Title: Responsible antibiotic use in Turkeys

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- Hello, my name is Henrietta. I'm gonna lead you through this Turkey module as part of the arm vet champions initiative. And this, this presentation was written by myself and Emma Young and John Tasker as well from the BVPA. I am owner of Surrey poultry vet and veteran practise. I'm also teaching fellow at the university of Surrey and I'm education lead for the BVPA. The contributors were many were a big team pulling this together. So I'm very, very grateful for the time and effort that they've spent on this as well. And their review is particularly Stephen Lister putting in a lot of effort to an extra resources. So thank you very much. This is very much a team effort even though I'm presenting it.

Now, the Learning objectives are very similar to the other modules in this initiative. So by the end of this module, you should be able to redefine those key areas where we're Turkey management it is likely to incur risk inappropriate antibiotic. And for each of those areas you should be able to use the plan, prevent, protect, principles in order to discuss mitigation factors and try and reduce the likelihood of requirement antibiotics. We'll also discuss how exactly we're going to enact those principles in in the flock setting. And I'm going to show you as well, how to calculate and compare antibodies use so that you can use that as a tool with your clients to, to measure and manage that their usage and feature. And finally, we use the monitor measure and manage principles to really help inform flock health planning, and, and try and get your clients on board with this. Now, this is just one of this is a very wordy presentation. All right, there are, there's a lot of texts in this and that's deliberate so that you can use it as a resource. So do download it, have it on your phone, print it off keep it in the back of your car. You know, these, these slides have been deliberately made so that you can keep them as a resource for the future. So I try very hard not to read off them and summarise them for you, but I do hope they're helpful.

So if you look at the Turkey production challenges, most turkeys are generally grown all year round, actually for the commercially but most seasonal producers are only going to produce for the Christmas period. So these are probably more likely the ones that you're going to see if you're not seeing them too regularly. Now, most of those are often read as a as a seasonal business or mixed farm. So they're often not Turkey only farms. And that means that there are other, you know, other needs on that farmer as well. And, and a lot have experienced stock persons but just be aware they may not be full-time because they're on a mixed farm and they've got maybe got arable or other species depending On the two. Quite often they're multi-age multi-species site. So they might have a little flock of chickens selling eggs locally as well as the Turkey everything for Christmas. And that all these factors just mean that the likelihood of disease is higher. So it's a, all a bit of the above. on the back foot with these kinds of sites I'm we've to work quite hard in order to in order to try and reduce the chances of disease and the need for antibiotics.

So why do we use antibiotics in Turkey? Well, definitely hatching and rearing. We have E.coli or potentially pseudomonas infections particularly if all the hygiene is poor. During the fattening period that mycoplasma ORT and E.coli tend to predominate. And then as adults we often have enter respiratory arthritis E.coli. So a transfer, transfer is when the birds are taken from the rearing site to the fattening site that can often result in quite a lot of stress and can predispose to emergence of new diseases. And, and once they're in the growing system then actually a lot of the diseases have got quite a complex mixture multi multi-factorial mixture. So for example, mixes of bacterial and viral and parasitic diseases as well. And don't forget the other infections that turkeys can get including Pasteurella, Erysipelas and clostridia Staphylococcal and Histomonad infections. They are really the most common infections you're going to see in turkeys. So we look at the key areas of of inappropriate or avoidable antibiotic use. You've got Poult start, transfer, enteritis, Respiratory and sudden mortality. Now we're going to go through these one by one, I'm using the plant protect prevent principles to discuss them.

