Targets Task Force Report 2017

A report setting out the findings of the UK livestock industry's Targets Task Force. The intention to form the group was announced in May 2016 by the Responsible Use of Medicines in Agriculture (RUMA) Alliance, and it convened for the first time in December 2016 with the specific aim of delivering on the Government objective of identifying sector-specific targets for the reduction, refinement or replacement of antibiotics in food-producing animals.

RESPONSIBLE USE OF MEDICINES IN AGRICULTURE ALLIANCE

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Preface

Gwyn Jones, Chair of RUMA

The Targets Task Force was first conceived in Spring 2016 as RUMA prepared to respond to the final report in Lord O'Neill's seminal AMR Review.

Concern had been building over the critical issue of antibiotic resistance for a number of months, with the AMR Review panel publishing chapters throughout 2015 and the breaking news in November that the colistin-resistant mcr-1 gene had been discovered in pigs in China. RUMA also held its first conference that November of 2015, at which it received a clear steer towards the need for action on the use of antibiotics in agriculture.

Six months later, RUMA, which spans every animal agriculture sector and every stage of the food chain, had taken decisive, proactive action before farming found itself regulated with unwieldy or inappropriate constraints. It knew it was best placed to identify and deliver the ways in which antibiotic use could be reduced, refined or replaced without impacting on the health and welfare of over a billion farm animals in its care each year.

By the time the Government response to the AMR Review was published in September 2016 and had specified a cross-sector average target of 50mg/PCU antibiotic use by 2018, the concept of the Targets Task Force had gathered momentum. It was ideally positioned to deliver on the key Government objective of a set of industry-developed, sector-specific targets by the end of 2017.

The Task Force first convened in December 2016 and comprised a specialist vet and leading farmer for each of the sectors covering beef, dairy, eggs, fish, gamebirds, pigs, poultry meat and sheep. This facilitated session laid out the challenge and the timetable. Both the Veterinary Medicines Directorate and Food Standards Agency observed and agreed to provide input on data gathering and methodology.

With bi-monthly meetings mapping and challenging progress, I can honestly say the support and hard work of every member of the team has been incredible. Each sector's starting point was very different. The poultry meat sector's stewardship programme has been in operation since 2012 and its highly integrated nature aids communication and collective action; whereas the sheep and beef sectors, with high numbers of producers and more fragmented supply chain but generally lower levels of antibiotic use, have had to identify key 'hotspots' to tackle. The dispersed nature of the red meat sectors also makes communication, consultation and agreement more challenging.

The results of this hard work are contained in the following chapters. You will see that each report, while having some standard headings, is very different. Not only do the structures, content and lengths vary, but there are distinctions in the way the targets are expressed. This reflects not only the very different nature and challenge of each part of the industry but also the way in which the reports are conceived and will be owned and delivered by their respective sectors.

Food production faces many challenges and continues to battle for public support in meeting what should be one of our most fundamental needs in life.

But, on this issue, make no mistake. The last 18 months have seen UK farming rise to the challenge and take a leadership role in the critical matter of antibiotic use, and it fully intends to play a key part in the global One Health fight to preserve the efficacy of our most valuable medicines.

RESPONSIBLE USE OF MEDICINES IN AGRICULTURE ALLIANCE
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Foreword

Chief Veterinary Officers Nigel Gibbens (United Kingdom), Christianne Glossop (Wales), Robert Huey, (Northern Ireland) and Sheila Voas (Scotland)

A part of the government's response to the recommendations made by the O'Neill review on antimicrobial resistance, in September 2016, was a commitment to work collaboratively with vets and the agriculture industry to create appropriate, sector-specific antibiotic usage reduction targets by the end of 2017.

Eight key UK livestock sectors, co-ordinated by RUMA, and working collaboratively with independent veterinarians and government officials, have taken the lead in developing these targets. Each has demonstrated a high level of ambition in line with the intention that future reductions should be greatest where there is most scope – while safeguarding animal health and welfare. The targets vary according to the specific circumstances and features of each sector. However, all are founded on the principle that "prevention is better than cure". We fully support this approach and envisage that the targets will be an added driver, not just for reduced use of antibiotics but to improved animal health and welfare through active animal health planning by livestock keepers and their vet. We also support the essential need to focus reductions on antibiotics that are of critical importance to human medicine.

We have encouraged the sectors during the development of these targets, and the preventive medicine approaches that underpin them, and we are pleased to endorse the scope and ambition of the resulting plans. Furthermore, we extend our support to all these sectors as they develop high health animal production systems for the future, which will deliver these plans in the years ahead.

We would like to thank all involved for their hard work in this important area, with a particular mention to RUMA for their co-ordination and facilitation.

Professor S. Peter Borriello, Chief Executive Officer, Veterinary Medicines Directorate

Last year, in response to the recommendations of the O'Neill Review on antimicrobial resistance, we made three high profile government commitments around the introduction of targets for the reduction of antibiotic use in animals and strengthening veterinary stewardship of antibiotics, particularly those of greatest importance to human health. We committed to do this without compromising animal health or welfare, through optimising animal health and the prevention of disease to reduce the need for antibiotic use. We view this approach as essential in underpinning sustainable and long-term success.

The species specific antibiotic usage targets presented here share this ambition and show that the agriculture sectors are "facing up to the AMR challenge" in a positive and proactive way. Furthermore, the voluntary sharing of usage data in this report demonstrates their commitment to transparency – showing where antibiotic use is reducing, where there is still work to be done, and illustrating the different challenges faced by a diverse range of sectors.

AMR is a long term threat which will never fully go away and there will always be work to be done, but we have been impressed by the way different sectors have risen, or are rising to the challenge. We look forward to continuing to work with the sectors in this spirit in the years ahead.

Beef sector plan

Background

In order to establish the targets and objectives for the beef sector, a Beef Antimicrobial Use Working Group has been established as a sub-group of CHAWG and linked to RUMA. The Group works across Great Britain and has representation from BCVA, AHDB, CHAWG, NFU, NOAH and other key stakeholders. It has also engaged with a range of farmers, vets and industry stakeholders during the development of this document.

The Group has set out seven targets, which it will work with industry to deliver; these are detailed in the following sections. However, as there has been a lack of data to help inform the target-setting process, the Group will review these targets when more sector-specific usage data becomes available. The following targets also incorporate cross-sector sheep and beef cattle discussions held on 20 July 2017, to which members of both sector groups were invited.

Antibiotic Usage

Currently, there is no significant dataset that will easily quantify either sales or use of antibiotics in the beef sector. However, work is underway to establish a figure using veterinary sales data in collaboration with projects being run by AHDB, VMD, FarmVet Systems and Bristol University based on a subset of beef farms.

As with any sample, it will be important to determine whether it is representative of the UK – which is particularly important in beef, where there are many different types of system (e.g. suckler, calf rearer, finisher herds etc.).

The Group is also aware of the need to be cautious in its interpretation of veterinary sales data as it may not accurately differentiate usage between different sectors and, with a large number of beef enterprises being present on mixed farms which may also have sheep and to a lesser extent dairy cattle, the sales data is likely to reflect an element of combined usage across species. For this reason, the Group is looking into options for collecting antibiotic usage data from the farm directly.

Scope for Change

Focus 1: Reducing use of antibiotics in the beef sector

Overall usage

The Group predicts that the level of antibiotic use in beef cattle is relatively low and, as such, the scope for reduction is also relatively low. Notwithstanding that position, the Group is committed to reducing use in the sector but has struggled to commit with confidence to reduction targets expressed as mg/PCU without robust information on current usage. Even a proportional reduction target is challenging because the scope for achieving it is determined by the as-yet-unknown usage levels.

As the work on data collection and collation of usage data within the cattle sector develops over the next few years, the sector will be in a position to submit a more accurate usage figure and potentially expand the number of metrics used to monitor changes in behaviour away from antibiotics towards preventative strategies such as vaccination.

Highest Priority Critically Important Antibiotics

Highest Priority Critically Important Antibiotics (HP-CIAs) are a focus area for the industry and this Group supports a determined attempt to avoid the use of these products, except in exceptional circumstances and provided there is no detriment to cattle health and welfare. It endorses the important position statement from the BCVA in December 2016 recommending the minimal use of HP-CIAs. It is also important to note that the targets are based on the European Medicines Agency's Antimicrobial Expert Group (AMEG) Classification of CIAs based on degree of risk to humans due to antimicrobial resistance development following use in animals, as defined in Appendix 1.

Again, the availability of data that accurately reflect use of HP-CIAs in beef cattle specifically is not easily available and the Group will work with the VMD and industry to find the best source of data to provide an indication of industry use. After much debate the Group has proposed a target for reductions in HP-CIA use for beef cattle in line with that for dairy cattle, initially using sales data for cattle licensed injectable HP-CIAs, which is provided to the VMD by the pharmaceutical industry and incorporates use in both the dairy and beef sectors.

Although some of these products are licensed for other species (in particular pigs), feedback from industry suggests that around 80% of mass of antibiotic active ingredient for these products is prescribed for cattle. As with total antibiotic use, the Group reserves the right to review the target in the light of relevant HP-CIA usage data for the beef industry becoming available. There is also recognition that a reduction in use of HP-CIAs could potentially cause a slight increase in total antibiotic use as other non-critical classes of antibiotics, which have higher dose rates, are used as alternative treatments.

Strategies that take a preventative approach to tackling cattle health challenges rather than a reactive one will be encouraged. The group will monitor the use of vaccinations in cattle, although it is accepted that vaccination is not the only preventative strategy and it cannot be assumed that no increase in vaccination implies lack of prevention, as other means such as improved management, housing, biosecurity and herd-level test and cull approaches will also be effective.

Health and welfare

As reductions are implemented, it is important to ensure this is not having a negative impact on the health and welfare of beef animals. For this reason, available health and welfare metrics and data for beef animals will be monitored and reviewed regularly.

Focus 2: Data collection and protocols at farm level

Limited data collected from veterinary practice prescribing records has provided an initial insight into antibiotic use across the sector; however, it is a long term ambition to establish a more accurate picture of antibiotic use.

The long-term objective is to centrally collate the antibiotic use data currently held in on-farm medicine records, some of which is in digital form. The Beef Antimicrobial Use Working Group recognises the challenges that such an undertaking presents and will seek to engage with the whole supply chain to ensure that the methods used are fit for purpose and that any change to on-farm recording protocols happens only once. It is also recognised that this objective links to a number of ongoing industry data projects.

The ESVAC methodology is required to calculate antibiotic use at a national level. However, the Beef Antimicrobial Use Working Group has identified that this method is not best suited for on-farm benchmarking and that there is a need to establish a separate standard protocol. The segmented nature of the beef industry and the fact that the population of cattle on a beef unit is more dynamic than on a dairy unit makes it challenging to find practical solutions. The Group has therefore resolved to work with experts and farmers to explore options for farm level benchmarking over time on the same farm and also between similar system types.

Benchmarking of antibiotic use alongside recording indicators of health, welfare and performance of livestock is essential at national and farm level if targets for achieving responsible use of medicines are to be monitored going forward. This process should ensure that the outcome from any change in the level of use of antibiotics is not detrimental to animal welfare and will allow farmers to record health and welfare indicators as well as performance.

There is consensus that, as well as monitoring total use of antibiotics, separate monitoring of use of critically important antibiotics and vaccines would provide additional insight into behaviour change in the industry if robust data becomes available to allow this.

The Beef Antimicrobial Use Working Group welcomes the development of tools to help collate and analyse veterinary medicine use to help famers and vets understand where use is highest and target those areas accordingly. These tools would comply with the methodology agreed in Target 5 (see later).

Focus 3: Promoting best practice and knowledge exchange

Training

Any change in behaviour and upskilling of the knowledge base will require training aimed at both the farm and veterinary level. This needs to be credible and satisfy the requirements of the whole supply chain.

Training should be delivered via an affordable, convenient, multiplatform route. The Group welcomes the work being done by NOAH to develop and promote cross sector co-ordination and standardised training for students, vets and farmers on the responsible use of medicines. This will provide the framework for different training providers and encourage a common language and approach across industry.

BCVA is currently running courses on prescribing practices to better support vets in decision making and they are committed to ensuring their members are supported in this area.

The Group felt that the practical health and safety consequences of medicine choice for farmers and vets need to be considered as well as antibiotic class and other factors.

Training will complement the knowledge exchange and best practice messaging.

Communication

The Group identified the need for knowledge exchange between farmers and vets as a key component of the drive to reduce antibiotic use. The Group will promote and deliver, through the CHAWG members and other UK-wide stakeholders, simple practical advice along with examples of best practice on-farm for the responsible use of medicines.

Beef Sector Targets

Focus 1: Reducing use of antibiotics in the beef sector

1 National beef sector antibiotic use

Work with the beef industry to monitor national sector antibiotic usage levels annually, aiming for a 10% reduction between 2016 and 2020 or reach a usage level of 10mg/PCU by 2020, whichever is the lower level on a mg/PCU basis.

Target completion date: December 2020

Notes: These targets represent the levels of reduction the beef sector would expect following implementation of the measures contained in this document, and are based on an estimation of current average (mean) levels of usage in the sector. However, options for collecting farm level data will be explored and these targets will be reviewed as more information on antibiotic usage becomes available. We aim to have baseline data in place by Oct 2018.

2 Use of Highest Priority Critically Important Antibiotics

Monitor use of HP-CIAs in the beef sector, aiming for 50% reduction between 2016 and 2020. (This target is based on the current EMA AMEG recommendation for HP-CIAs and will be reviewed should that recommendation change).

