Title Responsible use of antibiotics in game birds

Author: Henrietta Kodilinye-Sims

- Hello, welcome to Responsible antibiotic use in game birds webinar. Thank you very much to both Emma Youngs and John Tasker who helped put this presentation together. Very grateful for the amount of man hours that's gone behind this. I do hope you find it helpful. Just bear in mind that a lot of these slides are put together and deliberately quite wordy so that you've got a good resource. So do print them off and keep them in the back of your car or download them in your files and device in your phone, but they're deliberately made to be a future resource for you as well. So we'll try very hard to summarise them rather than reread the slides to you. So I'm Henri, Henrietta Kodilinye-Sims. I am owner of Surrey Poultry Vet practise. I'm a teaching fellow at the University of Surrey and School of Veterinary Medicine. I'm Education Lead for the BVPA as well. I'm going to be delivering this webinar for you. Now, we had a big team behind the BVPA that helped us. So thank you very much to them as well as the reviewers, both in BVMS&S also from our MRCVS knowledge. Thank you very much.

So on completion of this module, you should be able to define the key areas in game birds, where there's a risk about microbial use. And for each of those you'll be able to use a Plan, Protect and Prevent principles in order to prevent and reduce that usage. These are really going to be about focusing on flocks that are under your care of direct application of this advice on those flocks. Trying to convince your clients to engage with this whole process as well which we understand now it's challenging sometimes. So I'm going to show you how to calculate and compare antibiotic usage for flocks, so that you can use it as part of your monitoring, measurement and managing strategies. And really, show how to you can use these principles to try and inform your decision making on flock health and help improve your relationship with the client as well with regards to this topic.

When do we use antibiotics in game birds? Well, there are a lot of non-specific conditions which are associated with that post-hatch period to be honest, a lot of them are due to hatchery or breeder issues, which are not necessarily on farm and drug problems, but also you've got on-farm issues too like starve outs, non-starters due to poor environment for example a poor setup. So in the rearing period, and there's a lot of parasites that are going to predispose disease things like Spironucleosis, just bear in mind. That's previously been called Hexamita. See, you might hear, people still use the term Hexamita instead. Coccidiosis bacteria enteritis and respiratory diseases are very common underlying factors in these and they need a lot of our attention. Now with adult birds it's most likely to be Mycoplasma. That causes problems to be honest. So that's quite as important. So we're going to go through step by step, the key areas of potential areas where antibiotics are likely to be inappropriate or avoidably used. I'm going to go through the plan, protect prevent principles in order to address them.

Let's start off with chick start Often there's quite a high mortality in chicks that are less than seven days, that's reported. And quite chicks travel a long way but there aren't very many game hatcheries

in the UK and chicks have usually got quite a long journey. So you could only imagine, that the potential impact of that transport on that bird. Don't forget they're, they do hatch with a yolk sac inside of them. They can live off the first three days of life, but it would still be better not to have to rely on that. So making sure that the brooding environment is optimal is really going to help that chick once it's finally got to the end of its journey to start successfully. Now, it's really important to get a clear diagnosis exactly of what those birds have got. So do perform post-mortem inspections and takes for sac infection sensitivity septicaemia. if there really is bacteria involved, or actually if the birds are dying, because there is evidence of severe dehydration and poor feed taker. Are they actually start outs instead and also have a look at the history as well. Is there a history of predisposing factors, was there a gas brake dust supply break down and an all heaters went off or something?