So we start with pulse start as a very high early mortality. So we would find high early mortality as in chicks less than seven days old, that's usually due to starve outs and non-starters, but it can also get yolk sac infections and probably bacterial septicaemia but it tends to be less often than it is in chicks, chicken chicks. So just, just that using postmortems as a diagnosis is a really essential way of differentiating between the two. Now, brooding environment's got a really major underlying factor for this. So if, if the brooding environment is good then you're likely to have good chick stock success. And you're likely to really lower the chances of starve outs non-starters and infections as well. So it's really important and said to get a really clear diagnosis. So have the chicks actually got yolk sac infection? Is there any evidence of septicemia with splenomegaly or hyperspmegaly for example what bacteria are involved, you know have you taken those swaps and set them off the culture sensitivity? And is there evidence of some severe dehydration or poor feed intake? So have you seen a rates backing up in the kidneys or evidence of dehydration in the in the blood vessels around the metatarsus? Is there any visceral articular gout as well? And is there food in the gutters or food in the gizzard. Also it's if you can, it's really, really helpful to have a look at the actual setting, because then you can assess yourself using the brooding environment whether or not you think that there's likely to be substantial predisposing factors in them or they're in their history as well. So for example, if they're transported really long way before chicks placement, then you know, that's gonna be a predisposing factor. So do you use your history as well to help.

So, first of all, when you're looking at planning you need to consider the brooding environment and make sure that it's optimal for chick for chick start. So there's many factors that are involved and they're all listed on the slide. I'd say that they're all very important, but temperature is going to have very, very big effect and things like sufficient litter, and that's related to temperature. So if chicks or pulse or snuggling down in nice, nice thick, litter, then they're going to be able to maintain their temperature much better. And clean water You know, there's, there's no point in making sure that everything's clean and tidy and the environments perfect. If all you're going to do is be feeding the chicks E.coli, pseudomonas and edge caucus species in the water lines. All right so don't underestimate the risks of having dirty water. Now, supplementary feeds and drinkers can be beneficial. That's just to really encourage the birds to drink and feed and give them more choice and more options as well. And they do really like the colour red as well. And if they've got something that can create some noise as well, when they're feeding that that's even better. So there's like corrugated cardboard at the bottom of the tray for example. That's going to really draw the chicks towards the feeders. Now, sometimes you might have to think actually, you know if they're going to be rearing somewhere, that's really cold and they struggle maintaining heat and gas and electric supply then perhaps it might actually be more appropriate for client to buy the older birds. That's

where we're considering as well. And never ever you plan to use antibiotics. If the client's really concerned they can submit dead on arrival poults for screening and you can take some bacteriology samples. So at least you're prepared if anything happens, but, but do try and discourage them for using prophylactic antibiotics at placement.

Now, when it comes to prevention encourage your client to make sure that water is really clean and cold is very helpful. So although birds like being placed in nice warm environment they don't really like drinking warm water. They'd much prefer being cool water. So that can really, really help as well. And providing electrolytes and multivitamins can help to support at-risk chicks. For example, if you know that they've been hatched out late or they have spent a long time in the transport in order to get on farm then then giving them electrolytes multivitamin is can help. You just got to always be aware that but whatever products you're putting in the water lines you're potentially going to be compromising on water hygiene, and you don't want to make them hydrated but then expose them to dangerous levels of bacteria. So do you consider the use of probiotics to protect poults from invasive bacteria. They work as competitive exclusion product at competitive exclusions. So things like Broilact and Aviguard are examples there. And do you consider light E.coli vaccination as well. So although it is off label, it's still very effective and useful in controlling those coliform infections and should massively reduce any antibiotic usage. If, if that's a particular problem on a site.

Next we're going to talk about transfer. So there are advantages and disadvantages for transfer. I'd say advantages are they're moving to clean litter and usually more spaces are so that's good for the birds and disease levels, but the disadvantage is stress. So handling transport, you know going to a new environment, diet change, all of those factors are going to really impact quite significantly on the intestinal, microbiome your stuff and that's going to make them more susceptible to pathogens. So they might be exposed to new pathogens when they're on route, when they're driving down the most way, they might also be exposed to new pathogens in that new environment as well as particularly if they've had a poor turnaround between the last, between the last few crops. So because Of the stress, this is going to be a good chance for subclinical disease to come out as clinical disease as well. So we really got to keep our eyes on them to make sure that transfer is going as smoothly as possible. Now, some clients may still pressure vets to in-feed antibiotics to prevent enteritis and weight loss while those birds are settling in at transfer. But I suggest no evidence against these the prophylactic use of these antibiotics would be. So for example, in this study, by Le Roy they found that antibiotic treatments actually trigger dysbiosis. And if you're triggering this dysbiosis you are leaving them open to overgrowth of those more pathogenic bacteria. So I would warn against peripheral attributes of antibiotics and just really help them optimise their transfer processes instead.