Target completion date: December 2020

Notes: Initially, these data will be monitored using antibiotic sales records of injectable HP-CIAs with cattle in their license, but other options will be explored going forward. In 2015, the use of injectable HP-CIAs which included cattle in the licence was 1.075mg/PCU. This target will be achieved with a focus on the main reasons for antibiotic use (see 'Delivering on the Plan'), which include calf health and respiratory disease.

3 Monitoring use of cattle vaccinations

Work with industry stakeholders (e.g. pharmaceutical companies) to monitor use of vaccinations targeting respiratory disease in cattle, aiming for an increase year-on-year between 2017 and 2020. Baseline data will be in place by December 2017.

Target completion date: December 2020

Notes: It will be difficult to distinguish use of respiratory vaccinations in dairy and beef cattle from product sales data. Therefore this target relates to all bovine youngstock, unless robust enterprise specific data becomes available.

4 Monitoring national beef herd health and welfare metrics

The group will monitor available metrics of national cattle health and welfare alongside antibiotic use data to ensure reductions in antibiotic use are not impacting negatively on health and welfare.

Target completion date: December 2020

Notes: Data to achieve this will include mortality figures from the Cattle Tracing System (CTS) as well as other data that becomes available through CHAWG-led initiatives and, for example, from Red Tractor assurance.

Focus 2: Data collection and protocols at farm level

5 Farm level benchmarking of antibiotic use

Determine a standard methodology for calculating on farm antibiotic use in beef cattle for benchmarking within and between farms, taking account of different production systems. This will include standardising data entry, definition of reasons for treatment, transfer of product information from the VMD and any other protocols used by third party software providers to help to establish a uniform on-farm data set.

Target completion date: December 2020

Focus 3: Promoting best practice and knowledge exchange

6 Promotion of training at farm and vet level

a) Work with CHAWG stakeholders to promote training of both vets and farmers in responsible use and prescribing of medicines in beef production systems.

Target completion date: On-going

b) BCVA to monitor numbers of vets attending prescribing CPD course.

On-going annual reporting

c) Integration of NOAH training package into existing and new training delivery.

Target completion date: June 2018

d) Monitor uptake of responsible use of medicines courses across the industry.

Target completion date: December 2018

7 Dissemination of responsible use of medicines messages

Work with CHAWG stakeholders to disseminate responsible use of medicine messages across the beef industry.
All CHAWG members with communication routes reaching beef farmers will disseminate, at least annually, a responsible use of medicine message focusing on ways to reduce antibiotic use in relation to at least of one of the main reasons for use (see below) between 2018 and 2020.

Target date in place by: December 2018

Delivering on the Plan

Discussions with various members of the beef industry have identified the six areas listed below as the most likely main reasons for antibiotic use on beef farms. Use patterns will vary between farms for a number of reasons, and understanding the most common reasons for use will help focus knowledge exchange activity to be most effective. According to expert opinion, the main reasons for antibiotic use in beef cattle are:

- Respiratory disease
- Calf navel ill
- Lameness
- Calf scour
- Mycoplasma
- Calving problems & caesareans.

A large body of science, knowledge and proven best practice already exists to tackle the health problems identified. Through CHAWG and other UK-wide stakeholders, the Group has access to an extensive network of communication routes to beef producers. The delivery of these targets will be reliant on the relationship between farmers and their vets and the Group will target both audiences to enable the delivery of its targets.

Youngstock

The industry acknowledges that many of the health problems identified relate to youngstock. Beef calves, from the dairy herd in particular, represent a high risk category in terms of health problems and consequently antibiotic use. Efforts will be made to attain a better understanding of the current health management practices undertaken by calf rearers and the health problems experienced in rearing units.

It is also accepted that, on beef farms, youngstock generally receive more antibiotics than finishing or breeding cattle, with respiratory disease being the main reason for antibiotic use across the sector. CHAWG will work with its members to coordinate targeted messages around improving cattle husbandry and the responsible use of medicines in relation to the main reasons for use, at relevant points within the farming calendar.

Working with stakeholders

As well as this, the Group will work with a broad range of relevant stakeholders across the UK to stimulate knowledge exchange activity. This includes the Agriculture and Horticulture Development Board (AHDB), Meat Promotion Wales (HCC), Quality Meat Scotland (QMS) and Agrisearch in Northern Ireland.

The Group will actively support relevant regional and national initiatives as appropriate. For example, it supports all the Bovine Viral Diarrhoea (BVD) eradication strategies being delivered across the UK, and sees BVD as an important disease that many farms need to address if they are going to tackle on-going health issues such as respiratory disease.

Changing attitudes and behaviour towards the use of antibiotics will require a coordinated knowledge exchange campaign that brings together multiple stakeholders – all with simple and consistent messages. Key to this is ensuring producers understand what responsible use of medicines looks like and how it fits with a holistic approach to animal health and welfare, complemented by training.

This means the beef industry needs to present a coordinated plan for delivering knowledge exchange and the Beef Antimicrobial Use Working Group will provide this function over the next few years. Other industry groups across the UK will need to be involved and they will be invited to attend where appropriate.

Herd health planning

Effort needs to be focused on reducing the need for antibiotics in the first place and promoting the role that vaccination and the better management of feed, environment and endemic disease control play in achieving this. Herd health planning is crucial and should promote the principles of:

- Reducing the need to use medicines – through keeping diseases out (bioexclusion)
- Preventing disease spread within the farm (biocontainment)
- Increasing animal resistance to disease (colostrum, management, vaccination)
- Disease elimination (BVD, Johne's).

If antibiotics are required, messages need to highlight the principles of responsible use (e.g. early identification of disease, choosing the correct treatment, administering the correct dose rate, and finishing courses). RUMA already has an information guideline on ‘Responsible use of antimicrobials in cattle production’, and is a valuable resource to support knowledge exchange activity. It is also key that new technologies to facilitate responsible use of medicines, such as pen-side diagnostic tests and health monitoring devices, are showcased.

Next Steps

The Beef Antimicrobial Use Working Group has recommended that a sustainable action plan is developed in the wake of the work done by the Targets Task Force, to ensure momentum is maintained. CHAWG will aim to convene a Beef Antimicrobial Use Working Group meeting shortly after the release of the targets to share research outcomes, industry experiences and knowledge exchange routes and ideas, so that a strategy to start effecting behaviour change can be developed by the Group. The eventual aim is an industry with improved beef cattle health as a result of better vet-farmer partnership working, which in turn reduces the use of antibiotics across the sector.

Dairy sector plan

Background

The UK is the third-largest milk producer in the EU after Germany and France, and the tenth-largest producer in the world. There are approximately 12,000 registered dairy farm holdings across the UK with a total of around 1.9 million cows, producing between them just under 15 billion litres of milk annually.

The UK Dairy Sector recognises the important issue of antibiotic use and antimicrobial resistance in both dairy cattle and the human population. It is aware of its responsibilities in being part of the solution, along with the other livestock sectors, to enable the Government to achieve its objectives for addressing antibiotic resistance in particular.

The relative lack of current ‘on farm‘ usage data coupled with the diverse nature of UK dairy farms means it is a challenge to set meaningful objectives in this area. Nonetheless, the dairy sector is committed to delivering an industry-led strategy to do just this, acknowledging that as more data becomes available, targets and strategies may have to flex accordingly.

Antibiotic Usage

Currently there is no comprehensive dataset relating to ‘on-farm usage’ of antibiotics specific to the dairy sector.

However, 11,814 of holdings in the UK (98%) are registered dairy members of Red Tractor. Under the Red Tractor scheme there is a requirement to create a Herd Health Plan. This health plan can be written either by the farmer or in conjunction with the vet and it must include a review of medicines and antibiotic purchase and use. There is currently no requirement for this information to be collected using software and a rough estimation would suggest that approximately less than a third of dairy farmers are recording this information electronically.

Data are available from the annual VARSS reports indicating annual ‘sales’ volumes, but this is not wholly specific to the dairy sector and requires an intelligent estimation to be made to assess where the sector sits in terms of usage.

However, usage data has recently been made available from a FarmVet Systems survey, which is a collation of delivery data to dairy farms from Practice Management Systems. The dairy data for 2015 represents just over 3,000 farms and accounts for 33% of UK dairy cattle. The FarmVet Systems survey will be repeated yearly until 2020 so, although it doesn’t represent all dairy farms and is not designed to be a fully representative sample, it is a large sample and will allow for trend monitoring. Further details on the methods used to collect this data, as well as the limitations and assumptions around the data, are available in the VARSS report for 2016.

There are smaller sub sets of information available within the dairy sector. Some of these are voluntary, and others are being collected by consultants, retailers and/or milk processors, for example Asda, Kingshay, Kite and Tesco. The information contained within these can be used to provide an indicator of ‘on-farm’ usage. However, we must recognise that these data may not be representative of the sector as a whole as there may be a tendency for the more progressive dairy farmers who have embraced software, or have had incentives to do so, and are actively monitoring antibiotic usage levels to be using this route.

Nevertheless the information is of value as it confirms some of the estimated baselines being used to develop the targets for the sector.

So to conclude, it is difficult to ascertain a true and accurate picture of current antibiotic usage either at on farm level or from sales data. The sector is, however, continuing to work to collect robust and representative antibiotic usage data from dairy farms, and these targets may be adapted and modified further as more information becomes available.

Scope for Change

Relative to some more integrated sectors within agriculture, dairy is at the early stages of this journey, which gives us scope for a significant reduction in usage. Key potential areas to target have been identified as:

Focus 1: Overall reduction in the use of Highest Priority Critically Important Antibiotics

Focus 2: Selective dry cow management

Focus 3: Pneumonia/respiratory issues in youngstock

Focus 4: Use survey data to review the use of antibiotics in foot baths

This leads us to look at specific targets to monitor use of HP-CIA injectables and intra-mammary tubes. Use of teat sealants could also indicate a switch to antibiotic alternatives, even though they can sometimes be used in conjunction with, rather than instead of, an antibiotic tube. From these, it is possible to create overall targets for the dairy sector.

Dairy Sector Targets

	Subject	Baseline Figure	Targets 2020	% Change
1	HP-CIA injectables (mg/PCU)	1.075*	0.538	-50%
2	HP-CIA intra-mammary use (DCDVet)	0.332*	0.166	-50%
3	Intra-mammary tubes – dry cow (DCDVet)	0.842*	0.674	-20%
4	Intra-mammary tubes – lactating cow (DCDVet)	0.808*	0.727	-10%
5	Sealant tube usage (average number of courses per dairy cow)	0.5*	0.7	+40%
6	Total usage (mg/PCU)	26.2**	21.0	-20%

* Measured using 2015 UK sales data ** Measured using FarmVet Systems survey

As these targets have been created on the back of sales it receives, sample data of farm usage, and anecdotal evidence, the Dairy Targets Task Force reserves the right to amend the targets as more accurate 'on-farm' usage figures going forward.

In the table, mg/PCU and DCDVet have been calculated using ESVAC methodology, which defines the Production Corrected Unit (PCU) for a dairy cow as 425kg to normalise usage. DCDVet represents the average number of courses per dairy cow using a standard course dose of four tubes per dry cow treatment and three tubes per lactating cow treatment.

Delivering on the Plan

Overview

In the UK there is no one organisation that represents all dairy farmers or one that represents the whole industry so consequently in April 2017, a Dairy Antimicrobial Stewardship Group (DASG), initially chaired by the RABDF, was established by the NFU and Dairy UK to implement a strategy to deliver the range of antibiotic-use targets in this report.

The group brings together farming, processing, veterinary and support functions across the whole dairy industry, identifying the responsibilities and actions required of different organisations to achieve the targets and monitor progress. Its membership is drawn from AHDB, Arla Foods, BCVA, Dairy UK, Lactalis, Livestock Auctioneers Association, National Milk Records, National Office for Animal Health, RABDF, Red Tractor, RUMA and the UK farming unions – National Farmers Union of Scotland, Farmers Union of Wales, NFU England and Wales, Ulster Farmers Union.

The DASG will be key to delivering, promoting and co-ordinating the strategy to achieving these reduction targets, and has identified the following key areas:

- Data collection, including on farm software and the co-ordinating data hub
- Herd health plans
- Farmer training
- Vet training
- Supply chain
- Preventative and alternative routes
- Communication and PR.

The vet/farmer relationship is paramount and the BCVA has revised the RUMA guidelines to promote the responsible use of medicines to its vet members and issued a position statement on responsible use of medicines in December 2016.

BCVA is recommending that prophylactic use is avoided wherever possible provided animal welfare is not compromised, and should be regarded as an interim measure whilst alternative management and/or vaccination strategies are implemented. All cows which comply with recommendations for internal teat sealant use should be considered for non-antibiotic treatments at drying off. BCVA continues to recommend the use of diagnostics to identify disease so that appropriate treatments can be selected and vaccination programmes instituted to prevent or reduce the severity of disease.

There are currently several software programs available in the marketplace to use on farm with numerous companies developing more sophisticated packages, including new apps. With the appropriate training and support, this will encourage greater farmer uptake and ease of data collection, and will improve accuracy as well as making it less onerous.

Highest Priority Critically Important Antibiotics

In its revised guidelines, the BCVA is recommending minimal use of the third and fourth generation Cephalosporins, Fluoroquinolones and Colistin. These drugs should only be used where they have been demonstrated by sensitivity testing to be the only suitable choice to avoid unnecessary suffering.