So talk about plan first. You must really consider that brooding environment make sure it's appropriate for the birds. There's a list of things here that are very helpful and beneficial to go through things like light, water, draughts, temperature, preheating ensuring there's enough litter as well for the birds for to sort of cosy down into, and keep warm. Those are really essential things to have a look at and just talk about where your chicks have come from is it possible if the chicks are coming from a very long way? So for example, from France, that those birds have things like hydration gels in with them in their boxes so that they can at least stay hydrated on the trip on the way there to prevent dehydration on farm. Perhaps would it also be appropriate for your client to buy in older bird? So for example, if they're in a really draughty, windy area and part of the country. They really struggle with heat and they're miles away from electric and gas supply for example, it might be really tough, to get a really decent preheat and keep those sheds at a hot temperatures. So in those situations it might actually be more appropriate for clients to buy older birds rather than to buy them chicks. Because they need such high temperatures and never ever planned to use antibiotics. You'll be amazed. The chicks actually do arrive sometimes with a course of antibiotics from the supplier. That's clearly not good enough but it's worth asking the question You'll be amazed.

Now, prevention do encourage your client to make sure there is fresh water available. And that it's cooled as well. You know, poults don't like drinking warm water. It's got to be nice cool water. They're like living in hot environment but they're like drinking cool water. So that'll really help drive that water intake. You can give electrolytes and multivitamins as well to support chicks you know at risks of they're coming from very long ways away. But just remember that anything you add to the water is potentially going to compromise on water quality and water hygiene. So I would say that use them strategically. They're useful but using strategically, I consider the use of probiotics. For example, things like Broilact to to really protect chicks from invasive gut bacteria. So they're not just competitive exclusion products and considering e.coli live vaccination as well. Although it's off-label, it's still very useful to control coliform infections, which are often affect chicks.

Next, we're going to talk about bitting. So bitting is a very stressful time for the birds. They've got to be handled as a potential discomfort of actual bitting process itself. Although it's very important to prevent birds from pecking each other. Sometimes the behaviours actually begun or and it may even continue or be exacerbated by the stress following bitting. So sometimes it can lead to a spike in mortality it's really essential to distinguish between starve outs, bullying and bacterial disease. So when you're planning you need to discuss when you're going to perform bitting and use last year's experience to guide you. So for example, don't do it at a dietary change or when the birds are moving pens or sites although it might seem more efficient with regards to the personnel, it's not good for the birds to compound that stress and try and work towards the ideal management

systems. They don't actually require the devices. So the code of practise for welfare for game birds reared for sporting purposes does state that things like this shouldn't be used perfectively with a reason. Management systems should be explored in order to prevent bitting entirely. And consider using things like pain relief. Although it is off-label things acytylsalicylics may help promote appetite afterwards and reduce the number of starve outs that you get subsequent to bitting. So you've got actually plant extracts that include acytylsalicylic acids or you've got aspirin itself. They're electrolytes as well and other supportive agents to really help those birds cope with the stress and, potentially any reduction in feed intake as well off process. But just remember again, don't compromise water hygiene so you're much better off getting the process right in the first place.

Next essential about transfer of birds to the release site. So stressful. Again, another stressful situation is a good train of thought with this, isn't it? So whatever the stress or situations, the bird we've got a potential consequences that are going to need that antibiotics are, Oh, I wanted. Not necessarily required. So you've got handling transport and they're going to be placed into a new environment. You know, that's a lot of stress for them. Cause the diet change as well. And all these factors are going to really impact upon that gut flora and imbalance that microbiota. Of course that's going to potentially increase susceptibility to pathogens invading from the gut. So there are a few benefits to this as well. Now they're moving onto clean litter and there's more spaces, less stocking density, but there's, it's still a chance for things like sub-clinical disease to become a clinical disease. Thanks to the stress. Often mortality is actually due to starve outs rather than disease. so must perform post-mortem examinations to really identify whether it's something that's even treatable or whether it's management changes that need to occur.

