocks were using pills or tablets. Pills or tablets are something we're typically concerned about. They don't come under the radar at all because they're not licenced in food producing animals. But certainly only five years ago, 10% of our sheep farmers were giving pills or tablets to every single lamb. So those are licenced for dogs and were being given to lambs. So hopefully if you're in practise now and you do still have farmers who come in and want the little yellow pills, oxytetracycline, or worse I've heard of groups of farmers using oral tertocynilox, you know that is not acceptable as a prophylactic treatment. Those are not licenced in, in food producing animals. But we do have licenced products predominantly spectam although until this year we've had oral jet as well.

We track these, part of RUMA, we track oral sales. And so back in 2016 lambing time in the UK we had 11 and a half million doses of oral antibiotics, resulting in eight lambs. That's not including the tablets and pills. That was just the licenced products. And we have worked on that over the past five years. And basically there's been a 10% reduction year on year. So by last year it was 34% less antibiotics. So for neonatal lambs than five years ago. It's still seven and a half million doses. It's not something to be complacent about but we're definitely heading in the right direction. It's just interesting to note this graph is from the VARs report where they look at eco light isolates from neonatal lambs back in 2017. You can see spectam they tested about 90 samples and about 50% were resistant to spectinomycin, that's the main product used. The only antibiotic where we had more resistant to nicolai was tetracycline. Any one of you working on sheep farms knows that there's a huge amount of oxytetracycline, commonly used on sheep farms. And there's a large amount of resistance oxytetracycline and nicolai on sheep farms. This is where we've got an issue and this is why we need to be doing something about it. But thinking specifically about watery mouth essentially.

As we are producer Sheep Vet Society Good Practise guidelines a couple of years ago. And the statement in there says "There may be, it may be appropriate to use targeted control measures that include antibiotic treatment in neonatal lambs in some flocks, but, and I'm on to the highlighted bit now in no flock, in no flock, is it appropriate for all lambs to be treated routinely from the start of the new lambing season? And any vets in farm practise knows that now February, March time there are farmers coming into the practise saying, "Can I please have thousand doses of spectam?" That's no longer acceptable that it started lambing. He might need to start using them but he can't come in at the four lambing starts and say I need to dose every lamb antibiotics. So we have to think what factors were important to lambing success and how can we cope with that sort of statement in the good practise guidelines? And to do that, we need to, we think of the shepherd. We think of the environment of the sheep, and we think of the ewes. And we're thinking planning ahead, preventing

infection and protecting the flock. So this is my sketched out version, we're going to a slightly neonatal version.

Here we are back with the shepherd planning ahead. What does planning ahead mean? And it means it's the whole reason I've been so hectically busy over the last couple of months is dealing with analysed forage and arranging quality diets for use. It's actually talking with people about what they're gonna do with a newborn lambs. How do we maximise colostrum? How do they minimise stress on those newborn lambs? Can they monitor colostrum quality? We've actually got 160 bricks refractometers out on sheep farms at the moment as farmers testing the colostrum and ensuring that the ewes are producing decent colostrum that needs some planning. You need to have that in place way before the stress of lambing. And keeping good records comes into that planning. In terms of the prevent for neonatal and disease. If they're outside, they want sufficient shelter. They want to be clean, dry and draught-free conditions. If they're inside, it needs to be draught-free. Rarely do we get a draught-free outside but they do need some sort of shelter. They don't want a prevailing wind. They don't when we have hideous weather, like we did a couple of lambings ago, east from the East time. Any sort of shelter is better, is better. And we had large losses from hypothermia starvation because of the cause of the weather. And when we're outside, it's actually hypothermia starvation that we're worried about. When we're inside it's infectious disease, and plenty of clean bedding, good hygiene, making everything sure. It's as clean as possible. And these details, they kind of seem a bit tedious. We talk about them again and again, it's absolutely crucial to pay attention to detail in the lambing shed.