Raising the awareness of the issues has already triggered a willing and strong response from the sector, with many farmers attending workshops and courses to improve their own knowledge; they are going back to basics to learn which antibiotics are classified as HP-CIAs and to start asking the 'why' question. This has led them to look at their protocols and infrastructure on farm and develop strong working relationships with their vets, which will be fundamental in the delivery of these reductions. For others however, this topic will require a change in mindset and an increase in confidence, which will take time.

Bristol University has demonstrated that cattle health and welfare – as measured by production parameters, fertility, udder health, mobility and culling rates – can be maintained and even improved alongside a cessation in the use of HP-CIAs and an overall reduction of antibiotic use on dairy farms. In this case, these reductions were achieved through an active process of education and herd health planning meetings.

Following the consultation on the Red Tractor scheme, from October 2017 its standards include additional requirements including one that the farmer collates data on antibiotic usage and reviews this with the vet on an annual basis. This review must also make recommendations as necessary on responsible reduction of antibiotic use and selective antibiotic dry cow therapy, as well as provide a review of any antibiotic failures. Additionally, it has been recommended from October 2017 that the HP-CIAs as defined by the European Medicines Agency are used only as a last resort and their use is discussed as part of the vet review on antibiotics. As 98% of dairy herds are registered under the Red Tractor scheme, this will provide considerable traction.

Endemic disease

The sector also welcomes and supports UK initiatives to control and/or eradicate endemic disease. There are now BVD initiatives available in each devolved nation – the Scottish BVD eradication scheme is well-established and Government-led; a compulsory phase of the Northern Ireland BVD eradication programme began in 2016; England has an industry-led scheme (BVD Free); and Wales has recently launched its own BVD control programme.

As well as this, there is an industry-led initiative on Johne's Disease control within the dairy sector, www.actionjohnesuk.org. In Northern Ireland, a Government scheme is being developed for Johne's which will be comparable to the scheme running in the republic of Ireland. The British Cattle Veterinary Association is hosting training for veterinary surgeons on BVD and Johne's, and the industry-run Cattle Health Certification Standards (CHeCS) programme helps to standardize and quality-control a number of schemes across the country.

Training and research

Through proposed farmer and vet training packages, as well as academic syllabuses, the next generation can be educated to ensure that both understanding and responsible use of antibiotics becomes second nature. Other important training activities include the work of NOAH, which is leading on a cross-sector farmer training initiative that could culminate in providing accreditation for individual sectors; this would be a useful tool to have available for the dairy sector.

Another initiative called MilkSure (www.milksure.co.uk), which was industry funded, is available to educate farmers on their use of antibiotics and avoiding potential residues in milk. Interest from large and small dairy processors and vet groups in training packages such as this, as well as professional development programmes like Dairy Pro (www.dairypro.co.uk), should ensure a stronger uptake.

To support the sector in achieving the proposed targets, a variety of research initiatives and technical projects are underway, for example, to create and increase uptake of novel informatics to monitor health. These are either current or in the pipeline but, more importantly, are led by combined industry groups from leading veterinary schools and agricultural universities, milk processors and retailers.

Next Steps

Encouraging farmers to record electronically and deliver their data to a co-ordinating hub will be the first step towards creating accurate usage data for the dairy sector. As this will take time, it is important not to wait for the data to be gathered before acting, but instead press ahead with other measures that will help drive responsible use.

However, it must be recognised that anomalies could emerge as the sector moves a) from sales data to usage data b) become more accurate in our reporting and c) ensure the drugs recorded are specific to the dairy sector. Any success in reducing the volume of antibiotics used in the sector must not be at the expense of the welfare of the national dairy herd and, through the Dairy Antimicrobial Stewardship Group a mechanism will be developed to use existing welfare metrics to monitor and review any adverse impact.

Egg sector plan

Background

The UK egg industry produces around 10,500 million eggs a year from a national laying flock of 36 million hens. Every person in the UK is estimated to consume the equivalent of almost 200 eggs a year and the UK is approximately 85% self sufficient in production versus demand.

Antibiotic Usage

Antibiotic use in the layer industry is directed at treatment and control of specific bacterial infections (E.coli, Brachyspira spp, Erysipelothrix, Enterococcus sp, Pasteurella sp primarily), with each usage being prescribed by a veterinary surgeon. Infectious disease is mainly controlled by good management, hygiene and, where appropriate, vaccination. Routine administration of antibiotics to day-old chicks, either in the hatchery, or on farm, is not practised.

The UK egg industry assurance scheme – the BEIC Lion Code of Practice (which accounts for over 90% of UK egg production) – includes specific additional constraints on antibiotic use:

1. Third and fourth generation Cephalosporins may not be used
2. Fluoroquinolones may not be used at one day of age
3. Colistin may not be used (since 6 June 2016).

These constraints have been implemented by BEIC, in consultation with veterinarians, with a view to reducing the risk of selection for antibiotic resistance in the egg food chain which might be of clinical relevance in human medicine (i.e. in the case of the above Highest Priority Critically Important Antibiotics – HP-CIAs – as defined by the EMA).

The EU has no immediate plans for collecting data in this area and has not yet proposed a framework as to how usage should be analysed for monitoring or target-setting purposes.

The Lion Scheme implemented an obligatory system of detailed reporting of all antibiotic use, beginning in January 2015. This scheme continues to develop and improve the quality of the data set.

In 2016, the egg industry used 2.611 tonnes of antibiotic active ingredient. The sector monitors total usage on the basis of bird/days medicated (daily doses) as a proportion of the estimated total number of bird/days at risk based on Lion Code census figures. On this basis, for 2016 the egg industry used 0.73 daily doses/100 bird-days (or % medication days).

Scope for Change

Use of antibiotics in egg production is already low compared with some other animal production systems. The sector publishes a figure for total tonnage of active antibiotic ingredients.

However, our main aim is to assess usage trends by class of antibiotic. Hence total usage is monitored on the basis of bird/days medicated (daily doses) as a proportion of the estimated total number of bird/days at risk based on Lion Code census figures. Throughout this, the aim is ensure that the maximum flexibility is available to the prescribing veterinarian to use the most appropriate treatment in any situation.

Egg Sector Targets

The Sector has adopted a broad objective of ensuring that the total tonnage used in egg production does not grow (taking into account the size of the productive population and management systems in place). However, our main target will be to assess usage trends by class of antibiotic. Throughout this, the aim is to ensure that the maximum flexibility is available to the prescribing veterinarian to use the most appropriate treatment in any situation.

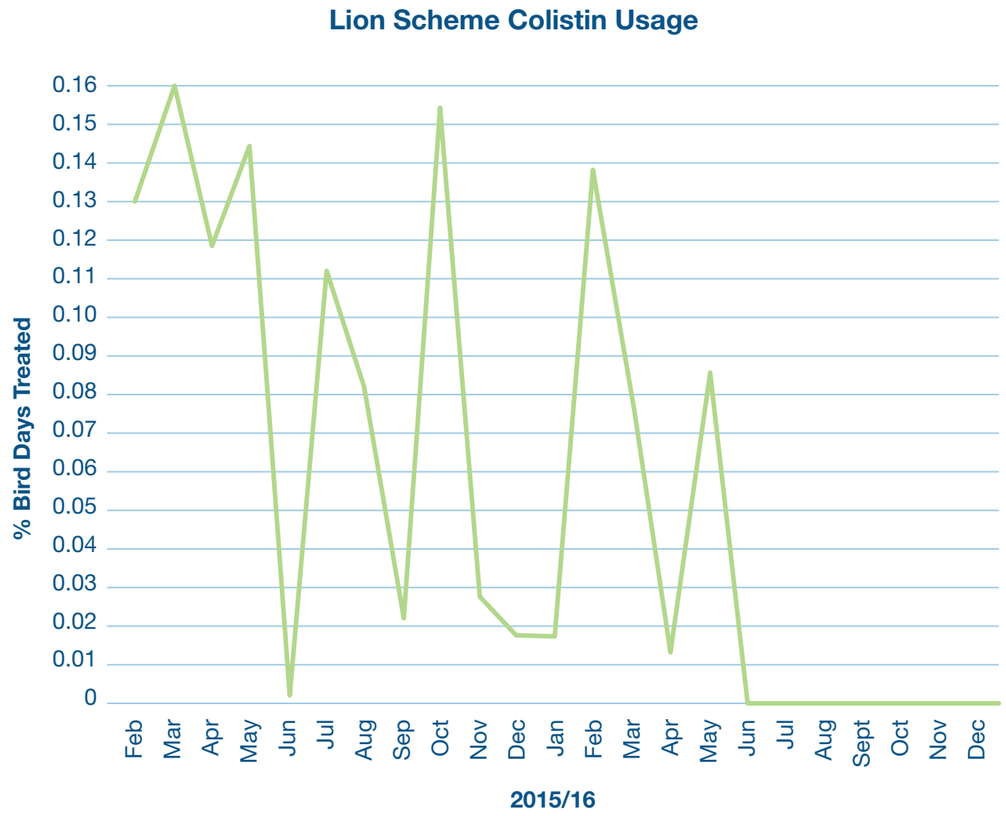
Our initial targets will be that:

	Target
1	Total bird/days medicated remains below 1%
2	Fluoroquinolone + Colistin (HP-CIA) days medicated remains below 0.05%

Delivering on the Plan

It is fully expected that the sector will achieve these targets in 2017. It will continue to monitor usage closely, in total, and by antibacterial class, with a view to further developing methods for reduction and refinement of antimicrobial usage, where these are possible.

In response to growing concern with respect to potentially transmissible Colistin resistance, Lion subscribers agreed to voluntarily cease use of Colistin-containing approved products. The data collected under the usage recording scheme confirm the full implementation of this change:



Source: BEIC 2017

Refinement

With respect to refinement of usage, the sector calls on the VMD to assess its policies and procedures with a view to avoiding unnecessary restrictions in the use of Critically Important Antibiotics which are not Highest Priority, to ensure that veterinarians have the tools they need to avoid the use, where possible, of the Highest Priority antibiotics.

Replacement

Vaccines against bacterial infections have the greatest chance of reducing the need to medicate. Vaccines against viral diseases may also reduce the need for medication by reducing secondary infections. The sector calls on the VMD and pharmaceutical companies to work closely together to provide tools to reduce the need for medication. Given the complex interactions present in real-world microbiology, the emphasis should be on ensuring safety and quality of medicines (including vaccines) and basic assessment of efficacy. Where current data sheet recommendations restrict usage unnecessarily, then work should be put in place to remove such restrictions. The layer industry does use autogenous vaccines in some circumstances. The sector also calls on the on VMD to continue to allow such use, particularly in its established approach of allowing epidemiological linkage to be a basis for common product use.

Avoidance of unintended consequences

It is important that the risk of collateral damage associated with our planned actions is minimised. A procedure to provide a derogation with respect to the existing constraints on antibiotic usage has been developed but has not yet had any applications under this regime.

Next Steps

BEIC is in the process of rolling out a new formal training scheme for farm and hatchery staff involved in egg production (The Lion Training Passport). This will involve targeted training on many aspects of farm operations relevant to reducing the need to medicate, which is available to all members of staff on Lion Code farms and hatcheries.

There will also be more detailed training in a separate poultry health and welfare course for farm and hatchery managers and supervisors. This will include modules on ‘The Role of the Veterinary Surgeon & The Vet Health Plan’, as well as ‘Administration and responsible use of vaccines and medication including antimicrobials – RUMA Guidelines’.

Fish sector plan

Background

Atlantic Salmon

UK finfish aquaculture is dominated by Atlantic Salmon production. In accordance with the natural lifecycle, juvenile salmon are grown in freshwater until they undergo a metabolic transformation to become smolts, which are transferred to marine units for on-growing.

Around 44 million smolts are moved to sea each year, to produce around 180 thousand tonnes of salmon annually. While there are smolt-production units elsewhere in the UK, with the exception of two small organic farms in Northern Ireland, all current marine farms are in Scotland.

The majority of salmon are farmed by large, vertically-integrated companies, principally multi-nationals. Almost all producers are members of the Scottish Salmon Producers Organisation. It is a requirement of membership of SSPO that companies adhere to the Code of Good Practice for Scottish Finfish Aquaculture (CoGP) – www.thecodeofgoodpractice.co.uk.

The CoGP focuses strongly on fish health and welfare, especially on preventative strategies and on co-operation between farms and companies in managing the health of fish produced within Farm Management Areas.

Veterinary involvement in aquaculture has been variable, as fish are not covered by the Veterinary Surgeons Act. However, the use of antibiotics, whether in accordance with market authorisation or under Cascade legislation, requires veterinary prescription. Under the CoGP, all farms must have a Veterinary Health Plan, which covers the use of medicines.

Veterinary care to the Scottish salmon industry is supplied by a relatively small number of vets, either employed by the production companies or working in specialist practices. All of the vets currently prescribing for the Scottish industry are believed to be members of the Fish Veterinary Society (FVS).

Rainbow Trout

Rainbow Trout aquaculture is a smaller, more fragmented industry, with the British Trout Association (BTA) representing those responsible for some 80% of production. It produces around 18 thousand tonnes annually, of which about 30% is for restocking waters for angling rather than directly for food production. The majority of trout are grown in freshwater but in Scotland (responsible for almost 50% of UK production) transfer of fish to the sea for on-growing is also practised.