So if you have a look at the antibiotic usage in turkeys over the past five years, between 2014 and 2019 you can see how significantly it's dropped off. So it's gone from 220 PCU almost down to 42. Now I'll explain what a PCU is later. It's a population correction unit but we'll go into that later. But the it's really substantial reduction antibiotics actually we've, you know, we've not seen a corresponding massive increase in in enteritis and problems to be honest. So the hopefully I've helped give you some good reasons is to fight against prophylactic antibiotics use at this time. Planning is very important. You know, they've got to get this right. And I think promoting a really good relationship between the client and the supplier is, is gonna help, you know, have they had any problems in these birds in the rearing period that we think might be exacerbated by transfer? Is there anything we can try and protect them against for example, and try and encourage the client to to set up similar sorts of equipment as well. So if the birds are seeing the same drink as the same drinkers in the rearing side they'll know exactly what to do when they get onto the fattening site, for

example. And If birds, if birds are due to be turned out in a range when they get onto the fattening side, but is there enough shelter? Now have the birds being harmed off sufficiently? Is it, are you have they experienced those lower temperatures? If they're now going to be going outside and try not to do it it's going to be snowing and filthy wet and they have very little shelter, for example. So really think about what those birds are aren't getting exposed to and have they got the facilities in order to help regulate their own body temperatures and feed and drink in the warm when they're, when they are cosy. So think about delivery times as well. If they're coming from really, really long journeys they might need electrolytes on arrival. Just be aware again, potential water quality effects. So do follow up with, with water sanitizers. And try and design the pens to really reduced stress using enrichment, both toys and shelters as well. Now using vaccination can really help prime the immune system and prevent disease. We all know that, and there's quite a few potential vaccinations that could be used. I mean, there's quite limited use in seasonal birds at the moment. So do you try and challenge your client to engage with a more thorough vaccination programme, especially if it's tailored to their site and what they've seen previously and, and to the rear as well and their history and site too. So there's a list here of, of diseases that, and, and vaccinations that I'll let you read through in your own time. If you're interested in this.

Now, when it comes to prevention, trying to ensure that your environment is clean, it's obviously essential try and reduce mouth pathogens. These birds are going to be exposed to on the new site and think about not just viruses bacteria, but also and the parasites X parasites as well too. And make sure that not just the shed is cleaner but also the feeders as well the feeders and the drinkers, because that's what of birds are going to directly be consuming food and water from. So make sure that they're already clean as well. And do you think about E.coli vaccination in rare as well. Now for protection there's actually, there's a lot of supplements on the market. There's quite scant evidence, really of the true efficacy in vivo of Oregon or supplements for treating blackhead, but it does seem to work quite well in vitro as an ant, as with an anti-parasitic activity. So, you know, it's well is it well commonly used in the, in the in the industry and any signs of a blackhead infection or when there's a risk of blackhead as well. It certainly helps increase appetite and feed intake and it does stabilise gut health as well. So maybe it's its effects from that, but I'd say it's they're well worth trying and let's face it. There is a complete lack of any actual treatment for blackhead. So we don't have too many choices. Now, water hygiene, keeping them clean by using sanitizers is really, really important. So just be whether it's going to be hindered by multivitamins electrolytes and routine organic acids as well. Now, again, organic acid is a very helpful to stabilise and promote good gut health and really reduce the risk of bacteria invading the intestinal tract but that, you know, they good for gut bacteria and they're good for Lyme bacteria as well. So it's where we're following any of those products up with, with line sanitizers to get rid of any, any developed biofilm. So probiotics such as Broilact and Avaguard can be used practically at this time to reduce enteritis developing. So there's nothing wrong with them having it twice in their lives. You know they can have it at chick start to promote good gut health as chicks and reduce infections and they can have it again at transfer to to prevent enteritis as well. Then next we talk about enteritis.