And then we get to protect and we're thinking we need our ewes to be fit and well fed. So they have to be in good body condition score. We want them to have a good quality balanced diet. We want them to be fully vaccinated, sound in foot, and we want them to be daggged and clean. Any dirt around the ewe bugs on her feet. It's going to contaminate the lambing shed and increased contamination. But the whole protect in terms of newborn lambs is that we want to get colostrum into them. And we need to get the colostrum in there quickly. Sufficient quantity of good quality colostrum as quickly as possible. And that's essential. So this is like a fully charged battery. Once we've got a full battery worth of colostrum, we're not going to have the problems with watery mouth. So go back to watery mouth and neonatal lambs. There are still a lot of sheep farmers who want to dose every lamb at birth. And there may be a number of reasons for that. It may be that there is a genuine risk and that's a veterinary decision. And you need to talk about that. You don't know there's a genuine and current risk before they even start lambing. It may be that they've had previous outbreaks. It may be the other people have told them this is what you do. You dose every lamb. It may be that they actually think a dose of antibiotics for every lamb, well actually is actually just good in itself. And whatever those reasons are, it's important as a vet to work those out. I've certainly had number of farmers who have started working with them, and they'd been dosing every lamb from birth for the last 10, 15 years. They can't remember when they last had problems with watery mouth, but it's something that they've just kept doing. And so from a vet point of view, we need to work out that. Divide the flock down, work out high risk and low risk lambs, target treatment appropriately and make sure you've got the space to allow for changes as lambing proceeds. So if you take that into detail, the targeting the flock and actually think about our high-risk animals and our lower risk animals. If you've got a lamb with sufficient colostrum, fit, healthy, single lamb born in the first week of lambing, everything's clean dry. There is absolutely no reason for that animal to be given any antibiotic. And if you've got a farmer who you can't wean off wanting to dose everything, those are the lamps to start with. They definitely do not need to be dosed. And then the higher risk scandals it may be if he's really nervous to stop using antibiotics but you can still allow him to have a bottle on hand and use it for those high risk lambs. If there's been recent clinical cases,

triplet lambs, low birth weight lambs or lambs born to thin poorly fed ewes. So, but whatever you do, don't fall into the trap of thinking the whole flock the same. We've got to do the same for every lamb in the group. And I set this challenge for farmers. How far can you get through lambing before you open the bottle of spectam? So often if you've got a farmer who really does not want to stop allow him to have a bottle there, but challenge him not to use it until he absolutely has to. And even if you only get him through the first three days of lambing before he wants to turn the antibiotics you've made some progress. Every dose you save is a dose in the right direction.

Joint ill is a tricky one. In a way it's harder with the watery mouth. I quite often ask groups of farmers to actually tell me how many cases they had last year. And I would say joint till comes up at least as commonly. Joint ill is a reason that people want to be injecting every lamb. But we have to look at what the causes are. So both the causes entry of the *Streptococcus dysgalactiae* into the lambs and where it's coming from. So carrier ewes or in a sheep, they can pick it up in the birth canal. They can pick it up on the tits and the milk from any of those carrier ewes. Any equipment, bottles, teats, stomach tubes can be that transfer into the lamb. And then anything that breaks the skin of the lamb whether that's at the navel, whether it's with a ring the dock tail, whether it's a tag going in any of that can inject the strip into the lamb. So what do we do? We, we think, plan, prevent, protect. We think of every single practise we go through farms with a fine tooth comb and a risk assessment of all the different things you do. Sometimes it's the bedding. Sometimes we end up changing people on pine shavings. Sometimes it's the trailer that the lambs go into as they go out from the shed. I'd say it's never, always the same thing. It might be the stomach tube. Sometimes putting a baby steriliser is the thing to do but it's making sure that you've covered every base and thought about everything joint ill to is not just an issue of dirty lambing sheds. We see it on quite clean sheds, which is quite nice, decent straw bedding. It actually is fives quite well on dry straw, *Streptococcus dysgalactiae*, which is part of the problem. And it can be a problem. We can get morbidity up to 20%. We can get up to 50% of lambs affected in the really bad cases. You know, it's a horrible disease. And once a lamb has joint ill infecting the joints, those lambs often don't make it. They're the ones that, that need to be put to sleep. There is some quite a lot of misunderstanding amongst farming community that *erysipelothrix* is a reason for joint ill. It can cause *erysipolethrix* in older lambs. It very rarely is a problem in neonatal lambs, very rarely. And just as a warning, as a vet, if you're asked to prescribe unauthorised *erysipelothrix* vaccine to prevent joint ill, be very, very cautious, think about it very carefully. It's not authorised and there are potential for complications. So that is not something to step into lightly and bear in mind that the vast majority of joint ill is *Streptococcus dysgalactiae* it's not caused by *erysipelas*. When we've done, when people have done studies into joint ill often farmers still have joint ill problems, even though they're prophylactically using injectable antibiotics and often farmers who have had joint ill problems, they don't necessarily go on to prophylactic antibiotics but the problem sorts itself out and it may be something to do with the carrier use. So it is frustrating and it's complicated. And in the short term, we may need to use metaphylaxis within the lambs within that group.