The nature of trout production makes it more difficult to operate the all-in all-out systems which are normal in salmon production and this can impact on pathogen control. FVS members are involved in providing services to trout aquaculture but some smaller producers make use of local general practices which might not employ FVS members.

The freshwater phase of salmon production, and some trout units, can involve very controlled environments, with indoor tanks allowing a high degree of biosecurity. However, production in freshwater lochs or in ponds and raceways is less easily isolated from pathogens in the water or from wild fish. The same is true of seawater production units, almost all of which are based upon net pens.

Other species

Other fish species, including Brown Trout and Halibut, are produced in the UK. Aquaculture also includes the production of non-food species, for the pet trade and restocking of coarse fisheries.

Recently there has been a rapid upscaling of production of fish which may be stocked on salmon farms to assist in ectoparasite control by eating sea lice. These Cleaner Fish include Lumpsuckers and various species of Wrasse. Although serving the Scottish industry, production units now also exist in England and Wales. While not in the food chain, it is reasonable to assume that these fish will share bacterial pathogens with the salmon with which they cohabit. Veterinary care of these fish is generally provided by those involved in salmon farming.

Antibiotic Usage

Bacterial pathogens infect salmon and trout in both freshwater and seawater. A variety of bacterial species are involved but none are human pathogens.

Furunculosis control

When salmon farming underwent rapid expansion in the late 1980s and early 1990s, bacterial infections were common. In particular, *Aeromonas salmonicida* septicaemia ('furunculosis') became a growth-limiting factor for the industry. Treatment was principally by in-feed antibiotic medication; resistance to multiple antibacterials was a major concern.

Through collaboration between salmon farmers, an industry-led research consortium was established which involved Scottish universities, the Fisheries Research Services (now Marine Scotland Science) and a commercial vaccine manufacturer. This rapidly raised the investment necessary to support work on furunculosis vaccine development and led to the development of highly efficacious vaccines (IROMPs) which were patented and made commercially available.

The introduction of these oil-adjuvanted vaccines by the mid-1990s, injected intraperitoneally into individual fish, proved extremely successful. All salmon are now vaccinated against furunculosis during the freshwater phase and the clinical disease is exceedingly rare in salmon at sea.

A variety of bacterial challenges also exist in Rainbow Trout aquaculture, where the production cycle is shorter. Both injectable and short-acting immersion vaccines have been used successfully in trout farming. However, two previously licensed monovalent furunculosis vaccines have been lost to the industry in recent years, which has led to an increased need for antibiotic treatment in freshwater. Antibiotic medication of sea-grown trout is very rarely done.

Other vaccines or antibacterials

Some salmon producers also use multivalent vaccines to protect against known local threats from other bacterial pathogens and against several viral diseases. This has resulted in negligible use of antibiotics in the marine on-growing phase of salmon farming over the last twenty years.

There is still some usage of antibacterials during the freshwater phase of salmon farming, to treat sporadic infections. As this is generally done when the fish are at 50g or less, compared to a slaughter weight of around 5kg, the amounts measured in grammes per tonne of production are very small. Where treatments are applied, they are at least one year before the fish are slaughtered for human consumption and when their bacterial population (in freshwater) is quite different to that later in the production cycle.

Antibiotic usage data

Data on antibiotic usage, as opposed to purchase of antibiotic, has been sourced from prescribing vets and trade bodies.

Salmon industry data suggests a current level of antibiotic usage of just over 5mg/kg produced. Figures for the much smaller trout industry are less easy to ascertain but are believed to be higher. Estimates, using prescribers' figures, suggest 40mg/kg for certain operators, although a survey of the industry has shown around one third of farms have not used any antibiotics for several years. A recent presentation to VMD indicated a level of usage in trout farms in England and Wales of around 20mg/kg, while average usage from the industry survey (covering around 50% of UK production) reported similar levels, implying the 40mg/kg figure is unusually high.

No Highest Priority Critically Important Antibiotics (HP-CIAs) are licensed for use in aquaculture species in the UK. However, HP-CIAs may be prescribed to fish under Cascade legislation. The quinolone, oxolinic acid, used under Special Import Certificate has been important in the control of furunculosis and *Yersinia ruckeri* infection (Enteric Redmouth) in trout and has been used, to a lesser extent, in juvenile salmon. Data on such usage acquired through personal communication with prescribing vets suggests it may be around 12mg/kg in English trout. The FVS, in collaboration with the producers' organisations and the VMD, plans to gather data on future use.

The relatively limited use of antibiotics in the largest part of the industry means that antibiotic resistance has not been seen as a current priority by fish vets or their clients but the intention is to increase focus on this issue through the data gathering exercise.

Fish Sector Targets

Antibiotic usage in UK seawater aquaculture is already at a historically low level. It is very low in comparison with other forms of large-scale protein production and foreign finfish aquaculture. In the face of unknown future emerging diseases, an aim of maintaining this level is realistic.

Vaccines have proven effective against the bacterial pathogens of farmed fish when used in conjunction with good management practices. The continued development of cost-effective authorised vaccines should be supported by producers' organisations and the veterinary profession. Autogenous vaccines represent a practical alternative to antibacterials in the face of new challenges.

The use of Highest Priority Critically Important Antibiotics (HP-CIAs) is, and should continue to be, minimal across UK aquaculture as a whole. Oxolinic acid is, however, critical for infections resistant to the limited UK-licensed antibacterials. Access to CIAs under the Cascade, to be used under carefully controlled conditions where no other option is available, should remain an option for fish vets.

Therefore the targets for the aquaculture sector are:

	Target
1	Overall antibacterial usage in UK finfish aquaculture to be maintained at a maximum of 5mg/kg for salmon and at an average of 20mg/kg for trout
2	All Atlantic salmon to continue to be vaccinated against relevant bacterial pathogens before the seawater production phase
3	All sea-grown Rainbow Trout to be vaccinated against relevant bacterial pathogens before transfer to marine sites
4	Use of appropriate vaccines to be promoted in freshwater trout farms
5	In the absence of appropriate licensed vaccines, autogenous vaccines to be developed and used wherever possible in species new to aquaculture (eg Cleaner Fish) and in the face of emerging bacterial diseases
6	No CIAs to be used routinely in any farmed fish species, but only following sensitivity testing which shows no other treatment option. Sensitivity testing has been and will remain standard practice among FVS members
7	Compliance with the Code of Good Practice for Scottish Finfish Aquaculture, or equivalent standards elsewhere in the UK, to be accepted as the norm for all finfish producers
8	Information on the use of all antibiotics to be gathered and collated; further discussions will be held between FVS, BVA, SSPO, BTA and VMD before the end of 2017 over the details of this programme

The above measures should be adopted in 2018 with review in March 2019. Through compliance with the CoGP and membership of RSPCA Assured and other farm assurance schemes, the welfare of the vast majority of farmed fish in the UK is closely monitored and audited. The proposed targets are not considered likely to negatively impact fish welfare.

Next Steps

A review of progress will be held at the FVS Conference in March 2018; this will be followed up with assessment of target achievement and consideration of next steps in March 2019.

Members of the Fish Veterinary Society involved in prescribing for farmed fish have indicated a willingness to report antibiotic usage to the VMD using a standard form already in circulation. However, the details of data gathering are yet to be finalised and this will be discussed further before the year-end.

The above data, together with antibacterial sales figures and aquaculture production data collected by Marine Scotland and Cefas, should allow the calculation of overall industry performance against the targets.

Gamebird sector plan

Background

Many millions of gamebirds (pheasants and partridges) are reared annually in the UK for re-stocking over 10,000 shoots, which between them generate annual expenditure totalling £2 billion and sustain the equivalent of 74,000 full time jobs. It is a seasonal activity: eggs are laid in early spring; young birds reared into the summer months; the birds are then released on to shoots from mid-summer to early autumn, with the winter shooting season commencing some time later.

Although the shot birds do eventually enter the food chain (as harvested, wild meat), the game rearing sector's output is focused not so much on the food production side as on supplying fit, healthy birds ready for release into the countryside, with the inevitable environmental and disease challenges that entails.

To produce these fit, wild-aware gamebirds, rearing is invariably done outdoors in grass runs subject to the weather and using genetic stock that is bred for strong flying and survival, rather than docility and meat weight. Gamebirds are naturally territorial and this too brings challenges relating to bird-on-bird aggression and stress-related diseases. Government codes of conduct define how birds must be reared, including the correct management of this disease challenge.

Just as in other livestock sectors, therefore, the advent of antibiotics several decades ago was greeted with enthusiasm by game rearers and their vets. Antibiotic resistance was not on anyone's agenda then and antibiotics provided a route to addressing the game sector's particular disease challenges. Antibiotic usage became commonplace and sometimes high. There was, however, no mechanism for gathering national data, so when antibiotic resistance recently rose up the EU agenda, the Veterinary Medicines Directorate (VMD) approached the gamebird sector to ask if a voluntary national system of monitoring could be set up to help understand the sector's antibiotic usage and how it might be reduced.

Antibiotic Usage

Previously published data on antibiotic use had not included figures for gamebirds and so in 2016, a comprehensive, voluntary exercise was carried out to measure the use of antibiotics throughout the UK gamebird sector.

Coordinated by the Game Farmers' Association, it involved all known specialist gamebird vets and game feed producers, collating their prescribing and in-feed incorporation records to calculate a national total of antibiotic used.

This measuring exercise, devised and agreed in consultation with the VMD, has provided accepted base year data which is published in the VARSS report for 2016 (to be published late 2017): 22.3 tonnes of antibiotic active was used in UK gamebirds in 2016[1]. This is approximately 5% of the total antibiotic used in all UK livestock sectors combined[2].

The 2016 measurements also showed that 75% of the antibiotic active was administered through feed, whilst 25% was administered in the form of soluble treatments through drinking water. All antibiotics, whatever their method of administration, were administered under veterinary prescription as the law requires.

The amount of 'Highest Priority Critically Important Antibiotics' (HP-CIA)[3] used in gamebirds in 2016 was found to be very low at 64kgs nationally, or just 0.0029% of the total antibiotic used in the sector.

Scope for Change

Although it comprises only a twentieth of the total antibiotic used in all animals kept in the UK, antibiotic use in gamebirds needs to be brought down in line with other livestock sectors and the Government's overall objectives for addressing antibiotic resistance.

The scope for significant reduction in the gamebird sector is good because up until now there has been little downward pressure on antibiotic use and, in common with some other livestock sectors and human medicine, antibiotics have certainly been used too readily in the past.

Raising awareness

A campaign to raise awareness and ensure that gamebird keepers, their vets and their feed companies use as little antibiotic as possible in future was begun in 2016 and is being well-received. In May 2017, all 19 specialist gamebird veterinary practices in the UK supported and circulated a Joint Communication summarising best practice requirements for antibiotic use and prescribing. Individual vets have been working with their gamebird clients during 2017 to reduce antibiotics whilst always ensuring bird health and welfare are preserved. This important work continues.

The Joint Communication document was issued in the names of the Game Farmers' Association, the British Veterinary Association (BVA), the British Veterinary Poultry Association (BVPA) and the Responsible Use of Medicines in Agriculture (RUMA) Alliance. The Game Feed Trade Association was also a full signatory because one of the key messages in the campaign is that no in-feed antibiotics should be prescribed to gamebirds unless the responsible vet has visited the birds and established, through diagnosis, a specific need to prescribe. This particular message is designed to address the finding that 75% of all antibiotic use in gamebirds is in-feed. The Joint Communication was well-received by gamebird keepers and is expected to result in significant and immediate falls in unnecessary prescribing during the summer of 2017.

Further encouragement can be taken from the fact that some gamebird producers do manage to rear their birds with very little use of antibiotic. Scrupulous biosecurity, moderate stocking densities and correct management contribute towards this. These flagships provide a route to encouraging others by publicising good case studies and through providing training on best practice.

Bird welfare, however, remains paramount and the specialist gamebird vets are all agreed that effective antibiotics must always be retained and available for treating disease issues which cannot be resolved in other ways. Current rearing practices have evolved in an era of easily available antibiotics and reversing this process in ways that are safe for bird welfare must be done carefully and over time.

Protozoal infections

Gamebirds, which necessarily have to be reared extensively, are very susceptible to protozoal infections of the gut and there are no alternative treatments available for many of these conditions. Preserving antibiotics in future for treating such conditions will be essential. Vaccine development may provide some solutions in the future but further research work is needed as there are limited options available at this point in time.

Notwithstanding the practical and welfare difficulties, the gamebird sector needs quickly to get to a point where it is always treating with antibiotics in clinical expectation, rather than dosing in hope. This message is now being widely promoted and well received, so the signs for rapid progress are good.

Game Sector Targets

Developing the targets

Identifying and setting an antibiotic reduction target for the gamebird sector was the subject of a meeting held on 3 May 2017. In attendance were representatives of the BVA, the BVPA, RUMA, 15 specialist gamebird veterinary practices, game farmers, game feed compounders and a representative of the National Gamekeepers' Organisation. One of the vets present is also a member of the Animal Health and Welfare Board for England. The veterinary practices represented at the meeting are between them responsible for about 75% of all the gamebirds reared in the UK, whilst the game farmers in attendance reflected a range of management systems and geographical locations. In short, it was a meeting well-qualified to set an informed antibiotic reduction target for the gamebird sector.