Now enteritis is often multi-factoral and it can be caused by a combination of bacteria viruses processor or, or just one by itself. And usually it's a massive overwhelming challenge. That's the problem. So it is essential that postmortems are performed and that both intestinal scrapes and wet smears are on undergo as well. So intestinal scrapes, we'll be looking for parasites that are lodged within the actual cells in the gut wall and wet smears. We'll be looking for parasites that are free flowing or attached to the surface, so, or not attached but loosely attached to the surface. So we tend to look for coccidiostats using intestinal scrapes because they're in the cells. And we tend to look for things like Histomoniasis in wet smears. Now any of these problems may lead to bird

pecking. Soon as you have diarrhoea, you've got dirty feathers around the back end, and that's gonna attract other birds. So it's must, must be controlled. So it doesn't kick off any bird pecking. Clients often want antibiotics immediately almost on a does work well, to be honest, but fairly due to a non-specific effect on just disturbing the microbiome and perhaps controlling some toxigenic E.coli as well but birds can present as huddling, or actually just as a sudden mortality a sudden rise in mortality too. Now, there's many underlying factors. You've got water quality, feed quality, not just quality actually a feed you've got feed consistency presentation and interruptions as well. So if you have some feeders that go down overnight and those birds do, and those birds have an empty gut then that's going to be predisposing them to enteritis. And think about environment as well. You know, if there's an adverse environment and they're all sat there huddling and they don't want to eat and their feed intake is low, then, then obviously they're gonna be predisposed to, to enteritis.

So let's talk about Plan first has, has enteritis occurred in this spot before you know, is it, is it likely to recur based on, based on their setup and if it has occurred before does it happen repeatedly? Does it happen at specific times in the flock? Or is it in specific seasons that happens? Do you try and challenge your client to, to engage in the issue? And I think it's, it's actually really helpful if at the end of the flock, everyone's so, so happy to get rid of the birds, but I look forward to the next one that they don't sit and reflect. And I think it's really helpful to get a good session with your clients, sit down and reflect what has happened. You know, there might be things that didn't flag up at the time that actually think might be useful now. And they all come into a picture together to suggest something. So do you spend that time I think reflecting on a crop because it should really help inform the flock health plans going forward. Now always make sure that drinkers aligns as well as the housing, very clean. This is something you're gonna hear a lot to clean housing, clean drinkers and you can use water testing to, to inform whether or not the water is being kept clean enough. So for example, if we take a sample of water and send it to one of the labs for total viable counts and potentially E.coli and see the minus detection as well, that can be really helpful in identifying waterline and water issues. So if they're on boreholes and they really should be doing chemical tests as well because borehole water can often contain more metals and strange unusual levels of salts as well that can potentially cause diarrhoea and to enteritis. So it's worth it. If there are borehole doing full chemical profiles as well I'd suggest. And ideally birds would not be fed borehole water. They'd be fed on mains water alone, but you know you've got to understand the cost implications of that. So they can really use housing and site design as well to help achieve good bio security and reduce pathogen loads. And if you have clients who are building new sheds or thinking of expanding and try to get involved, you know, at that planning stage so you can really put a good veterinary input on that and plan to mitigate some of these from the very beginning. Try and optimise the husbandry when the birds are actually onsite to prevent susceptibility to disease they've got to be comfortable to encourage feed intake and good quality and quantity of bedding as well. It's gonna help prevent them being chilled overnight especially in naturally ventilated sheds. When they are really at the at the mercy of the British weather then giving them good quality bedding that they can snuggle down and keep help, keep warm, will help reduce chilling. We've spoken about supplements before. So organic acids and probiotics here maybe something that has to be considered either to promote gut health and maintain appetite. Or if you think there's, they're at risk of enteritis. We'll talk about respiratory next.