There can be quite a lot of pressure for in-feed antibiotics as well just to sort of see them through unfortunately. So it's difficult to challenge and change client mentality. That's understood. But if you are going to try and argue against prophylactic use of antibiotics then there are many studies that found out that antibiotic treatments actually trigger dysbiosis. So if you're giving them in healthy birds and they're really managed well. Then you may actually manage to trigger dysbiosis and a secondary arthritis. So you've got to be careful When you're planning do you promote really good relationships between the client and their supplier. They've got to talk, they've got to tell them be honest, whether about they've had any challenges in the rearing period that you might need to look out for protect against, and also things like don't try and deliver them when it's pouring with rain and it's freezing cold. They're trying to delay that delivery until the weather is slightly better. I encourage your client to set up the release pens with very similar equipment, both feeders and drinkers because they're going to have seen in their rearing sites. So the birds, know exactly where the feed and water is and what it looks like when they arrive and have a look at the situation that they're being placed in. So is there enough shelter? Have the birds been hardened off sufficiently? You know, have they gone from indoor environment to outdoor freezing with little shelter? That's clearly not going to work very well. So how we'll think about delivery time to, if they are travelling a long way are they going to need some electrolytes on arrival? For example, and really design those pans to reduce stress. So use shelter perching and environment to mimic natural behaviours. Really reduce the stress levels of those birds so they can cope with any challenges. Think about use of anticoccidial and wormer on arrival, or immediately prior to transfer. Just important to clarify that you don't want to double-dose. So they need to communicate between the supplier and the client. And really make sure that the environment they're going into is going to be clean. So have the feeders and drinkers been cleaned between the last flock. you don't want to carry over of pathogens between flocks. Try and manage the ground as well. So the ectoparasite burden and an ectoparasite that burden is low as well. Good release site rotation, for example if that's possible that e.coli vaccination in rear is also a very useful thing to prevent secondary current infections post-transplant

stress. But that obviously has to be communicated with the rearer, requested for your client to their rear. So again, highlighting why good communication channels are really essential.

When you're considering the use of supplements to encourage feed intake and support the immune system, there's quite a lot of supplements available. Oregano is often used when there's a risk of histomoniasis identified. But, we know it's got good in-vitro activity but the evidence for in-Vitro is not particularly strong. So we know it's got good evidence of positive gut health effects, but, and it theoretically in-vitro activity but just be a way where that you're much better off to try and reduce the risks of histomoniasis to begin with.

So next we are going to move on to sudden death. So firstly, you've got to work out whether the birds that actually dying suddenly or whether it's just an acute rise in mortality due to underlying, the established disease levels. They could be having they could have had spironucelosis or coccidiosis for a while. And finally something's pushed them over the edge because it was foul weather windy and wet and the birds have chills. And then you've got a rise in mortality. I wouldn't say that sudden death as such. So it'd be very critical when you get sudden death reported in and have a real thing is actually true sudden because that's going to lead you to different differentials. Now post-mortem examinations are very useful, are essential I'd say to identify those. And at that main gross pathology to try and identify whether things like hepatic cardiac involvement which would actually support the sudden death diagnosis or they've got more gastrointestinal lesions, suggesting they've got some underlying infections that sort of pushed the birds over the edge and don't forget to check for gapeworm as well. All right. Don't underestimate how they can infect all birds. So both intestinal wall scapes and wet smears are useful. So intestinal wall scrapes, we'll be looking at things like coccidiosis and wet smears. You're looking more for those mortal protocells and those can be identified and confirmed grossly. I don't see that. So you must have access to a microscope. If you are going to see game birds it's really essentially take a microscope with you.

Now, when you're planning biosecurity's got to be good. I know that they house outside but that's not excuse for completely ignoring biosecurity and still quite a lot can be done. Including when you're planning that pen, all the buildings so that you can reduce pathogen load and it'll ease cleaning rotate the ground, for example. Optimising husbandry and preventing stress is really essential to reduce susceptibility to disease as well. So you can use probiotics like Avar guard and Broilact and other nutritional supplements as well just put birds if you identify a potential stresses. So again, that relationship between you and your client is really essential so that they can tell you when they've got early warning signs and you can do something about it. Preventatively.