These sheep belonged to my colleague who farms at home. This is this they potentially get joint ill in this shed in certain conditions. And they sometimes need to treat small groups of lambs. They never go on and start treating lamps. The following year, they've always sort out and they often have years where they don't have to treat any lambs at all. And that's really important that we just don't have farmers with the mentality. We always have to treat lamps against joint ill you know, that is not the case. Even though there are plenty of farmers who believe that they do have to, that is definitely not the case. I have to say there are plenty of vets who believe you have to carry on jabbing lambs every year. That is not the case. We do get to the bottom of it. It's just worth pointing out at this stage. If you have got a lamb with joint ill, do not even contemplate using oxytetracycline we almost never

see susceptibility to oxytetracycline from a *Streptococcus dysgalactiae*. You always need to go for white penicillin as a treatment.

So let me just go back to our hotspots. That's what I'm planning to say for neonatal lambs. It's really topical plenty of farmers out there now in their lambing sheds as we speak. And we're going on to ewes at lambing time. And particularly abortion. But when we've taken this study of looking at use of antibiotics in sheep farms through the years, this huge massive antibiotics, through February, March, this is lambing time antibiotics. Interestingly, this was actually quite a small number of farms and none of the farms within this study were using antibiotics as a control for abortion. But this is just lambing time antibiotics. It's worse thinking what the M Sheep at Society consideration for giving antibiotics around lambing time to ewes. And the sheep research consider it acceptable to use prophylactic antibiotics in surge if you've surgically intervened. So at caesarian, and in cases of prolapse or you try and prolapse anywhere you might have some sort of infection, that is acceptable for an antibiotic to be used on assisted lambing. If there's bruising or damage, it's not always necessary to give an antibiotic but it may be acceptable to do so. But what we particularly want to talk about is terms of abortion and particularly enzootic abortion.

So enzootic abortion, as you well know it's the most common cause of abortion in the UK. It's caused by chlamydia. And we go back to plan, prevent and protect. So planning ahead, the important thing is where you get your placements from. I would say any farm buying in use, and lambing them is at risk of buying enzootic abortion. So sourcing from few flocks as possible is important. Not mixing pregnant ewes is important. So I would always suggest people keep ewe separate from the whole flock until after the first lambing. I mean, that's important for border disease. It's important for enzootic, you know it can pull it back to there's plenty of reasons why you won't, you don't want to mix pregnant ewes. But very important in the plan is not to plan to use antibiotics. Now I know there'll be vets here who say, well you know, farmers haven't used antibiotics as a control of enzootic abortion for years. And certainly there are parts of the country where, so up here in the Northeast we vaccinated for years, we don't generally use oxytetracycline to control abortion. But I know there were other parts of the country and I've spoken to plenty of farmers who it stand at they will jab every ewe before lambing with oxytetracycline. They must be not, they cannot plan to use antibiotics in late pregnancy. It's not acceptable. It's only acceptable in the face of an outbreak or following confirmed laboratory diagnosis of enzootic. So that's all part of the planning.

In terms of preventing, so preventing unnecessary disease, probably the key control measure for aborting ewes is isolation. I'd say that's whatever has caused abortion, and even though it's enzootic abortion we're talking about here. If that aborting ewe is infectious to other ewes around her, not fatigue, but for salmonella commonly the ewe is infection, the source for other ewes. So she needs to be isolated. It's difficult sometimes to see her, farmers will always say they can't catch her but I would really, really stress to them that it makes a massive difference in the control. Moving on aborting materials. Making sure you know what the diagnosis is with all the different causes of abortion. It really makes a difference your ongoing advices, cleaning up, you know, making sure that you've got a good diagnosis and that you've removed the source of infection for future ewes is really important. And then additionally, any ewe lamb bought into a lambing shed where there's enzootic abortion will go on to abort in her first pregnancy. So it's very important she's not fostered onto an aborted ewe. And the risk with them pregnant women as well from the zoonosis is important. And then protection. So the reason that we don't commonly use and oxytetracycline to control for abortion is because most of our farmers we'll known to vaccinate to protect against enzootic abortion. If you look at the cost benefit, there's just no question vaccinating before enzootic arrives on the farm is far more cost effective than going in and injecting every ewe with oxytetracycline

every single pregnancy. Injecting ewes with antibiotics prophylactically is not an answer for enzootic abortion. You know, vaccination it's recommended for anybody who either has sheep neighbours, any risk of a placenta or debris being dragged from lambing ewes of your neighbours over into a lambing shed or anyone who buys in replacement ewes. So those are the key plan, prevent, protect for enzootic abortion. I grant you, it's a pretty busy slide all the information is on there. And we can, you know, you can access that as an infographic for the farmers to go through the plan, prevent, protect specifically for abortion.