So respiratory could be caused by ammonia excessive dust or it could be caused by infectious agents such as mycoplasma ORT, TRT, avian, pneumovirus or aspergillosis. They can also get aspiration pneumonia and E.coli can cause pneumonia and enteritis as well. So quite a long list, really and quite lots of good poetry acronyms too. So do one for if you're not sure. Now oropharyngeal tracheal swabs are very useful for PCR fuss and these organisms just be aware that when you're doing PCR

testing you must not use wooden swabs because that's going to complicate that test. Do you use plastical round swaps for that. And equally when you're doing tracheal swabs avoid doing tracheal swabs, I would suggest in live birds because especially if you use a swab that's too big you can damage the trachea and the lungs. So I'd suggest Oropharyngeal in live birds and tracheal swaps in dead birds. Now you can quite often dominate on culture. So if you are going to be doing, if you want to do culture for mycoplasma instead of PCR, then you have to use the proper swamps with the transport media and just be aware that sometimes E.coli will dominate. If you just do a straightforward a box standard coach sensitivity testing. Now he can go into a site visit to make sure that you can have a look at the environment and ensure that air is really fresh in the straws is clean as well. Dump dirty straw is, could be growing moulds. And they're quite sensitive to to aspergillus spores, I'd say turkeys. And you might find some birds, presenters just cyanosis of Combs and mortals as well. There may be coughing and sneezing or sometimes you just get sudden death instead. So have a think about a respiratory disease. This is something that's likely to occur in the flock. You know, is this a bomb that's very easy to ventilate or is it a bomb that's quite difficult to ventilate all the birds quite often get chilled or overheated, for example. Do you challenge your clients really engage with this issue and use their flock health plans as well. So if you want to say about vaccination, have a look at back at slide 15. Now good bye security and hygiene.

We get to say it again is essential and really good ventilation will help reduce pathogen loads and help maintain good respiratory health as well. So do have a look at the ventilation. Use smoke bombs, if you need to, to assess that air flow. And, and if you do have access to those metres that measure ammonia, carbon dioxide, temperature and relative humidity. Then they're very helpful to take along as well. Now vaccination in rear possible for some diseases and should be considered in some cases. And you have very, you have few treatments for them but Bromhexine vaccine is licenced for turkeys for symptomatic treatment. So it's well worth trying Bromhexine vaccine. If you think that actually the birds are mounting their own immune response, but they might need some symptomatic treatment instead. And last but not least we'll look at sudden mortality. So first of all, we need to sign whether, you know it's actually sudden death and sudden mortality. That is the presenting problem, or whether actually it's an acute rise in mortality due to a more chronic underlying cause. So for example Coccidiosis now that will have been there ticking over in the background for a while, but then all of a sudden the birds own overwhelmed they've died. So I wouldn't necessarily say that it's sudden death in that case, but it is a sudden rise in mortality as well. Well, differentiating between the two. Now prompt very prompt post-mortem exams are required especially in seasonal birds because you know most well a turkey placed is a turkey ordered effectively so they can't afford to lose birds. And also some of these differential. So for example, histomoniasis. You know histomoniasis is easier to, to identify in a fresh and fresh cadaver and a freshly dead bird. The longer the bird is dead. And the colder that cadaver is the harder it is to identify down the microscope. So really prompt postmortems can be very helpful. Identifying the main pathology. So if it's particle cardiac involvement then it's probably is really a sudden death. But actually if you're seeing wasting and gastrointestinal lesions, then it's probably not some death differential we're going for. It's more likely to be enteric for example, on that one. And you might find that there's more viral bacterial or parasitic infection. That's the underlying cause there. Now take samples for culture. When you think that bacterial disease might be suspected. So for example, pasteurella or erysipelas or ORT all those can cause some mortalities and can be vaccinated for in the future. If you've got live birds, then you take blood samples. And if you've got dead birds, then taking liver, spleen and hot blood is quite useful for the bacteriology samples there. And again, both trachea scapes and wet smears are absolutely essential when investigating these cases and underlying gut parasites. You can't just spot on grocery at home. So if you're doing any of these

postmortems you have to have a microscope. It's an absolute essential. And as I said, those, those, those motor proteins are do stop wiggling pretty soon after death. So if you're going out and visiting clients then really you need to make sure that you have a mobile field microscope with you so that you can identify those. If you prepare the slide and the smear and take it back to the practise with you, they'll probably stop wiggling. And they're very hard to spot at that point. So you've got to have a mogul microscope and you can get some really small, cheap ones nowadays. They don't have to be the massive old plug-in ones. They can be small and battery powered.