Next we'll talk about enteritis. So enteritis can be caused by bacteria viruses, protozoa or combinations of the loss. Sometimes there is simply just a dysbiosis which is a disturbance the gut for. But other times there's a really overwhelming challenge and you get enteritis and potentially an necrotic enteritis as well when the lining of the gut wall sloughs off and that's going to cause hemorrhagic diarrhoea. So quite frequently you will find that involves motor protozoa or coccidia as a major underlying factor. So even if you cut open a bird on post-mortem examination and you think, Oh, goodness me that's got a raging necrotic enteritis. Don't just chuck it in bin for goodness sakes performs and guts scrapes, have your microscope with you. Look for these underlying factors. Now you may find that anything that's changing in the consistency of the faeces is going to cause to vent packing because the birds are going to see the faeces stuck to the feathers and peck for peck it. Clients may often want antibiotics immediately and the birds are looking pretty sick. So they present as huddling or sudden rising mortality. It can be quite a panic, if the owner So they'll often want to have antibiotics but have a look at water quality as well. Don't forget about feed too. So not just quality of feed but also consistency of feeders presentation as well. Have there been any feed

interruptions, a delay in delivery or something. Look at the environment as well. there are many important underlying factors and simply giving them antibiotics treating enteritis may not be enough. You put a note, you won't be fixing the problem if you're not spotting this underlying factors and addressing them as well because it's just going to happen again.

So in your planning always plan, but good biosecurity. Think about your building and your pen planning. So you can reduce that pathogen load, make it easy to clean. All right. And plan release times, according to the weather don't release them when it's going to pour in rain and freezing cold. Trying to optimise your husbandry and stress and prevent stresses is going to be prevent. It's going to prevent susceptibility to disease and those birds. Try and avoid placing them in areas of poor drainage as well. So is it really wet soggy area. Then there's likely more pathogens around. Annual rotation of release pen sites can really help prevent disease as well. You just. You're lowering the buildup of pathogens between flocks. Do provide additional feeders and drinkers. If you think birds are showing early signs of illness. For the ones that are low in taking water, or if you think that they're very uneven when they're placed here. If they're low in taking water, they aren't, going to want to fight with the bigger ones to eat and drink. They're simply going to get smaller and smaller. So if you're providing additional feeders and drinkers. You'll be supporting those smaller ones and reducing bird to bird interactions, which is going to lower stress. Make those smaller ones do much better. Now probiotics and nutritional supplements can be used to support birds. If you identify stress, just again, remember about the consequences of poor water hygiene with that. Performing regular coccidiosis monitoring using either faecal oocyst counts or by post-mortems will really enable you to perform prompt oral coccidiocidal therapy. Thus preventing secondary bacterial enteritis rather than letting it get out of control because it's not being noticed. Then you end up with a raging enteritis.

Last but not least respiratory health. So although a common cause or respiratory is mycoplasma gallisepticum. They're a lots of the pathogens that can also affect game birds including the gapeworm. Remember too, and environmental issues do really play a really important role with this. So for example, the litter's really dry and if ventilation is insufficient. Then you're going to have more dust and dust can be problematic because it's going to irritate those airways or for example, overstocking as well. That long was some under ventilation can can be tight levels of ammonia too. And that'll also irritate the airways. So don't always just to assume that the respiratory disease or sign. Respiratory clinical signs has got from mycoplasma. That would be a mistake. So testing is really essential in order to confirm that course so that your treatment can be targeted. So you'd want to perform oropharyngeal or tracheal swabs only I would suggest you would only perform tracheal swabs on a dead bird. You wouldn't do in a live bird. Cause you can harm that the tracheal, so oropharyngeal on live birds or to kill swabs or dead birds, always on plastics swabs for PCR because any wood will inhibit the test. So you can, you can submit them. For mycoplasma gallisepticum or culture actually as well but often E.coli does dominate on culture. So you've got to make sure you use proper transport media as well. So it's just PCR might be easier. So you can actually source mycoplasma free stocks. If you do not have a history on-site of mycoplasma that might be worth doing and do make sure that the houses are actually designed to allow for good biosecurity and good ventilation it's hard to adapt them.