Factors taken into account included the scope for significant and early reduction of antibiotic use, especially in-feed (see above) and the experiences of several vets and gamebird keepers present in reducing antibiotic requirements through better management, such as improved biosecurity, more moderate stocking densities, the use of appropriate acids in water, ensuring that rearing sheds have correct light levels, consistent ventilation and the ploughing of ground between rearing seasons. It was felt that while standards in gamebird rearing have risen markedly since Government welfare codes were introduced by Parliament and the Devolved Authorities in 2009[4], recent advances lend themselves to further improvements and that the ongoing campaign of education and training should continue to reduce antibiotic demand significantly.

The gamebird sector has previously been through something similar when the product authorisation for Dimetridazole (DMZ, trade name Emtryl) was withdrawn in 2002. DMZ had been very widely used in the UK as a means of reducing the impact of stress-related diseases in game species. It had become a product of choice and the norm in gamebird rearing, somewhat by default. It was, consciously or otherwise, a prop for less than perfect systems and management. The industry responded remarkably to its imminent removal, however, by improving gamebird rearing systems and management so that DMZ would be unnecessary. Industry experts believe that the challenge of reducing antibiotics will be similarly embraced within the gamebird sector, which is close-knit and always works well and in partnership with its specialist vets to address shared sector problems.

Targeting reductions in tonnage

The meeting agreed that the reduction target for the gamebird sector would be best expressed as a nationwide percentage reduction on the tonnage used in 2016 as a base year. The European Medicines Agency has no PCU weights or categories assigned to gamebirds, so defining the gamebird sector's reduction target as a percentage reduction on the overall tonnage of active antibiotic used, rather than taking a PCU approach, therefore seems the sensible option. It will also be more easily understood within this particular livestock sector and by wider stakeholders.

Setting a nationwide percentage reduction target will allow individual gamebird keepers to assess their own reduction results against the national benchmark. This will encourage the sense that they are part of a nationwide reduction campaign and help them to see how they are doing. The Game Farmers' Association has already facilitated this process by supplying all members with a simple 'Self-Reckoner' to calculate their own usage of antibiotic active from the quantity of each product they use.

In light of all the above, the following targets for reducing antibiotic use in UK gamebirds are proposed. They were reviewed and approved by the RUMA Targets Task Force on 5 June 2017 and are now presented by the Game Farmers' Association with the full support of other stakeholder organisations within the shooting sector.

The proposed targets for the gamebird sector are therefore:

Targets	
1	**Reduction in tonnage** 25% reduction in the tonnage of antibiotic active used in 2017, as compared with 2016. This equates to 16.7 tonnes to be used in 2017, reduced from the 22.3 tonnes used in 2016. *Notes: This target amount is not being divided into 'in-feed' or 'soluble' antibiotics, although we believe that by far the greater part of the reduction will be delivered through reducing in-feed use.*
2	**Reduction in HP-CIAs** Very little Highest Priority Critically Important Antibiotic is used in gamebirds but we expect that heightened awareness of the particular need to restrict HP-CIAs will reduce their use by at least the same 25% margin by 2017.
3	**Future reductions** We propose a sector target for a further reduction of 25% between the end of 2017 and the end of 2020. *Notes: The biggest annual decrease will be in 2017 as the 'low fruit' reductions are most easily achieved but as more is learned about rearing gamebirds safely using less antibiotic, there will be continuing reductions thereafter.*

Delivering on the Plan

The period immediately after gamebird delivery to release pens is one of high vulnerability to disease as birds face new environmental challenge. Cooperation between the game rearer and the keeper of the birds post-delivery is crucial to ensure that bird management remains as constant as possible. New delivery documents will be introduced to aid preparedness on the receiving premises and feedback to the supplier.

Our stakeholder group is being expanded to include more vets and feed companies all the time so that the antibiotic reduction campaign in the sector gathers momentum and feedback on issues such as welfare becomes ever more accurate.

The sector is confident of securing further reductions after 2017 as communication about the need to reduce antibiotic use has been widespread and well-received. Plans are in hand for more 'how to do it' articles, advice sheets and training events. At this stage, however, a target is not being set beyond 2020 because we cannot know with precision what the welfare consequences of rearing with much less antibiotic will be. This will become clearer in time as feedback is received and monitoring is put in place. Arising from all the above, the aim is to have enough feedback by the end of 2018 to be able to set further realistic reduction targets beyond 2020.

Next Steps

Actual use in 2017 and subsequent years will be measured using the same methodology as was employed in 2016, to ensure consistency in reporting and allow comparisons to be made between years.

Game rearing is seasonal and in the main has finished by late summer, so our data collection methodology will enable the yearly total usage to be available before the end of each calendar year in question.

Specialist gamebird vets have already agreed to monitor progress in that regard and there will be further meetings, the first in November 2017, for them to report back on the welfare consequences seen as a result of the 2017 reductions. One possibility is the feasibility of benchmarking welfare in relation to reduction rates on individual but anonymous farms.

The gamebird sector's willingness and ability to respond to the call for antibiotic reduction, demonstrated by our effective measuring of 2016 use and the whole-sector approach taken since, should give confidence that these targets strike the right balance between ambition and reality. It is believed they are robust, achievable and can be defended as a thoroughly responsible reaction - taken at the earliest possible opportunity - to our voluntary measurement of the scale of the antibiotic reduction challenge in gamebirds.

References and Acknowledgments

Organisations in the shooting and rural business sectors which support this target document and its approach to reducing antibiotic use in UK gamebirds include: British Association for Shooting and Conservation, Country Land and Business Association, Code of Good Shooting Practice Steering Group, Countryside Alliance, Game Farmers' Association, Game and Wildlife Conservation Trust, Moorland Association, National Game Dealers' Association, National Gamekeepers' Organisation, Scottish Land and Estates.

[1] 2016 usage data for soluble antibiotic treatments was collected from all known UK specialist gamebird veterinary practices, estimated to account for 75% of all prescriptions written. The UK's known game feed manufacturers each contributed the totals of antibiotic they had incorporated into feed during 2016 (assumed to be 95% of actual total to allow for any unknown suppliers). The given total of 22.3 tonnes of antibiotic active includes extrapolation in accordance with these percentages to allow for antibiotic likely to have been used but for which actual data could not be collected. The VMD approved the collection process and converted the gross totals by product into the amount of active ingredient they contained. All data were anonymous.

[2] Sales of antibiotic active to all livestock sectors combined were 404 tonnes in 2015. Source: VARSS Report 2016, published by the Veterinary Medicines Directorate.

[3] As defined by the European Medicines Agency and endorsed by the VMD and RUMA. (Enflofloxacin and Colistin are the only two HP-CIA antibiotics on the EMA list that are used in gamebirds). References http://www.ema.europa.eu/docs/en_GB/document_library/Other/2014/07/WC500170253.pdf http://www.ema.europa.eu/docs/en_GB/document_library/Scientific_guideline/2016/07/WC500211080.pdf

[4] http://webarchive.nationalarchives.gov.uk/20130402160727/http://archive.defra.gov.uk/foodfarm/farmanimal/documents/cop-welfaregamebirds100722.pdf

Pig sector plan

Background

The UK pig industry, in common with commercial pig production worldwide, is recognised and acknowledged to be a high user of antibiotics and in the UK it is believed to use more pro rata than any other mainstream livestock production sector.

The reasons for high use are fundamentally a reflection of need, or perception of need. The use of antibiotics for growth promotion has been prohibited in the UK since 1 January 2006.

Specific reasons for antibiotic use in pigs at current levels include:

- A wide range of persistent enzootic bacterial disease challenges for which vaccines are not available, reliable or economically attractive (eg *Streptococcus sp, Haemophilus parasuis, Brachyspira sp, Lawsonia* etc)
- Continuous production systems at different points within the production cycle that allow enzootic disease to continuously recycle in a dynamic farm population; this is a feature of commercial pig production worldwide
- Presence of major enzootic non-bacterial diseases which have immune modulating effects on pigs, 'opening the door' to secondary bacterial disease (PRRS, *Mycoplasma hyopneumoniae* and PCVAD)
- Variable or inadequate vaccinal control of these and other agents
- High proportion of UK pigs kept on solid floor (straw bedded) systems, creating hygiene challenges and increased faecal/oral recycling
- Old buildings compromising environmental control and husbandry, (e.g. pig flow, hygiene measures)
- Poor understanding of environmental needs of pigs and poor control systems
- Inadequate internal and external biosecurity measures
- Geographical clustering of pig farms, leading to disease exchange and spread.
- Ease of medication via feed, encouraging prolonged treatments to fit with feeding regimes. Conversely limitations on water based medication application
- 'Cheap' medication, especially via in feed route producing low cost insurance against disease threats
- Habit
- Fear of consequences of withdrawal following historical bad experiences
- Pressures on farm margins requiring avoidance of production challenges and limiting investment in infrastructure, husbandry techniques etc
- Planning constraints limiting new buildings and innovative changes.

The pig industry and its veterinary advisers – represented by the Pig Veterinary Society (PVS) – recognise their responsibilities in the context of antibiotic resistance and intend to institute a challenging and rigorous plan to reduce and refine antibiotic use within the sector.

Antibiotic Usage

It is proposed to adopt the European Medicine Agency approved methodology for calculating antibiotic use in pigs, which expresses use in terms of milligram active salt of antibiotic per kilogram population correction unit (mg/PCU).

Until April 2016 no coordinated system existed for measuring antibiotic use across pig farms; eMB Pigs was introduced then and considerable historical data has been obtained.

The UK sales data released in the VARSS report for 2015[1] is consolidated data from which it is not possible to accurately derive individual sector data. Based on the sales data in that report, knowledge of industry practice, anecdotal information provided by some pharmaceutical companies and feed compounders, and estimated usage in other sectors of livestock production, the following estimates of use in pigs in 2015 have been made.

Antibiotics sales 2015	
In all food-producing animals, 2015	403 tonnes
Pig-only products (50 tonnes – and deduct 3 tonnes estimated use off-label in game birds of Aivlosin premix), giving:	47 tonnes
Pig and Poultry products (212 tonnes, estimated pig component 66.6%), giving:	142 tonnes
Multifood animal products (28 tonnes, estimated Pig component 10%), giving:	3 tonnes
Total estimated pig use 2015	192 tonnes
Pig PCU (tonnes)	770,000 tonnes
Estimated use 2015	249mg/PCU

As at 26 September 2017, eMB Pigs had captured data for 61% of English pig production in 2015 with average recorded usage of **278mg/PCU**[2].

Given the alignment of these two data sources, the proposed baseline usage for 2015 at the time of compilation of this report, is the midpoint of the two sources of approximately **263.5mg/PCU**.

As from 11 November 2017 all Red Tractor assured pig producing farms will be required to have entered at least the two previous quarters' usage data on to eMB Pigs, which will cover 93% of all UK pig production. The QMS assurance scheme in Scotland required use of eMB Pigs from August 2016.

The industry is therefore confident that accurate data of antibiotic use will be available for the majority of 2017 and subsequent years, both for individual farms and the industry as a whole. The actual figures from eMB Pigs will therefore be used to track progress from 2017 on, with sales data only used to broadly cross check the figures.

Furthermore, anecdotal reports of declining sales of antibiotics in 2016, particularly high volume in-feed products, suggest usage in pigs declined substantially during 2016, possibly by as much as 35%. This decline can to some extent be cross-checked with VARSS sales figures for 2016 when available. eMB Pigs data has been collected from 70% of pigs produced for 2016 and indicates a level of 183mg/PCU- a reduction in recorded use of 34.4% since 2015.

Highest Priority Critically Important Antibiotics (HP-CIAs)

It is proposed that the European Medicines Agency (EMA) list of CIAs, endorsed by the Veterinary Medicine Directorate (VMD) and RUMA, and incorporated into the last resort category of the PVS prescribing principles, will be adopted. This comprises

- Fluoroquinolones
- Third and fourth generation Cephalosporins
- Colistin.

According to eMB Pigs data, pig use of these actives for the industry has been:

	Fluoroquinolones	Third/fourth generation Cephalosporins	Colistin
2015	0.11mg/PCU	0.02mg/PCU	0.9mg/PCU
2016	0.05mg/PCU	0.01mg/PCU	0.2mg/PCU

Following identification in late 2015 of Colistin-resistant *E coli* in China, and acknowledgement of its critical importance in human medicine, not only has the low level of use in 2015 declined substantially, but from the second half of 2016 to date, it is understood that no distributor of Colistin has imported the product for commercial sale in the UK and thus usage now is believed to be negligible.

Usage of Fluoroquinolones and third/fourth generation Cephalosporins in UK pigs is very low. Only individual treatment preparations of all such products have ever been available for pigs in the UK – no licensed mass treatment via water or feed has been used in pigs.

However, both remain vital tools for veterinary surgeons and their clients to treat specific conditions, and for disease elimination programmes. Their use is constrained by the requirement of the PVS Prescribing Principles advice to which all veterinary surgeons attending Red Tractor assured farms and the equivalent in Scotland are required to give 'due regard'. From October 2017, additional documented justification for such use on the Veterinary Health Plan will be required in all regions.

Pig Sector Targets

Experiences from within the industry already suggest that some producers have fully embraced the concept of antibiotic reduction. These have been achieved by a variety of approaches, including:

- Attitudinal change and a preparedness to attempt to reduce dependency borne of long-standing practice (the 'courage to cut')
- Introduction of improved or more extensive vaccination techniques whilst acknowledging that vaccines are not silver bullets
- Disease elimination strategies which frequently lead to a spike in usage of antibiotics before levels drop dramatically
- Day to day husbandry improvements
- Internal & external biosecurity improvements
- Investment in buildings and infrastructure improving the environment and allowing improved husbandry practice
- Moves away from in-feed medication to more strategic water or systemic treatments.