So that's neonatal lambs, it's ewes at lambing time. And I'm going to go on and talk about the control of lameness. And lameness is the most common reason that we use antibiotics in sheep in the UK. So in this study from Nottingham, a couple of years ago two thirds of the antibiotics used in the sheep farms were using the control of lameness. So we can see these black bars here for the oxytetracycline right on through the year that's ongoing control of lameness. And it is correct to inject an animal that is clinically lame with either foot rot or CODD. It is correct to use injectable antibiotic to treat them. So this farmer here who says, "I don't jabble ewes except the really bad cases" has missed the point. So we are saying avoid using unnecessary antibiotics, but we are also saying if you have a clinically infected lame sheep with a bacterial condition, I.e, foot rot, or CODD, it is absolutely correct and appropriate to use an antibiotic to treat them. What our challenges and what where we're coming from with the Farm Vet Champions is to work together to prevent sheep becoming lame in the first place. So, and by that, I mean, plan ahead. Prevent unnecessary infection and protect the flock.

So with lameness, what do we mean by plan ahead? And it's brilliant. We've got the five point plan. It's well-recognized. Farmers recognise it. It's well tested. We've got plenty of papers that show the effect of the five point plan, treat animals where necessary, avoid the spread, quarantine animals as they come on to the flock, call when necessary and vaccinate. So correct diagnosis is really important in your plan. And when you talk to a group of farmers and ask them to identify on photos for most of the time, each percent of time, farmers will correctly identify foot rot but and depending where you are in the country farmers do not always correctly identify CODD. So if a farmer phones you up and says, and has self-diagnosed, I would always always recommend getting out there and diagnosing what's going on yourself as the vet. So diagnosis is crucial, and then assessing the risk factors on that farm. And that's very farm specific. So you can't plan ahead if you haven't discussed, you know when he sees the most amount of lameness, which handling areas that they find, what the handling areas are like, whether it's happening worse for the sheep at house, whereas certain areas of the farm better the worst than others or certain times of the year, that's worse than others. And then with a plan that we try and put smart control measures in place. So for any lameness on farms, it's very specific to that farm. And we want to not only know where we are at the moment with the flock, but have measurable and achievable things to put in place to sort out the lameness as we go forward. So the plan is a key part in controlling lameness. And I would always send people back to the five point plan and there's some brilliant resources available on the web available, commercially to deal with looking at lameness from the point of view or the five-point plan.

Prevent, so this is a picture back to you it's just over there as you can see it from my office window. And it's looking at the field, my neighbours gate. And here's a lame ewe and she's dropping dichelobacter and the chirpinigs according to CODD. And she's walked through that gate. And she's dropped them as she's gone through the gate. Now, this ewe here is currently sound, but she's a sheep. So she follows the same sheep as a lame, the same path as a lame sheep took. And she picks up the infection on the way, and this ewe, she was sound but she also wants to go through the same gate. And she also follows the same path and picks up the same infection. So any high traffic area of

a farm is a risk for the spread of lameness. And so encouraging farmers to concentrate on those areas is quite important. And that might be putting lime in the gateways. It might be putting lying around feeders. But the other way to prevent the spread is to avoid the incursion of novel strains. There are plenty of farms that don't currently have CODD. The most common way for them to bring CODD into the farm is to buy in other people's sheep. And so if they can quarantine sheep as they arrive, key part of the five point plan, and make sure there's not CODD, and treat it in those quarantined animals they prevented bringing it into the flock. So time again, where I've seen lameness issues sometimes I've gone to do second opinion lameness on flocks. Often it's a leaky quarantine situation that buying in sheep combines. They might be doing every other part of the five-point plan but they keep buying in either a novel strain of *Dichelobacter* or they're buying code. And as I said before, treatment is important. So yes, we do want to use as little antibiotics as possible but if we have clinically lame sheep, we must get them out. We must isolate them and we must treat them because if we don't, they are forever increasing the problem. And this is preventing the challenge and having a lame sheep on the farm is a classic way of increasing that challenge. So preventing the challenge is important.