So, if you're trying to engage with clients if they are adding new sheds and new hats try engage them at that point to, to help with the design and ensure that you're going to be reducing disease levels. You can use mycoplasma vaccination in rear as well. If there's issues recurring of your site who's chronically really struggles with the mycoplasma infection. I'd also recommend regular well-made count monitoring. So every six, 12 weeks to inform worming protocols as well. Now I think you got

mild respiratory disease which is not significantly impacting on growth. Then you can use things like nutritional supplementation or decongestant products as well. So there are products in the markets for poultry that continue eucalyptus. For example, they're going to they're going to act as decongestants for the birds enable them to breathe better and is, get it get and have a regular serological or PCR monitoring to identify pathogens on site. Sometimes if clients don't want to spend the money regularly. They can at least take samples, a couple of times through the flock and bank them bank the blood and the swabs freeze them. Then it gets into the end of the flock and you've had no problems whatsoever then fine dispose of them. But if you do have problems then at least you have a, either a pre challenge sample for paired serology samples or you can run those samples to find out, what those birds were exposed to.

So most common patterns would be things like infectious bronchitis virus or avian pneumovirus or ORT bacteria, and pasteurella multocida. So do monitor these clinical signs as well and then educate the clients so that they can identify early signs of these diseases so that you can help them. Now veterinary medicines licenced in game birds not a lot to talk about this really because there's very few there's very few licenced in game birds. So most prescribing is actually done in the cascade. So do you make sure you've watched the veterinary medicines directorate presentation as part of the series. You have full understanding of that. Now neomycin and tylvalosin in partridge and quails. But only till they listen, in licenced in essence. So this table has been summarised from the European medicines agencies casualization of antibiotics. It must always begin by considering those antibiotics in the category D section. Note they're non-licensed for game birds but if you are using them on the cascade then you should start with those first. Do also note that if you are using things on the cascade or if even in the process that are licenced they tend to be quite long withdrawal periods. You have to make sure that you've got those periods in place or planned prior to the planned shooting date as well. So you can't have them being shot while they're on a meat withdrawal time. That's not appropriate. So you can use off licence cascade use of doxycycline and tiamulin. They're both quite useful in terms of treating protozoal enteric diseases of which we have no other treatments for. I'm not highly advocating the use of antibiotics for protozoal diseases, but I think you've got to look at it on balance because, they often work very well in combination with severe and refractory cases. I'd actually think that using them at a one-off combined usage, it's probably more responsible than repeats antibiotic usage numerous times through the clock through, through the flock. But, do you remember that the risk factors also got to be controlled?

So it's worth considering that Now I'm not going to teach you how to calculate when in water medications, but these the notes are here if you need it. But just as a tip, do make sure you prescribe based on the quantity of medicine that's required rather than buy the bag or pot and do try and encourage clients to return unused medication for disposal. So they're not just being stored and stashed up for a rainy day. When you're calculating in-feed medications. It's really important to make sure that that you try and work it out based on those expected food consumption and the body weights of those birds. So that you don't have excess medic medicated feed made and feed mills now are actually able to make medicated food by the bag rather than by the tonne. So that you can really minimise that wastage. How do we really think about, when you're choosing whether to medicate in-feed and water? What the pros and cons are. So for example, if it's really dry weather and there's very few external water sources apart from the drinkers that are available then probably giving it in water is a good idea because there'll be a higher high uptake of that water. Consequently, if it's pouring with rain and there's a lot of puddles and as a stream that runs through the release pen, then probably, giving medication in water is not going to have very it's not going to work very well. The birds are going to drink less than you expect. So they're going to be under dosing themselves and then predisposing to resistance. So in that case, actually calculating in-feed or