So if you think about the differential diagnosis for true sudden mortality you've got erysipelas, blackhead which is caused by histomoniasis. Histomoniasis, hepatic lipidosis in all the birds or around heart disease in young birds. And they're both metabolic or physiological diseases and they're not as common but they're pretty easy to diagnose at post-mortem. Just make sure that that there's no E.coli as well that that might actually benefit and treatment. And of course, you've got the avian influenza on this, this as well, and turkeys are very susceptible to this disease and they often show quite severe clinical signs. So if you want to look up the latest situations always go the gov.uk website. And they've also got advice for clients, vets and photos that are available as well at the most common clinical signs.

So now if we have a look at a planning we've got to think about good by security including building and pen planning again to reduce that pathogen load turkeys like to smother. So good building design will really reduce triggers for smothering. So for example, a circular brooding is much better than brooding with corners because that prevents there being any corners of birds to smother and, and even diffuse light intensity. If you have a shed with a ching of light in it and it cracks somewhere and light shining through all the turkeys and are going to go Ooh towards that light and they will all pile up and smother, you know, they are turkeys. They're like, they're like sheep. So in a good building design is going to reduce that waste that very wasteful and cause of death. Now, optimising husbandry and project preventing stress is obviously very essential in reducing steps with ability to disease particularly stress in this case as well because he could have acute cardiac signs due to some severe stresses, for example. And again think about using probiotics and other nutritional supplements to support birds. When you identify stresses, just remember to follow it up with some water hygiene products or water sanitizer too. Now we're gonna talk about the veterinary medicines that are licenced in turkey. So always begin by considering antibiotics in the category D. This table has been taken from the European medicines agency categorization of antibiotics and summarises the ones that are licenced in turkey. So the highlighted in grey then they are licenced in turkeys. Now you're lucky and turkeys has quite a lot that fall into this category D to be honest, just be aware that quite often withdrawal periods are much longer in turkeys compared to chickens. And particularly if you're using something that's that is off licenced to use on the cascade, then again those withdrawal periods are going to be very long and just be aware when always keep an eye on when Christmas is not just for your Christmas shopping but also for, for, for turkey meat withdrawal periods. Now, try to avoid using category C licence of course and category BS do note that for quinolones and Colistin are actually licenced in turkeys but you know, most of the retailers won't actually accept they use anymore. So, you know, do, do try and avoid using them. We will be looking at practical tips on the antibiotics use in turkeys There's various practical tips here. So amoxicillin tends to mix, mix very well. It's very easy to administer. It's got a, gyny quite good sensitivity as well, and works well for coliforms and often across can try to do to Clostridium, but again, whatever, you know all these practical tips, they should still rely on you performing cultural sensitivity tests and using that as your, your basis of information. And decision-making. Doxycycline tends to be the next best in sensitivity testing dictates but it's caught quite much longer with meat withdrawal periods. So you may not be able to use it near the end of the flock unfortunately. For all tetracycline there

are no actual licenced water. Actives has got quite limited appeal unfortunately. Now Neomycin has really only gut active. So it's not going to work very well in cases of septicemia but lincospectin have better luck within chicks rather than adults, just because, you know, you've got quite a major cost at chicks costs, and she want to know we should be talking about costs, but you'll find it more off, more cost effective using it in chicks. And you're probably not be able to use it in adults. I mean, do try and convince your client if you think that's the best, got the best evidence, but just as a warning really.