So that's planned, prevent, and the third one protect. And protect for lameness. There are two ways we can predominantly we can protect. One is to breed lameness resilient sheep. And that means culling out persistently lame ones. A persistently lame sheep is likely to have a to lame lamb. And she's also more susceptible to lameness. It's not hugely heretical it's in Texel sheep which is the only breed that we've managed to get a heritability for foot rot. Susceptibility it's at 0.81. So 18% heritability for susceptibility to lameness. So, okay it's not massively heritable, but there is a heritability, there is a genetic component and it is possible to breed more lameness resiliency in your sheep. Has to be noted that if you are going to cull out lame sheep you need to know which ones to cull. At the point they're not lame because you can't tell from them if they're lame. So they need to be well-marked. But also if you're breeding, lame resilient sheep, farmers need to have those records and know that the sheep that they're breeding from, the ewe lambs they're keeping from mothers who weren't, who didn't get lame from grandmothers, who didn't get lame. And that requires really good keeping but those are important. Those are both important factors in protecting the flock. And then the other key. And really, I think personally, I think underestimated of value in protecting the flock is vaccination. So we've got an effective vaccine in the UK, it's not brilliant. I wouldn't say it's a panacea. It's, you've got to use it within the whole control package. I would never promise someone they could vaccinate and that's the end of all their problems. But I have seen clinically seen some really good results with vaccination. I've seen it's the most common product that either merchants or farmers will stand up in meetings and just say for the foot rot vaccine has made all the difference. So it hasn't sorted everything out, but it has meant they'd been a better able to keep on top of things. It means they've had fewer animals go lame, that it's been easier for them to catch them and treat them quickly. It means they haven't had to, if they've, you know they've taken their eye off the ball had to, you know gone away on holiday or something for a week that lameness hasn't really got out of control. 'Cause as soon as we get a few lame sheep, as you well know we ended up quickly getting lots of lame sheep and anything we can do to protect the flock is a good thing. So it is worth considering. So those are my sort of key. That's a whistle stop tour through lameness which can in itself take, can take a whole easily, a whole day's training. So that's 10 minutes on plan, prevent, protect in lameness. And so we'll just go back to a hotspots.

Treatment and control of lameness and CODD. And I'll just go on to the control of pneumonia in store lambs which I'm thinking about your flocks. I mean, do you have people who are trying to sort out lame, pneumonia and want to go through and routinely treat everything with an oxytetracycline. There are some areas where that's quite common. So let's just talk about pneumonia predominantly

caused by pasteurellosis. Living on the tonsils of healthy sheep, causing sudden death. And basically there's no time to treat they die so quickly. And it's really quite significant. So this is slightly old data now for the short report, but for after when PGE and liver fluke pasteurellosis is right up there as the most commonly diagnosed disease in sheep. And as everyone listening is well aware for pasteurellosis we've got both pneumonia, pneumonic pasteurella, systemic pasteurellosis and some lovely post-mortem pictures which I can thank Ben at Fordham Stock Centre. Classic ulcerations of the oesophagus pathognomonic for septicemic pasteurellosis. But what what's your first sign of sudden death. You haven't got time to do much about it. It's a key disease where planning ahead and preventing it happening is important. So the disease is triggered by stress. So either giving them the sheet or sudden feed changes, stress of transport, any of those can set off pasteurellosis. And so if we can plan ahead, prevent disease and protect the flock so much the better. So if you look at Chief Vet Society guidelines for the control of pasteurellosis.

In the term planning ahead, managing transport, and marketing carefully, being loaded up, making sure that everyone's a full of good fibrous material to buffer acidosis. You know if we've got a stressful situation and we've got a feed change and we've got acidosis that's a key way of getting ulcerated oesophagus. So managing stress is really important and plenty of long fibre, the diet can help that. Vaccinating, have you programmed to vaccinate home lambs and any purchase stores. And actually that takes a heck of a lot of planning because making sure that stores are bought and we know what their history is, you know it's too late to vaccinate them on the arrival We want to know that they've been that they're already vaccinated. That does take a certain amount of planning. Recognising and avoiding stress and treating any underlying health issues. Making sure that they're well-nourished, making sure they're not stressed. That's all in terms of preventing unnecessary disease and protecting the flock. The protective vaccination obviously comes into protecting the flock. Any treatment. So any farmer who is keen to go through and jump all these store lambs with antibiotic on arrival he's got to understand it's a very short, very short active that three days of oxytetracycline is hardly relative more gives him something to do than actually is useful for those lambs. The only time it is acceptable to use antibiotic treatment in outbreak pasteurellosis is actually in the face of an outbreak. And then it may be appropriate to inject animals as we've got the problem there. But bear in mind that in itself could be a stress. So you've always got to weigh up gathering them in and going through and jabbing every animal is itself stressful and could precipitate a few more deaths. So actually if we can properly be on top of things before then and have stress-free and vaccinated animals well buffered good long fibre in the room and so much the better.