prescribing in-feed medication, when there's no other feed source available would actually be far more sensible. Now medicating in header tanks is a bit of a fine art. So I do encourage you or your clients to purchase automated medicating units, for example the dosatron, because they are far more accurate in the dosing, but I'm going to go through a few kind of tips in using header tanks. So header tanks are often just like what you find in your loft they've got an incoming or an outgoing water pipe. I'm going to put my little pointer on here at this point. So you got incoming water here filling up the tank and you got an outgoing water here. Now, anything in this yellow reservoir at the bottom is going to sit there. All right. So when the water, when you think it's actually empty and there's no more water, there's able to come out there's still a residual reservoir sat here underneath. So it's really important to have a plug at the bottom so that they can be fully drained because you don't want medication just sort of stacking up at the bottom there. Neither do you want debris and all sorts stacking up at the bottom there. So it's important to have a drain plug and not all of them do. So do encourage your clients to instal a drain plug if there isn't one already. So when you are filling up this, tank with medication. Just remember the anything that's sedimenting to the bottom is not going to go into the birds. It's got to be well-mixed and you can get sort of automated mixing things that churn the water about and try and reduce the wastage at the bottom. And also you've got to calculate how much is, if it is evenly distributed throughout the tank how much is actually going to be sat there or how much is going to remain in that yellow reservoir area once all the green has been delivered to the birds. So you've got to factor that in your calculations. So tanks should never ever be allowed to continuously refall, refill sorry once they've been filled with medicated solution because you're just going to continuously dilute that solution. The birds are not going to get the most appropriate dose, but you've also got to be aware that you can never allow tanks to end up completely empty or animals may get thirsty. So do estimate the daily water consumptions and use weather forecasting as well to calculate those volumes. So for example, if you know, it's going to be super hot then just relying on the likely standard from the bird supplier is it's probably going to be an underestimation of how much those birds are going to drink.

Now, a little few tips about biosecurity in it's. Some clients will say, Oh, well, my bird's are outside. So I don't need biosecurity because it's pointless. Now that's not actually true. So do try and ensure they're using separate foot tips for every pen to reduce horizontal spread of pathogens. Ideally you'd actually have separate wellies per pen, but we can understand how that may not be feasible in that situation. So at least some separate footdips and footdips have got to be covered too. Partly to prevent UV light deactivating the disinfectant chemical but also to prevent rainwater going in and diluting the concentrated acid solution and reducing its efficacy. So always make sure that chicks are kept isolated from older stock as far away as possible. And when Stockmen are working their day to day checks make sure they move from the youngest to the oldest stock, not the other way around. If they do have to go the other way around and they really should be having a complete change of clothes. So perhaps they only having a chick specific boiler suit for example, and wellies would be sensible. Now ensure water hygiene, food hygiene and pen hygiene are all optimum. To reduce exposure particularly in those young birds to pathogens, try and minimise the number of species, ages on site at any one time. So if they are going to refer pheasants try to discourage them rearing ducks and geese at the same time, particularly in the same fields as well. So when you identify any problems isolate them immediately to try and prevent horizontal transmission designate one person who doesn't enter healthy pens just to deal with those sick pens have those pens specific boots and overalls. At least if you can't afford the extra staff and try and rotate pens yearly. So partridge should not be reared on ground recently occupied by pheasants as well. That's another good golden rule.

So finally, we're going to discuss the monitor measure and manage criteria. So, first of all the birds under your care have you made the right decisions as well? Have you considered all the alternatives