Now tylvalosin and tylosin are often quite useful at ORT and mycoplasma treatment but just be aware that you should never, ever prescribe something like tiamulin when there might be monensin in the feed. So it's actually a toxic combination and you'll get your cause high mortality. So never, ever, ever combined tiamulin with monensin which is often in the feed as a, as a coccidiostat. That category B are just not used anymore. As I said before because retailers just won't have it in their meat and therefore turkey producers just don't use it anymore. And you have a look at the antibiotic usage. In fact, in turkeys in 2019 you'll have a look that it's a really positive message. So 87%, where were category D and products a 5% category C and zero in, in the, in the category B. Now these are fattening turkeys, of course, but that's you know, the industry is doing such a good job of reducing well of eliminating cat B and restricting cat C. So I'm not going to do teach you how to calculate in feed medications, but if you do want to go through this yourselves and I've put the notes at the bottom that you can go through and practise that calculation, should you need it. It's just really important to make sure that you calculate the quantity of medicated feed required based on the actual total feed consumption of the birds so that you don't order excess feed and excess medicated feed to be made. And it's very difficult to calculate because producers rarely know their actual feed intake but you can use the breed standard data and that's often available online so you can use that to upload. And also be aware that that nowadays feed mills are actually able to make medicated feed by the bag, not just by the tonne. So there's no excuse in ordering extra tonnes nowadays. And similarly here's the calculation for in water medications just make sure you really prescribe based on the quantity of medication required rather than on by bag or by pot. And try and advise, encourage clients return unused medication for disposal as well. And just a little tip. If you're not used to working with percentage actives then you can convert percentage actives to make per gramme by simply times in by 10%. So if 50% active is 500 mix per gramme. So if you think there's a 1000 milligrammes in the gramme then 50% of that is 500. Oh, just times by 10.

Oh I've been dreading this slide. So medicating in header tanks, it's a minefield. Let me put my pointer on first of all right. So you've got fresh water coming in the top. You've got water going out at the bottom. You're filling your tank up with water. You always have this little residue at the bottom this reservoir underneath the water out pipe. If anything is in that, that's not going to go to the birds. If you are calculating medication. And, and you're not thinking about the reservoir that will be left behind, then you will be effectively under-dosing those birds because some medication will be left in the bottom. Do try and make sure your clients have a plug at the bottom so that they can unplug that and drain it all out. Because then at least you're starting with just clean water and you're not carrying over medication from one day to the next. Now Ideally using medicated units are far better and form much more accurate water dosing but not everyone can afford those. For example, Dosa Johns. And if they have multiple sheds as well they may not like wanting to buy multiple medicating units but doing encourage them. They are so much better. And there are some golden rules when you're looking at header tanks. So tanks should never be allowed to continuously refill because otherwise the solution you put in there will be continuously diluted but equally you don't want tanks to be allowed to completely run empty or dry because you can't afford the animals going thirsty. So whatever you estimate, your, your water consumption on, just check them an hour an hour but at least before you to run out. So for example, if it's going to be hot weather the birds are

probably going to want to drink more than in cold weather. So do you take the weather into consideration as well when you're thinking about those estimated water consumptions. Now, as I said, when you're calculating the amount of product you're going to put in. So for example, if you wanted to administer this product over eight hours, then you would calculate the amount of water that's likely to be delivered to the birds in eight hours. And you're going to fill your tank up with just that amount of water. Now that amount of water has got to be in the green area. You might have to add in the, the yellow residual that you know will be left behind. So in summary, you make sure you use accurate water metres if possible, and do encourage clients to record water consumptions as well, and instal some water metres so that you can make informed decisions about their water intake, try and use medicating units like the dose of Tron, and also sanitised drinking mines after competed treatment, because you don't want to encourage overgrowth of bacteria. And do, do you keep good records on water consumptions.

Now meat withdrawal periods in turkeys are often very long so this is kind of strict. Sometimes your, your choices for what you're going to prescribe another option is that you know, separate, affected birds and only treat those affected birds leaving the rest to be slaughtered earlier if required and keeping those treated birds on for later slaughter. So that might be some way that you can you can get around that problem and still use the product. That's got the most evidence for it. And of course ideally you'd only treat infected birds as much as you as much as possible, but sometimes hospitalising large amount of birds is not going to be possible. So even if you separate off the unaffected birds and don't treat them and sort of those out here that would also work Right finally, we're going to go through the monitor ,measure, manage principles. So, you know, first of all, all the birds under your care have you made the right diagnosis as well? Have you checked all the differentials and performed testing, typically culture and sensitivity. If you do decide it's a bacterial cause so then make sure that you use those that information to decide on the correct antibiotic the correct dose rate and the correct duration as well. So there's no point in giving a free range turkeys medication in water if it's really wet weather. And there's a lot of puddles about because they're going to be drinking those external sources. Equally it might be a really good idea to be giving them in water medication if it's hot weather there aren't any external sources because it's dry. And the Rangers and the birds are not eating because they don't feel well enough but they are still drinking. So think about alternatives as well, transport it. So perhaps changes in diet diet managers and management changes or vaccination as well. They can all be used as an alternative. And don't, don't forget about looking at the response to treatment as well. So is a condition responding to treatment because if it's not, there might be something on the line, you know he could either be wrong or there could be something complicating it underlying as well. That's meaning those birds are not getting better. now in really acute, highly infectious situations. Immediate treatment may frankly just be required in order to safe guard bird health and welfare but coach sensitivity results could often indicate a different antibiotic. And in those situations it's well worth submitting your, your culture swap to the lab and requesting for direct sensitivity. So, you know, this shouldn't be used on a routine basis. It's not as accurate as doing full sensitivity profiling but if you're desperate for an answer then they can get you an answer within 24 hours. Sometimes it's a mixed growth and they can't achieve a useful result. But you know, I'd say some evidence is is better than nothing in those few really acute, highly infectious situations.