So that's my four hotspots that I wanted to talk about. I'm just going to quickly talk about measuring antibiotic use on sheep farm. And so a couple of years ago, we sorted out core metrics so that we are all comparing apples with apples in terms of measuring antibiotic use on sheep farm. And this is the key measure that we come up to. And if we think total massive antibiotics, that's relating to the total amount of antibiotics used within that flock. I, not the beef cattle on the farm, but within the flock of sheep in the year. And that could be that you've literally just listed them as is taking an extract out of the Nottingham calculate that people be aware of. I've got an earl to show you how to access that. But literally list all the antibiotics that have gone into that flock of sheep during the year and add them up. And then the denominator is the total number of lambs. So that's total number of lambs finished off the flock and the total number of lambs sold the stores or breeding or retained for breeding. So total lamb numbers from that year, plus the number of ewes. So we've got this factor 20 that's assuming every lamb, average weight, 20 kilos and assuming every ewe average weight 75 kilos, you will have farms where they have much heavier ewes or you'll have farms where they have much lighter lambs or they're selling that they're selling at different stages. For the core metric, it

doesn't matter what weight it's ewes are. It doesn't matter that we were using, what we want to do is have a standardised way of measuring it. And if you've got a farmer who says, "Well, that's not fair. My ewes are on average weight." It doesn't matter, we just want to get a figure that we can compare across one year to another and standardise it as much as possible, which is why we've gone with a core metric. And while we've been quite specific with how it's measured. So for example, it's numbers of adult ewes. It's not numbers of rams and we're not including ewe lambs. It's just so we all know we're using the same metric. Don't worry too much about the detail, we have argued about it on and on. It doesn't matter. Use the same metric as set out in the document. And then we've got an additional metrics for sheep farms and it's particularly to do with antibiotics to baby lambs. And that's total number of treatment days for lambs are less than a week old. So for example, if somebody gives a lamb a dose of oral antibiotic on one day, and then a dose on the second day, that's two. If they also give them an injection of, for example a long acting antibiotic that last for three days, that would be five treatments to that lamb that's less than a week old. This is just to give us some indication whether the number of antibiotic treatment days for baby lambs, compare it to the number of lambs born on the farm and it's useful as an additional metric. And the only reason for doing it is to give you something as a vet for you to hold that conversation with farmers. So you can compare one farm to the same farm another year, or one farm to another farm within the group, for example.

So there's a document, the metrics document the Nottingham Sheet Calculator both can be accessed by Sheep Vet Society. And do we just add the number of the AHDB Medicine Hub being up and running, it's there it's being in its final stages of testing. And we would really, really encourage vets to be using you know, working with their farmers to be putting on the antibiotic figures into the AHDB Medicine Hub, who are also we'll be collating nationally. So do we will have another training session within the far back champions for using the medicine hub, but don't do and you can also put data directly from the sheet calculating the Nottingham Calculator into the medicine hub. So you can use exactly the same format. So, but you don't have to write your own thing. You don't have to, you can ideally, if you everyone can be used in the medicine hub, that's better for all of us.

- Okay. So, I'm just going to finally sum up. It might be the farmer comes in and he's worried about lameness, joint ill, watery mouth, and he wants some antibiotics. And instead of giving him his usual annual order, we'd really encourage you to be talking with your receptionist and making sure he talks with one of your vets. And this is an ideal time to have that conversation with farmers. How can you talk with them, deliver farm specific targeted risk assessments. And it doesn't matter what almost which one of the areas we've talked about, the principles of planning ahead, preventing unnecessary infection, and protecting the flock run right across the board and they're essential principles. So, you know, I've hardly spoken at all about which antibiotics to use in which situation. The key is, can we plan ahead, prevent infection and protect the flock? So we don't even have to turn to the bottle of antibiotics. And then the final bit on the data is, if we don't measure it, if we're not monitoring and measuring it, we can't manage it. And so the more you can encourage your farmers to be recording, you can work with them. You've generally speaking, we've just finished a bit of work in Scotland where the vets have got a good handle on what antibiotics they've sold to the farmer but they don't know what the number is on the sheep of the farmer. The farmers know exactly what their numbers are but they may not have done that work of collecting all their invoices or it's gotta be a vet-farmer working together thing to get a handle on what's being used on the farm and please do use the AHDB Medicine Hub to do that.

So I'm not got much more to say. There's just a bit of further reading of Sheep Vet Society has got some really useful stuff on their technical pages, both access to the calculator, to the metrics document and the good practise guidelines. We have not called an in practise just a couple of years ago. That's much making the same infographics, but you know, go to that and use that. And then we've had a PhD student, Charlotte Dodge working over the last three years, looking at antibiotic uses. I haven't gone into a lot of that. Although we have got other sections within the Farm Back Champion, looking at why did vets make the decisions they make? Why do farmers do what they do? And how can we work together and change behaviour and encourage that behaviour change? And so there are other sections on the attitudes and behaviour change communications where we explore some of these papers in details. So that's really well worth looking into. And then there's a few references from some of the data I've got. So I think Pam, we're going to questions from our live audience show. I haven't looked at yet. You may have, you've had better chance.

- No, no. That's fine. Well, first of all, thank you. That was an amazing presentation. I think this Farm Vet Champions is gonna be such a great resource. And it was lovely to hear you talking about measuring and auditing and benchmarking. It really fits in with a lot of the quality improvement work that's RCVS Knowledge are carrying out. So yes, I've got a couple of questions already. So it will start off with Esther asked, "How many farms do you have on pine shavings and is there any issues with this?"