It is anticipated that the need for targeted prophylaxis will remain to protect the health and welfare of pigs but that habitual or routine prophylaxis (a "just in case" approach) should be rapidly phased out. Targeted prophylaxis is regarded as the use of preventative antibiotic medication in the short to medium term in a range of farm situation disease challenges. These include where no vaccines are available (e.g. swine dysentery) new or re-emerging disease outbreaks, time delays before vaccine regimes take effect, temporary unavailability of vaccines, persistent predictable disease problems that prove intractable to non-antibiotic interventions. In such cases the health and welfare of the pigs remains an absolute priority.

Metaphylaxis, i.e. the treatment of whole groups of pigs once disease has occurred in some of that cohort, will remain a fundamental requirement to ensure health and welfare in pig populations.

The industry, supported by its veterinary advisers, proposes a programme of substantial cuts in usage for the industry as a whole – with which each individual producer will need to engage. Anecdotal evidence from other countries suggests reductions of 70% or more (e.g. Netherlands) made too quickly can lead to unacceptable health and welfare compromise in individual farms and this must be avoided. Conversely, some UK producers have already reduced use by this level and more, following interventions such as those listed above.

UK pig producers have been widely canvassed by the National Pig Association (NPA) and a similar exercise including group debate with its members has been undertaken by the Pig Veterinary Society in an attempt to agree ambitious but achievable targets for average use of antibiotics in UK pig farms without likely risk to health and welfare.

Targets

1 Reductions in mg/PCU

2015 Baseline level 263.5mg/PCU

Year 1 reduction 35%: 2016 target 171mg/PCU

Year 2 reduction target 25%: 2017 target 128mg/PCU

Year 3 reduction target 10%: 2018 target 115.5mg/PCU

Year 4 reduction target 10%: 2019 target 104mg/PCU

Year 5 reduction target 5%: 2020 target 99mg/PCU

Notes: This represents a five-year reduction target up to 31st Dec 2020 of 62.4% across the industry. Such reduction can be used as a guide for individual farms irrespective of their starting levels whilst acknowledging that the highest users, especially those who have yet to embrace the concept of reducing usage, may have to bear a disproportionate share of the total planned reduction.
The programme commences on 1 January 2016 and will be completed by 31 December 2020. eMB Pigs will facilitate ongoing monitoring of use over time and the monitoring of health and welfare during this period will be essential. Under this programme significant reductions will already need to have been achieved.
Further reductions beyond 2020 should be considered closer to that time, dependent upon progress made, health and welfare of the national herd, developing technologies and economic considerations.

2 Reductions in use of Highest Priority Critically Important Antibiotics

It is proposed that no specific targeted reduction in use of these products over 2016 levels be set, up to and including 2020. It is anticipated that the low level of use across the industry will not rise above levels of 0.1mg/PCU for Fluoroquinolones and 0.015mg/PCU for third/fourth generation Cephalosporins – subject to disease control requirements and to ensure health and welfare.

Colistin should however remain available in case of serious disease issues, for which its use is vital, arising. A maximum use target of 0.1mg/PCU will provide for the necessary reserve position but this may need to be reviewed depending on the ongoing availability of therapeutic Zinc Oxide in the EU.

Delivering on the Plan

Usage monitoring

Antibiotic use will be monitored via eMB Pigs for whole industry usage, to enable annual assessment of progress, but it is yet to be decided how and by whom individual farm monitoring will be monitored.

The PCU-based methodology is based on production of slaughter pigs. Six separate sub-categories of pig farm[3] are recognised in the UK and beyond October 2017 it is anticipated that a bench-marking facility will be available within eMB Pigs to assist individual producers in assessing their antibiotic use against the wider industry.

Health and welfare

It is vital that both individual and collective health of pigs is monitored during this ambitious programme.

Veterinary surgeons attend Red Tractor assured farms each quarter (with some variance under QMS in Scotland) and it is their responsibility to assess health and welfare at every visit. This is achieved by clinical appraisal, diagnostic testing and record analysis. Herd mortality is a basic measure of welfare and is collected and reviewed at farm visits and consolidated industry data is published annually by AHDB Pork although the latter has limits of applicability as a monitor of welfare due to the time delay in reporting.

Real Welfare Outcome assessments under Red Tractor/QMS rules may assist in monitoring the overall welfare of the farm.

Health monitoring in the abattoir by the meat inspector-operated CCIR system is not deemed at present to be robust and reliable, but all regions of the UK operate a veterinary-based monitoring system for pig health (BPHS or its equivalent in Scotland and Northern Ireland) which is capable of providing health feedback both individually and collectively. Improvements to quality control and standardisation of some components of these schemes in some regions is needed to provide the necessary robust monitoring.

Training

A range of pig farmer and stockmen training programmes on responsible use of antibiotics and wider issues of health management are available with suppliers ranging from AHDB Pork and QMS, through to local training groups and private veterinary practice-operated courses. City and Guilds has updated its qualification on safe use of medicines to include responsible use of antibiotics, and NOAH is in the process of developing cross-sector antibiotic use training for farmers.

A primary purpose of the Pig Veterinary Society is the provision of Continuous Professional Development and the Society's twice yearly scientific meetings regularly cover elements of effective and responsible prescribing, health control and disease elimination protocols, and will continue to do so. The Society also produces guidance documents on an ad hoc basis for its members.

The National Pig Association's Pig Industry Antibiotic Stewardship Programme – available to all stakeholders – can be downloaded via the **www.farmantibiotics.org** information site, where information, guidance and case studies can also be found and will be regularly updated.

Other Considerations

It is agreed by all significant stakeholders that health and welfare of pigs cannot be sacrificed for reduced antibiotic usage *per se*. It is anticipated that the approach suggested will lead to fundamental changes in attitude and practice on pig farms which will have economic and welfare consequences.

The proposed and longer term constraints and reductions potentially could be undermined by a number of issues:

1. **Proposed ban on therapeutic use of Zinc Oxide in pig feed from 2022.** This may, if enacted, require increased antibiotic use to control post weaning disease associated with *E. coli* and *Salmonella*, with Aminoglycoside, Fluoroquinolone and Colistin use likely to increase. Where persistent health problems ensue, antibiotic usage could increase at farm level by 10mg/PCU or more over a year and this will need to be taken into account when reviewing progress towards the targeted reductions at both individual farm and industry level beyond the current target period.
2. **New or re-emerging diseases.** Many novel infectious diseases have appeared in UK pig farms in the last 50 years. These include the immune modulating viruses of PRRS and PCV2. Should further new diseases arrive, it should be anticipated, at least in the short to medium term, that antibiotic use will need to increase to protect health and welfare.
3. **In-feed usage of antibiotics is declining rapidly**. In many European countries, oral powders 'top dressed' on to feed are widely used to target treatment to specific groups of pigs rather than the more blanket approach that is needed by antibiotic incorporated in the feed. Instructive guidance of VMD in the UK severely restricts the use of top dressing to individual animals with a very narrow range of products available. VMD is encouraged to review such restrictions.
4. **Vaccine availability.** In recent years the pig industry has been plagued with regular interruption to supply of certain vaccines, many of which have only one or two suppliers. This inevitably leads to disease breakdowns at individual farm level tending to increase treatment requirements.
5. **Antibiotic availability.** The UK pig industry is small in international terms. As antibiotic use declines, the economic viability of supplying products into the UK market may be compromised with further loss of products. This could shift prescribing choices to specific classes of products, and increase resistance selection pressure on remaining products.
6. **The impact of Brexit.** Moreover, a consequence of Brexit could be reduced UK medicinal product availability including vaccines, and this could have implications for health control, triggering altered prescribing practices and increase in antibiotic use.

Should significant health and welfare problems be identified widely across the industry during the course of the reduction programme, the targets proposed will require review and, if necessary, amendment. At a herd level this would be the responsibility of the prescribing veterinary surgeon but in the wider context, the Target Task Force would need to reconsider the proposals herein.

Government is invited to consider these ambitious proposals and, once agreed, it is hoped that processors, retailers and NGOs will support them to achieve significant antibiotic use reductions, whilst taking due regard of the health and welfare of the pigs, and avoid creating a competitive approach to antibiotic reduction.

References

[1] Veterinary Antibiotic Resistance and Sales Surveillance Report 2015 https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/582341/1051728-v53-UK-VARSS_2015.pdf

[2] The estimates suggest that the pig industry, which represents 11% of the total PCU production in the UK in 2015, consumed approximately 47.5% of all antibiotics used in animals (by active weight).

[3] Breeder feeder, Breeder weaner, Breeder only, Nursery only, Finisher only and Nursery finisher. Finishing sites include breeding
gilt production

Poultry meat sector plan

BPC Antibiotic Stewardship

The British Poultry Council (BPC) is the trade association for the poultry meat industry in the UK. The BPC represents companies from primary breeding, through growing, to slaughter and processing, and covering chicken, turkey, duck, and goose. The BPC Antibiotic Stewardship Scheme was established in 2011, bringing together expertise from producers and poultry veterinarians. Initially, the Stewardship group was for companies that were BPC members, however, due to the close connection through trade and veterinary services with non BPC members, the Stewardship group was able to reach out to non BPC members and lobby those producers to actively contribute and participate in the BPC Antibiotic Stewardship Scheme. The main objectives of the BPC Antibiotic Stewardship are:

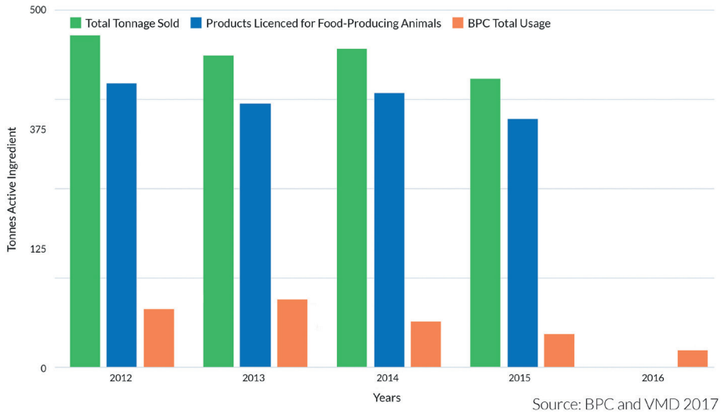
- To maintain the integrity of all classes of antibiotics to support both human and animal health
- To collect and monitor usage of all antibiotic classes in the UK poultry meat sector
- To work with the UK government sharing antibiotic usage data with the VMD
- To promote and apply best practice at all steps of production.

One of the initial objectives of the BPC Antibiotic Stewardship was to develop a data collection mechanism to record antibiotic usage across the commercial poultry meat sector. Whilst it was accepted that at the outset that it could not collect antibiotic usage data from all poultry meat farms, it was the first UK livestock sector to develop a data collection mechanism to record antibiotic usage. This data set now extends to over 90% of the production across chicken (meat), turkey and duck sectors and is, therefore, a robust dataset on antibiotic usage in the poultry meat sector. The data set is updated on a quarterly basis for chicken and duck meat producers and due to the seasonal nature of production on an annual basis for turkeys.

Data on antibiotic usage in the poultry meat sector from 2012 through to 2016 has now been collated and reported to Government directly through the Veterinary Medicines Directorate. In addition, the BPC has committed to make this data more widely available to stakeholders and the general public by publishing antibiotic usage data in an annual BPC antibiotic stewardship report. This commitment was made before the publication of the O'Neill report.

The published data shows a downward trend in overall antibiotic usage (tonnage) from 2012 to 2016 of over 71%.

TONNES OF ANTIBIOTICS SOLD OR USED



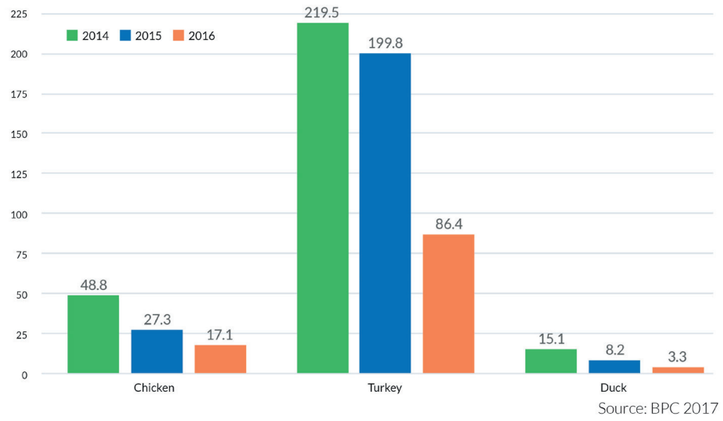
Source: BPC and VMD 2017

The UK poultry industry produced nearly half of the meat produced in the UK in 2015 and yet it only used 13.4% of the total antibiotics (licensed for food animal use) sold in that year.

At the time of this publication the amount of antibiotics sold (licensed for food animal use) in 2016 had not been published.

The European Medicines Agency has developed the European Surveillance of Veterinary Antimicrobial Consumption project (ESVAC) and this has developed a parameter mg/Population Correction Unit (PCU) which expresses antibiotic usage across the EU and across production animal species. The graph below expresses the UK poultry meat industry antibiotic usage data using the mg/PCU:

MG/PCU OF ANTIBIOTICS USED IN CHICKENS, TURKEYS, DUCKS



Source: BPC 2017

This data demonstrates that both ducks and broiler chicken are already well below the UK Government's multispecies average target for 2018 of 50mg/PCU and that the turkey sector has made significant progress in the last three years in reducing the mg/PCU across that sector.