So if you look at measurement of antibiotic use so does your practise have adequate prescription records? Does your client have a DEFRA approved medicines book as well. So try and restrict category B anti-microbial because assurance schemes just frankly don't allow their use. Have a look at the detailed guidelines at the BVA website. Go to resources and support that re medicines. Now we mentioned the PCU, the population correction unit before this is a theoretical unit of

measurements and it's been developed by the, by the EMA in 2009 and it's been adopted across Europe. So what it does is it takes into account the country's animal population every year along with the estimated weight at each particular species at the time of treatment with antibiotics. So it's an estimation, okay. But it does enable year on year comparisons to be made and to identify trends. So it is still very useful. So when you're performing this calculation you're going to be using the total massive antibiotic and milligrammes over the number of birds really a disorder per year, times by 6.5. And that's the PCU for turkeys. The BMR set, it's a 6.5. So there's an example here and how you can work out the, the, the daily usage of, of, of antibiotics. Now if you think about managing, managing clients and their expectations or flock health planning is such an important tool. And I think so often it can just be lost in the sort of yearly tick box exercise, but it really can be useful. So good flock health plans that are really tailored to the slide to the side and to the enterprise actually as well can really help clients achieve much lower disease levels. Do include antimicrobial usage review in these yearly forecast planning sessions and do include sort of from reflections based on the previous company experiences as well try and set really smart targets to achieve prevention and reduction too. You know, it takes a lot of time and effort and planning on the client's perspective to achieve quite small reductions sometimes as well. So I think aim for smaller achieve or reductions during to keep those clients on board and interested, engaged with the process.

I think One other tip that might be helpful is that, you know, if You sometimes want to cut costs and that's understandable, and they may not want to perform regular serological PCR monitoring, but there's no harm in engaging your clients to take the samples regularly as part of that flock health planning, but put them in the freezer, you know test them. If, if problems occur at the time, at least you'll have a pre sample for your paired serum samples. If you choose to do strongly testing or the end of the crop when they're actually reflecting, you know something may not have been obvious at the time but actually they look back and go, Oh, crikey there's quite a few things here that actually add up to something that we might wanna investigate. And they might be the times of actually you want to whip them out of the freezer and send them off for testing. And actually if there's no problems and they're not concerned well fine, then you can, then you can dispose of them. And the client does it, doesn't have to pay for that cost for testing. So I think that's something that is well worth considering

And finally client education. So they need to be educated about antibiotics and about best practises and try and encourage collaboration between farmers. Now, you're going to get far more collaboration and engagement. If you, if you get a load of turkey farmers in the room together and say, look how are you going to tackle this problem? How are you going to prevent this so that you don't have to use antibiotics. You know, they'll be able to come up with their own ideas. And I suggest that, you know, they'll probably achieve a lot more from that kind of session than if you dictate it to them as I'm hypocritically doing right now.

And if you're interested in further reading then here's some really good documents that, that that you can read here and do print them off and keep them in your car in a file or download them make sure they're on your files in your phones that you can get to them when you need to on farm. So thank you very much again for your time and, and listening to this presentation and do print it out. I really hope that it's that it's useful for you in the future. And thank you very much.