- Oh, that's interesting. So to see how many farms I couldn't say. Oh, I've done, how many of these similar meetings have a pre lambing meetings? Oh, we did, I did 14 in three weeks in the end of January. So different farmer groups. And we're talking about to joint ill and different farmers what they would swear by. And there was one particular meeting I'm thinking about and a farmer who had said, "We had tried everything, we've done this at the end. We changed our use onto pine shavings." I mean that's, it sorted out everything. I mean, by the end of the meeting we were teasing him for forum, for being, you know, selling pine shavings. But he, you know how farmers don't necessarily listen to vets but are great at listening to other farmers. And that was, it was just one of those occasions where... So I would, I don't have all my clients particularly on pine shavings, but I particularly put that in because for that farm, that was it. What their particular issue was must have been a bedding related thing and the pine shavings made the difference. So it's one of the things maybe worth trying.

- Great, John Blackwell has asked you, can you screen out the carrier ewes with *Streptococcus dysgalactiae* or would you record clinicals and cull the dams anyway?

- Well, that's interesting, John. And that's a really interesting question. I've spoken to a number of farmers about it, literally in the last couple of years with a view to doing that. Currently, I haven't come across datasets that are good enough, which is surprising. So I've come across some good datasets. We've had students working on it but as yet to look year on year. So I think theoretically, yes, I would carry screen out carrier use, but practically I can't promise it would be at that stage, although this year the people have promised that they are recording. It we'll get the good data. So, you know, I'd love to be able to say yes by next year, John, but I wouldn't. Yeah, carrier ewes are key,

but then even when you look at the detail work, they found in carrier ewes, but I wouldn't say that's the only answer. So yeah, it's something that's still a work in progress. I'd say John

- Thanks, there's quite a few questions coming in. Rachel Tenants asking you, what is your opinion on injecting store lambs with oxytet and a pasteurella vaccine at the same time?

- Well, that's interesting. No, as a matter of course, I would not want to inject them with an oxytetracycline although that certainly even the Sheep Vet Society when we went back to the committee and said, they would agree that you could metaphylaxis is okay. I wouldn't want to do it as a routine. I wouldn't want to think farmers were doing it as a routine, because it's sort of too much of a crutch. And I don't think we can afford to mass treat store lambs. So yes, if we know there's a known problem then that's fair enough. But if people are constantly buying from lots of different marts and buying in lambs that they feel they have to treat with antibiotics on arrival, I don't think that's acceptable. So, you know, as much as you can work with them to sort that the better. In terms of actually using the antibiotic at the same time as a vaccine. So pasteurella vaccine it's that IRP technology, it wouldn't be a problem. It's a dead vaccine. It wouldn't be an actual interaction between the oxytetracycline and the pasteurella bit of the vaccine. But as a principle, I wouldn't like to routinely inject with oxytetracycline.

- Thank you. Bill McKinney is asking, any suggestions on footbathing for control of foot rot or CODD, zinc sulphate, copper sulphate, or formalin obviously not antibiotic?

- Yes, well you say obviously not antibiotic Bill but, I do get asked a lot about people still are using antibiotic footbaths for sheep. Definitely, even though, you know, as you suggest, Bill, we can't condone it. We don't have evidence to show that we need to use antibiotic footbathing. And we have the thing that worries me most about antibiotic footbathing is how people dispose the footpath. And basically if their answer is, "I'm going to pour it down the drain," we know that it's totally unacceptable in terms of antibiotic in environment. I know you weren't asking that Bill. So you were saying suggestions and we just literally, Haley at Nottingham has just finished her PhD on footbathing for the control of foot rot, CODD. She was actually looking at formaldehyde, and some very interesting results, but she concurred with what other literature has said that if you have clinical foot rot, CODD, there is no benefit to footbathing. And potentially there will be a spread because of the football thing. So the footbathing will change the population of bacteria on the feet, not necessarily for the best and certainly not for a prolonged period of time. So in terms of, so I don't, there's no data as to whether standing them in zinc or standing them in copper sulphate, or walking them through formalin. There's no data on which is better and different farms have different preferences. But what I would say is for adult animals, you can only use it as a, because you've had them gathered and you're preventing unnecessary spread of bugs between the gathered animals. You cannot ever use it as a clinical treatment for either foot rot or CODD. And Haley's PhD concurs with that. But actually it was, it's turned me off footbaths even more than I've never particularly liked footbaths in my life and even less now put it that way.

- So I think you've also answered pretty much more of than Webster's question which is, is there any good evidence we can use to discourage antibiotic footbathing?