The turkey sector expects to make further progress in reducing its antibiotic usage in 2017, however, the chicken and duck sectors believe that they have already achieved significant reduction in usage and there is unlikely to be significant further reductions in antibiotic usage in these two sectors over the coming years.

The usage target the chicken meat sector has set for 2018 through to 2020 is 25mg/PCU and for the turkey sector, over the same time period, the target set is 50mg/PCU. The sectors believe these targets are achievable, realistic and sustainable and demonstrate a responsible approach to the use of antibiotics across the poultry meat sector. However, disease patterns can change and these targets may be affected by unforeseen or unexpected changes to the national flock health. These targets will be reviewed by the BPC Stewardship group on a regular basis as the annual usage figures become available.

Concern has been raised that bird health and welfare could be significantly impacted by setting targets for reducing antibiotic usage. The poultry industry has already made significant reductions in antibiotic usage and there have been no reported negative effects on bird health and welfare. This is continuously monitored by the individual poultry companies.

The Welfare of Farmed Animals (England) (Amendment) Regulations 2010 requires Official Veterinary inspection at chicken slaughter houses in England. Similar legislation has been implemented by the devolved governments in Scotland, Wales and Northern Ireland. This legislation requires bird welfare parameters, including cumulative daily mortality, rejects at slaughter and pododermatitis, to be monitored and where deficiencies occur to be reported to the flock owner and the Secretary of State. This data will allow the producers and government to monitor if there are negative effects of the antibiotic usage targets set on meat chicken health and welfare.

The Welfare of Farmed Animals (England) (Amendment) Regulations 2010 applies only to meat chicken, however, although there is no specific legislation related to meat turkeys or ducks, Red Tractor Assurance standards for these two species require records to be kept related to mortality levels and welfare. The Red Tractor standards are adopted by a high percentage of the poultry meat producers and are independently audited, therefore, any significant deterioration in bird health and welfare due to antibiotic reduction strategies should be identified through this audit process.

In addition to reducing the overall tonnage of antibiotic used in the poultry meat sector over the last 4 years, the BPC Antibiotic Stewardship has committed to removing some antibiotic classes that are considered most highly critical important to human health by the World Health Organisation (WHO) from their production systems. These classes include 3rd & 4th generation cephalosporins, glycopeptides and colistin. Furthermore the BPC has committed to only using fluroquinolone and macrolide classes, as last resort therapies when no other product is demonstrated through laboratory investigation to be effective.

To further supervise the usage of these most highly critically important antibiotics (fluroquinolones) in the poultry meat sector the members of the BPC stewardship group have adopted a system of clinical governance. If a producer requires to use fluroquinolones to treat a flock of birds he will report in detail to the BPC, where and why the product was used, the number of a birds treated, the clinical outcome of the treatment and the veterinary health plan to avoid having to use the product in further bird placements.

In summary, the UK poultry meat sector has made considerable strides in the reduction and the management of antibiotic use within its sector. It has been open and transparent in its antibiotic

usage and will continue to report to wider stakeholders through its annual antibiotic stewardship report. The targets the industry has proposed are considered to be realistic, achievable and sustainable for the long term health and welfare of the National poultry flock whilst being mindful of the stewardship of antibiotic usage to reduce the impact on the development of antibiotic resistance in both poultry and human populations.

Sheep sector plan

Background

In 2015, there were 33.3 million sheep and lambs in the United Kingdom. This included around 16 million breeding ewes in the UK, with 7.1 million in England, 4.7 million in Wales, 3.2 million in Scotland and 0.9 million in Northern Ireland respectively. In 2015, 300,000 tonnes of sheep meat were produced in the UK, of which around 80,000 tonnes were exported[1].

There are no fully housed mainstream sheep systems and, with the exception of a very small number of dairy sheep flocks, ewes housed around lambing time, and some lambs housed for short periods for finishing, the UK sheep flock is still extensive in nature and fed on a diet largely based on forage.

Antibiotic-related challenges for the sheep sector include the following:

- Potential for complacency within the sector as many sheep farms are extensive with a low numerical usage
- Generally low veterinary involvement on sheep farms with most medicines and vaccines sold through merchants and infrequent contact between some sheep enterprises and their vets
- A high number of small separate sheep farms using local general vet practices
- Difficulty collecting on-farm data from farmers with no single electronic system – paper records currently predominate, which may be filled in retrospectively and at a batch level
- It is not possible to collect sheep prescription data from vets in order to give accurate national figures for antibiotic usage in the sector as there is no uniform system to collect data and any method used currently is not specific to the species
- Related to the above point, most sheep farms are actually mixed beef and sheep producers, with the same antibiotics used for both species.

Antibiotic Usage

Total usage

Due to the relatively low antibiotic usage within the sheep sector at present, the sheep sector has suggested that it should concentrate more on the way antibiotics are used rather than on the actual quantities used.

With the total livestock antibiotic usage figure agreed as milligrams per population correction units (mg/PCU), it is relevant to consider the relative biomass of the different agricultural sectors. On a PCU basis, sheep make up approximately 40% of the total UK livestock biomass, so the size of the sheep industry makes a significant contribution to the denominator in the usage calculation for the UK.

A dataset from a peer-reviewed study of 207 sheep-only farms[2] has indicated the range of usage across the sector. This study showed that the mean figure for this sample of sheep farms is 11.4mg/PCU and the median is 5.6mg/PCU. These average levels are low but represent a wide variation, with only 2% of the

farms in this study having levels over 50mg/PCU. The study included farms across England, Scotland and Wales, with a mixture of flock types (hill (18), upland (25) and lowland (164)) and management systems (organic (11), conventional (196)).

Data that has been provided voluntarily, such as that collected from the convenience sample of veterinary practices, cannot be considered truly random and may present the possibility of inherent bias. However, it is considered that this study has provided a reasonable initial evidence base.

Highest Priority Critically Important Antibiotics

Current usage of Highest Priority Critically Important Antibiotics (HP-CIAs) within the sheep industry is low (0.5% of total use in Davies et al. study[2]). HP-CIAs comprise Fluoroquinolones, third & fourth generation Cephalosporins and Colistin, as defined in European Medicines Agency recommendations.

The Sheep Task Force suggests that the sector should indicate, with immediate effect, that the use of any HP-CIA is inappropriate within the sheep sector except under exceptional circumstances and only when supported by immediately-recent culture and sensitivity testing. Such usage should have clearly accountable supporting evidence that is documented within the farm flock health plan together with clear preventative action.

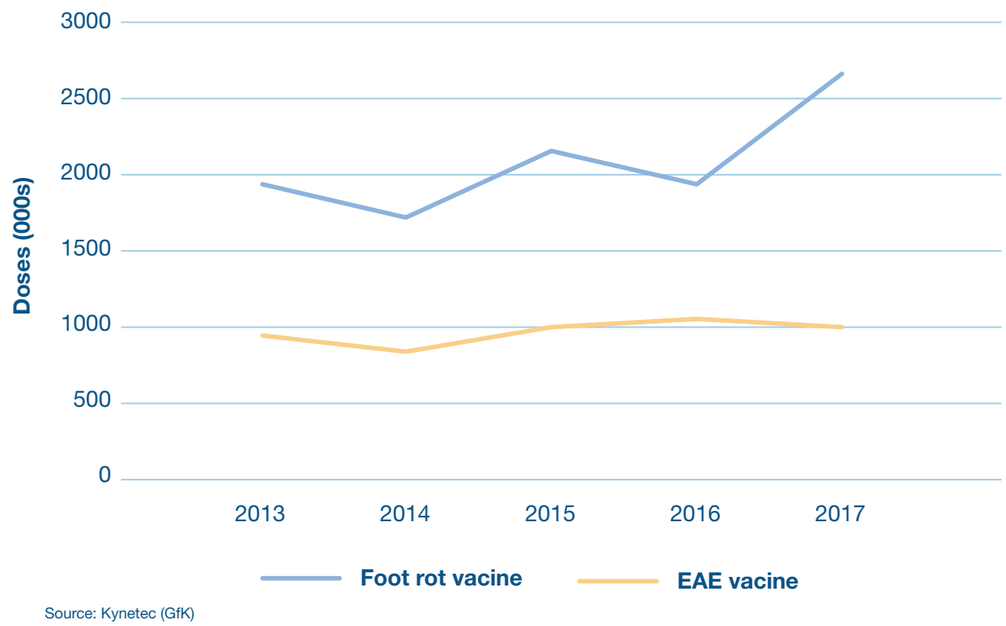
'Hotspots'

The following 'hotspot' areas have been identified where current behaviour on some farms may not necessarily reflect what would now be regarded as responsible use or good practice:

1. Control of lameness
2. Routine flock treatment of all ewes in late pregnancy to control abortion
3. Routine whole flock treatments for newborn lambs to guard against neonatal disease.

With respect to two of these 'hotspot' areas, sheep-specific vaccinations are available against foot rot and enzootic abortion. Usage of these could provide an indication that good practice guidelines are being put into effect. The Sheep Task Force has worked with industry to identify vaccine usage over the past five years (see Figure on next page) and will continue to monitor these trends over the next five years. A specific target has been set, to see vaccine usage increase with the number of ewes in the national flock as a denominator.

Wholesale vaccine sales data for vaccines against foot rot and enzootic abortion of ewes (EAE)



Source: Kynetec (GfK)

The lines represent the average figure for five years' worth of data (note that EAE vaccine is generally used once in a ewe's life and foot rot vaccine is given one to three times annually).

Scope for Change

Lameness

The five-point plan[3] is the agreed national strategy for achieving the Farm Animal Welfare Council (FAWC) target of reducing sheep lameness to less than 2% by 2021. An important part of the five-point plan is the appropriate use of antibiotics for the prompt treatment of clinical cases. However, flocks with high levels of poorly-controlled lameness, perhaps due to incomplete application of the five-point plan, may consequentially use inappropriately high levels of antibiotics.

Data from one veterinary practice suggested that two thirds of the total antibiotic used on their sheep farms was in the treatment of lame sheep[2]. In a questionnaire survey of approximately 300 sheep farmers at agricultural shows[4], 79% reported that they (quite correctly) gave antibiotics to individually infected ewes but 4% were using whole-flock antibiotic treatments for lameness.

Vaccination is an element of the five-point plan and it is possible to monitor the sales of foot rot vaccine as a proxy to give some measure of uptake of the five-point plan.

Abortion

In the questionnaire survey[4], approximately 10% of sheep farmers were giving all breeding ewes a dose of antibiotics before lambing to reduce losses due to abortion; this practice is believed to vary across regions of the UK. Good practice indicates that it is not appropriate for antibiotics to be prescribed for the control of abortion, except in the face of a new outbreak or in the year immediately following a confirmed diagnosis.

Enzootic abortion of ewes is the most commonly diagnosed cause of abortion in the UK and there are several effective vaccinations which preclude the need to treat routinely with antibiotics. With industry cooperation, the Sheep Task Force aims to monitor sales of enzootic abortion vaccine (see Figure).

Treatment of newborn lambs

About half of the flocks in the UK lamb all ewes in buildings, a quarter lamb outdoors, and the rest use a combination of systems. The treatment of lambs with antibiotics to prevent watery mouth and joint ill, particularly in indoor lambing systems, is relatively common. In the recent study of 207 sheep-only farms[2], oral antibiotics were prescribed to 47% of flocks with sufficient for 64% of the predicted lamb crop per farm. In the questionnaire survey[4], approximately 30% of farmers reported giving oral antibiotics to all lambs to prevent watery mouth and 10% reported treating all lambs to reduce cases of joint ill.

In 2015, Ceesa International Sales Survey (CISS) indicated that 10.5 million doses of oral antibiotics (Spectam Scourhalt and Orojet) were sold. Although these products are licensed for both piglets and lambs, it is thought that they are mainly used in lambs. Actual numbers of lambs dosed appears to be high but the volume of antibiotic used and its effect on the total mg/PCU is low.

This is a key area where behaviour and practices need to change to slow the rate of development of resistance and maintain efficacy in the licensed products, though these changes in behaviour will not have a large influence on volumes used.

Training and knowledge exchange

Guidelines for good practice behaviour aimed specifically at the hotspot areas – control of lameness, abortion and disease in neonatal lambs – have been developed and agreed by the Sheep Veterinary Society (SVS). 'The Sheep Veterinary Society Good Practice Guidelines' (available from www.sheepvetsoc.org.uk), will form the basis of updated RUMA guidelines for responsible use of antimicrobials in sheep. In addition to acceptable and good practice for the hotspot areas, the guidelines highlight the role of the veterinary surgeon in responsible prescribing behaviour with respect to metaphylactic and targeted prophylactic use as well as in the use of unauthorised products under the cascade.

The Sheep Task Force organised a workshop (20 July 2017) to develop and discuss sector plans alongside key personnel within the sheep and beef industries to ensure a coordinated approach. Consultation was also undertaken with Hybu Cig Cymru (HCC), Quality Meat Scotland (QMS) and Agrisearch to ensure a joined-up approach across the devolved administrations (see Beef Sector Plan).

Members of the task force are actively working with NOAH and the other sectors in the development of farmer education programmes with respect to the use of antibiotics. Within the sheep sector this will have a strong emphasis on enhancing the close working relationship between sheep farmers and their prescribing vet.