so. Are there any bacteria viral protozoa or non-infectious causes underlying, if bacterial cause is likely, then you should really be carrying out culture and sensitivity rather than picking up the nearest antibiotic. So do you select the most correct antibiotic dose rate or duration in for that, for that licence use to and have you considered other alternatives for antibiotics? So for example, probiotics, to be balanced, the gut bacteria or diet changes and management changes as well. So always keep a close eye on the condition once it's developed. So is it actually responding to treatment, or do you need to reevaluate and instead of swapping antibiotics, could it be that you've just missed something that's underlying and they need to go back have another look at the site. Go through all those underlying factors and make sure there's nothing that's been missed. Now in really acute, highly infectious situations. You might need immediate treatment. Okay. But if you can colt sensitivity and results because they may actually indicate a different antibiotic. Do you try and wait for them first? And I understand that sometimes it takes a long time to get those sensitive sensitivity results back. So if you have a good relationship with your lab it's well worth calling them up and saying, look I'm getting a sample to you, please can you run a direct sensitivity test on them? Because however inaccurate they are at least they're slightly better than, than guessing. And you can actually get a result from that back in 12 to 24 hours. So as well, worth finding out if that's a possibility. I, again, I wouldn't advocate it all the time but in certain situations, when you've got really acute highly infectious disease, then that's where we're thinking about.

So next we'll talk about measuring antibiotic use. So antibiotics in game birds is often reported in kilogrammes of active ingredient prescribed annually in both feed and in water medication. So do you have adequate prescription records in the practise or other farmers using a defra approved medicines book as well, so that you can trace that antimicrobial usage, do you try and those high-risk antimicrobials. So for example, before fluoroquinolones, and 3rd/4th generation cephalosporins and colistin. Actually some of the buyers of game meat won't even allow these being used. So do you try and discourage them and have you read the detailed guidance at BVA sorry at bva.co.uk as well, do you go to resources and support that new medicines for some more information there. Now if you're a supply, our clients with an antibiotic usage calculator to help them quickly and simply work out and record their usage that can be really help that can help them measure their usage and compare flock to flock as well. And they might find, Oh, goodness me. When I look back and reflect on this, on this flocks, crikey my usage is more than it has been in previous years. Great. Well, that's a time to get those, swabs and bloods out of storage and run them and see what else, what happened in that flock that may have caused that increase in enteritis anti-microbial usage. So if you're measuring it on the actual site I'd get your five farmers to calculate the total mass of antibiotic over the number of birds reared to release per year, because that's the most useful calculation that they're going to perform for their own monitoring purposes. So for example, if you have a rearer of 5,000 pheasants treating with 10,000 milligrammes of antibiotic, that's going to be 10,000, over 4,000 which is two milligrammes of antibiotic per bird. So their usage as reported by the GFA/BVPA in tonnage per year, that figures not as helpful to clients actually on the ground. So the figure above in the box is far more useful for the clients to monitor their own usage onsite. It's far more meaningful for them. And if you want to learn more about measuring antibiotic usage, then do you go to the RUMA website in the link on the slide?

So finally, we're going to talk about managing antibiotic usage. So flock health plannings are really, really they're such valuable tools. And I know they can so easily end up as tick box exercise but if you've got a really good flock health plan that's tailored to the site and the enterprise that's going to help the clients achieve lower disease levels. So do you spend the time on them and reducing stocking density sometimes can also be helpful in reducing disease pressures and stress as well. So that's well worth considering, particularly with sites that are struggling include antimicrobial usage

calculations in that a yearly flock health planning meetings as well, and set smart targets with your clients to achieve prevention and reduction. Make sure that they are small achievable reductions as well to try and keep clients onboard, engage with that process rather than sort of overloading them with, with reductions that you were expecting reductions that just far too high and unachievable in a short space of time. And making sure that client's understand the manager expectations. So it takes a lot of time planning and effort in order to achieve good bird health and reduce the requirement for anti-microbials. So, do keep them engaged, keep them informed try and educate them, try and encourage them to collaborate with each other. If you've got a load of gain farmers in a room and ask them to come up with some ideas on how they could improve bird health and prevent microbial usage. Then there could be a lot more invested in that process and then have there been dictated to. Finally do encourage your clients to sign up with the GFA game rearing codes. Part of that is reducing antimicrobial usage and there's a lot of useful information for them on that website as well. Thank you so much to farm vet champions for giving BVPA the opportunity to show this kind of information to vets on the ground and do not hesitate to contact us if you have further questions. Thank you. Good luck. And here the references. So thank you very much.