- Yeah, that's really interesting Molvin. And we've, so there was a letter from the cattle vets it was a year two back now, saying that there wasn't sufficient evidence to suggest that they should be using it in cows. We have even less evidence in the sheep industry. So people have used it as a crutch. Sometimes they've been using antibiotics when really it's just a school situation and they could easily using one of the things that Bill suggested, zinc sulphate copper sulphate, or walking through a formalin, which does work for lamps whose old. The only time I would sort of bend the rules when to buy a footbathing is if you are convinced you've got a massive welfare issue and you have nowhere else to go. But quite honestly, if you've got a big welfare issue you've got to be catching and properly treating every animal. The footbath is I think you're kidding yourself. So a lot of vets and a lot of farmers have been using antibiotic footbaths. No really good reason. So when you see is there any good evidence we can use to discourage it? There's no good evidence we can use to encourage it even though a lot of people do it. So I would, I'd say that the disposal is a big reason. You know, the last thing you want to do is to have the litres and litres of antibiotics going down the drain, which is what must be happening with antibiotic footbaths. You know, that's completely not acceptable.

- So if anyone else has got any more questions, pop them in quickly. But I've got a question Fiona, and I feel a bit of imposter syndrome today 'cause I haven't done farm work for quite a long time but in my experience in admittedly a while ago, sheep farmers were quite set in their ways. How do you think you'll get them on board to do these things?

- Well Pam, that's a good question. So, and I'm really quite fortunate because I work with a lot of very progressive sheep farmers. But equally I'm very well aware of a lot . There's, yes. A lot of people have been doing it for a long time and they all said no way. We've got, I would say actually the behaviour and attitudes train that we've got as part of the Farm Vet Champions, I'm really looking forward to it. I had a bit of a preview of some of the presentations but speaking with vets and farm vets, who've been making progress and this, we can't be continuing with our top-down approach of us as a vet saying, "This is what you have to do." But the actual motivational interviewing and finding out why people are doing what they're doing, I've actually been hugely encouraged this year, Pam by the difference and I don't think it's just what farmers say to me but people saying, "I used to treat all my lambs. I don't now." The progress farmers have made, I think in the last few years is colossal. And by one of the papers where we looked at we've looked at farmer's blogs. Although there are still farmers who are saying, "I can't think of changing. I do this. This is what I've always done." There are at least as many saying, "No we've made that change. You can do, think of this." So I think we're on a slow burn but we are making progress in the right direction. So yeah, but anyone who's struggling, A, have my sympathy 'cause I know it's really hard, but B, go to some of our other resources because we will have some quite exciting behaviour communication stuff out there and it's be well worth looking at that.

- Thank you, we all know that's great. And I thought it was really interesting what you said near the beginning Fiona, when you were talking about letting the farmer have a bottle of antibiotic but not starting at the beginning with the first few lambs at least. And that-

- Yes.

- What happens in the NHS a lot were now we got delayed prescriptions where they will let you have the antibiotics but say, "Try not to take them or leave it 48 hours before you start taking them." Which lots of people are, is happening to from their GP. So maybe that sort of makes a connection as well.

- Yeah, I think it's just being in control. Isn't it, people don't necessarily want to just be told you know, I also know vets who've, you know, if they've had their receptionist say, "Oh you can't have that this year," or that you know that the farmer is then immediately had his back up and it's just like, "Well, you know are you going to be responsible for my lambs dying?" And you know we can't be paternalistic about it. It's got to be, you know, patronising about it. We've got to work with people and work out why they're doing what they do. And yeah. And our ultimate aim is for better animal welfare for their farms to be at a better place. So as long as everyone can work out we're on the same, we've got the same ambition. It's just we're how do we get to that?

- We've just got one more quick question. If you've got time for that Fiona. Colostrum artificial, any thoughts some better than others?

- Absolutely, definitely. This project we've got. So we've got all these bricks refractometers, we've only just getting some of the data back through but farmers actually getting them to test the used colostrum. And then a few of them have been testing their artificial colostrum. And so I've got farmers coming back and telling me how rubbish it is. So there is a grade on artificial colostrum but the very best is only half as good as the ewes' colostrum. So yeah, there was a paper in the vet record about five, four months ago which did compare some of the commercial products out there. So that's where we're looking at. There is a range and some are totally rubbish. Some are better but the very best are still only half as good as the ewes own. So the more you can do to help farmers harvest colostrum of their own ewes, the better.

- Okay, so there's no more questions from anyone. I would just tell you the comment. Lovely comments have been put typed, Fiona fantastic presentation. Thank you. Great talk. Thank you, thank you. That's great. So yeah, I'll echo that. That's been really, really interesting.

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