Sheep Sector Targets

The following targets have been developed by the RUMA Sheep Target Task Force, who have worked closely with the Sheep Health and Welfare Group with representation from key stakeholders in the sheep sector throughout the UK.

Targets	
1	**Monitor and reduce antibiotic usage** Work with the sheep industry to monitor national sector antibiotic usage levels aiming for a 10% reduction. Target timescale: between 2016 and 2020 *Notes: Usage data from a range of sources, including levy boards, processors and vets, will be collated annually to monitor trends. The usage data will be compared with animal performance records and health and welfare data whenever possible. A further representative and robust survey will be conducted by 2020 to compare usage and how this has changed. Based on the data we currently have, the target represents a mean usage figure below 10mg/PCU by 2020, though this will be reviewed when more data is available.*
2	**Monitor and reduce use of HP-CIAs** Work with the sheep sector to monitor and reduce use of HP-CIAs, aiming for a 50% reduction. Target completion date: December 2020 *Notes: Data from a range of sources, including levy boards, processors and vets, will be collated annually to monitor trends. A further representative and robust survey will be conducted by 2020 to compare usage and how it changes. Currently the target represents a mean HP-CIA usage figure below 0.03mg/PCU by 2020, though this will be reviewed when more data becomes available.*

3 Co-ordinate collation of antibiotic usage data in the sheep sector

Vets and the industry to have access to an antimicrobial use calculator to encourage common calculation techniques and drive a co-ordinated approach to the central collation of usage data by the sheep sector.

Target timescale: by the end of 2018

Notes: The Sheep Task Force has already enabled the development of a tool at the University of Nottingham that calculates antibiotic usage at farm-level. The tool is currently being tested on farm and allows antibiotics used on farm to be entered by quantity of product. The tool calculates farm use in mg/PCU as well as defined daily dose (DDDVet) and defined course dose (DCDVet).
Vets and producers who want access to the calculator need to register their details, which means that they can be contacted for additional datasets and their uptake monitored.
Some development work is needed on the existing tool for collation of producers' data and discussions with software companies will be needed to understand what other tools are available.

4 Reduce lameness

Increase uptake of the five-point plan to control lameness within the sheep sector, measured by an increase in foot rot vaccine sales of 5% per year over the next five years.

Target timescale: between 2017 and 2021

Notes: Farmer-reported prevalence of lameness has been monitored by research groups (eg[5]) and the Sheep Task Force expects this monitoring of disease levels to continue. We aim for a steady reduction in lameness levels in line with FAWC (Farm Animal Welfare Committee) targets. In addition, as a proxy measure of the uptake of the five-point plan, sales of foot rot vaccine will be monitored annually. The Sheep Task Force has worked with industry to identify vaccine usage over the past five years (see Figure) and will continue to monitor these trends. A specific target has been set to see usage increase with the number of ewes in the national flock as a denominator.

5 Reduce abortion

Encourage the use of vaccination to control enzootic abortion in ewes, with clear guidance that routine antibiotic use is inappropriate for abortion control and an aim to increase vaccine sales by 5% per year over the next five years.

Target timescale: between 2017 and 2021

Notes: Data will be made available to the Sheep Task Force by the pharmaceutical companies on enzootic abortion in ewes (EAE) vaccine sales and trends will be monitored annually with an aim that EAE vaccine sales increase. Some pharmaceutical companies and vet practices monitor empty or aborted ewes for antibodies to EAE, so this information will be collated to ensure disease levels are not increasing.

6 Reduce use in neonatal lambs

Encourage farmers to avoid using routine prophylactic antibiotics in neonatal lambs except in high risk situations, as assessed in the veterinary flock health plan, aiming to decrease sales by 10% per year over the next five years.

Target timescale: between 2017 and 2021

Notes: Data will be made available to the Sheep Task Force by the pharmaceutical companies on oral antibiotics sales and trends will be monitored. As a proxy measure for this target, the aim will be for sales of oral antibiotics for neonatal lambs to decrease. There were some concerns that only mentioning oral antibiotics in the target may cause farmers to switch to other routes of administration. Lamb losses will be monitored by collating data from levy boards across the UK and vet practice benchmarking to ensure lamb survival is maintained or improves.

7 Deliver a knowledge exchange plan to tackle vet and farmer behaviour, particularly with respect to the 'hotspot' issues

a) The new Sheep Veterinary Society Good Practice Guidelines will be translated into farmer-appropriate language and communicated to the industry.

Target timescale: by February 2018

b) At least two comprehensive open-access case studies of sheep farmers who have changed practices with respect to each of the hotspot areas will be developed, published and used within knowledge exchange activities as appropriate. These will be used to help farmers see practical examples and consequently understand how changes can be made. For example, with respect to neonatal lamb disease there will be an emphasis on appropriate ewe nutrition, colostrum management and hygiene at lambing time.

Target timescale: ready for use within the sheep year from September 2017 to 2018

Note: Knowledge exchange activity, such as articles, events, workshops and social media, will be coordinated and monitored by the Sheep Health and Welfare Group (SHAWG) and an annual report produced. SHAWG's membership consists of over 25 stakeholder organisations that are involved in the sheep industry throughout the UK.

Other Considerations

Sheep-specific continuous professional development (CPD) for vets

There are several relevant farm assurance programmes throughout the UK, including Red Tractor, Farm Assured Welfare Livestock, Quality Meat Scotland standards and Northern Ireland Farm Quality Assurance Scheme. As an example, in the English sheep industry, there are around 24,000 beef and lamb assured members (Red Tractor, 2015), which represent nearly 50% of beef and lamb farmers in England. There is a recommendation that there should be an annual vet visit and health plan but currently the vet does not have to have demonstrated a specific interest in sheep work.

In contrast in the pig industry, there is a greater uptake of farm assurance by farmers and one of the requirements is a quarterly visit by a vet, who is also a member of the Pig Veterinary Society which would increase their access to pig-specific CPD.

The Sheep Task Force would like to encourage sheep farmers to actively engage with vets who are able to demonstrate participation in appropriate sheep-specific CPD. This could be via a specialist association such as the Sheep Veterinary Society or alternatively there could be further development of sheep-specific activity during other vet meetings (e.g. British Cattle Veterinary Association) to ensure vets are fully updated.

Understanding the potential of existing software systems

Farm-level data is limited and due to the high number of mixed livestock farms, it is difficult to extract accurate usage from vet prescription records. Additionally, there is a lack of accurate population numbers available for individual sheep farms as there is no sheep equivalent of the British Cattle Movement Service.

More work is needed to understand whether usage data can be extracted from existing on-farm software programs, but even if this were available, it would not provide complete coverage of the industry. However, data from software programs could indicate the range of different products used as well as the class of stock and conditions for which they are used.

Changing high risk behaviour

There is a need to undertake further social science to aid the understanding of how to change behaviours in both farmers and vets. Some of these behaviours are ingrained and driven by the perception of ‘doing the right thing’ and will be challenging to alter. Some successful knowledge exchange examples from other countries and sectors will be used within the plan organised via SHAWG.

Summary

An over-arching target is that we aim to increase sheep-specific active veterinary involvement on sheep farms through pro-active evidence-based flock health planning.

The Sheep Task Force expects there to be robust and representative sheep usage data by 2022. It is likely that this will result from a mixture of survey work, collection of data from a representative group of farmers via processors and retailers, and data collated from veterinary practices.

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Appendices

Appendix 1: EMA Classifications

European Medicines Agency (EMA) Antimicrobial Expert Group (AMEG) Classification of WHO Critically Important Antibiotics (CIAs) based on degree of risk to humans due to antibiotic resistance development following use in animals.

Category	Risk to Public Health	Antibiotics Included	Advice on use
Authorised CIAs			
1	Low/limited risk to public health	Narrow spectrum Penicillins, Macrolides, Tetracyclines	General principles of responsible use to be applied
2	Higher risk to public health	Fluoroquinolones, systemic third/ fourth generation Cephalosporins, (Aminoglycosides, broad-spectrum Penicillins), Colistin	Restricted to use where there are no alternatives or response to alternatives expected to be poor

Appendix 2: The Targets Task Force

Beef
Hugh Broom, Surrey beef farmer and NFU Livestock Board member
Dr Elizabeth Berry, specialist cattle vet and British Cattle Veterinary Association Council member

Dairy
Di Wastenage, Devon dairy farmer and Royal Association of British Dairy Farmers Council member
Dr Elizabeth Berry, specialist cattle vet and British Cattle Veterinary Association Council member

Eggs
Richard Kempsey, free-range egg farmer and Technical Director of Stonegate
Paul McMullin, Consultant Veterinarian to the British Egg Industry Executive

Fish
Dr John Webster, Technical Director at the Scottish Salmon Producers Association
Ronnie Soutar, specialist fish vet and President of the Fish Veterinary Society

Gamebirds
Paul Jeavons, Worcestershire game farmer and Chairman of the Game Farmers' Association Health and Welfare Committee
Christian Blake-Dyke, specialist poultry and game-bird vet

Pigs
Richard Lister, Yorkshire pig farmer and Chairman of the National Pig Association
Mark White, President of the Pig Veterinary Society and Chairman of PVS Medicines Sub-committee

Poultry Meat
Thomas Wornham, Hertfordshire poultry producer
Daniel Parker, specialist poultry vet and Veterinary Adviser to the British Poultry Council

Sheep
Charles Sercombe, Leicestershire sheep farmer and Chair of the NFU Livestock Board
Dr Fiona Lovatt, specialist sheep vet representing the Sheep Veterinary Society

Observers
Fraser Broadfoot, Veterinary Research Officer, Veterinary Medicines Directorate
Javier Dominguez, Veterinary Director and Head of Science, Evidence and Research, Food Standards Agency
John Fishwick, President, British Veterinary Association
Donal Murphy, Head of Technical and Regulatory Affairs, NOAH
Jess Sloss, Technical Manager, Red Tractor Assurance

Chairing and Organisation
Gwyn Jones, Chair, RUMA (Chair of Targets Task Force)
John FitzGerald, Secretary General, RUMA (Secretary)
Catherine McLaughlin, Vice Chair, RUMA
Amy Jackson, Communications Officer, RUMA

Abbreviations and Glossary

AHDA	Animal Health Distributors' Association
AHDB	Agriculture & Horticulture Development Board – parent organisation of the levy boards
AHDB Beef & Lamb	The levy board representing beef and lamb producers in England
AHDB Dairy	The levy board representing dairy producers in Great Britain
AHDB Pork	The levy board representing pig producers in England
AMR	Antimicrobial Resistance
AMU	Antimicrobial Use
Antibiotic	A medicine used to prevent and treat bacterial infections specifically. This report is primarily focused on the use of antibiotics, as a subset of wider antimicrobials.
Antimicrobial	A product which kills or slows the spread of a range of microorganisms including bacteria, viruses, protozoans, and fungi. Antibiotics are antimicrobials.
APHA	Animal and Plant Health Agency, formerly AHVLA
AHWBE	Animal Health and Welfare Board for England
BCMS	British Cattle Movement Service
BCVA	British Cattle Veterinary Association
BEIC	British Egg Industry Council
BMPA	British Meat Processors' Association
BTA	British Trout Association
BVPA	British Veterinary Poultry Association
BVA	British Veterinary Association
BVD	Bovine Viral Diarrhoea
Cefas	Centre for Environment, Fisheries and Aquaculture Science
CHAWG	Cattle Health and Welfare Group of Great Britain
CIA	Critically Important Antibiotic (in this context, as usually defined by the EMA)
CoGP	Code of Good Practice for Scottish Finfish Aquaculture
CPD	Continuous Professional Development
CTS	Cattle Tracing System
CVO	Chief Veterinary Officer
Dairy UK	The trade association for the British dairy supply chain.
Defra	The UK Government's Department for Environment, Food and Rural Affairs
DCDvet	Defined Course Dose for animals, the assumed average dose per kg animal per species per treatment
DDDvet	Defined Daily Doses for animals, the assumed average dose per kg animal per species per day
EAE	Enzootic Abortion of Ewes
EFSA	European Food Safety Authority
EMA	European Medicines Agency
EMA AMEG	European Medicines Agency's Antimicrobial Expert Group
eMB	The electronic Medicine Book, designed by AHDB to electronically collate antibiotic usage data from the UK pig sector
ESVAC	European Surveillance of Veterinary Antimicrobial Consumption
FSA	Food Standards Agency
FUW	Farmers Union of Wales
FVA	Fish Veterinary Association
GFA	Game Farmers' Association
HCC	Hybu Cig Cymru, responsible for the development, promotion and marketing of Welsh red meat
HP-CIA	Highest Priority Critically Important Antibiotic (for human medical purposes), as defined by the EMA
IBR	Infectious Bovine Rhinotracheitis
Metaphylaxis	The treatment of a group of animals after the diagnosis of infection and/or clinical disease in part of the group, with the aim of preventing the spread of infectious disease to animals in close contact and at considerable risk and which may already be (sub-clinically) infected or incubating the disease. Also called Control treatment.
mg/PCU	Milligrams per PCU, the unit of measurement developed by the EMA to monitor antibiotic use and sales across Europe, which has also been adopted by the UK in its national reports.
NFU	National Farmers' Union

NFU Cymru	The National Farmers' Union's Welsh arm
NFUS	National Farmers' Union of Scotland
NOAH	National Office of Animal Health
NPA	National Pig Association
NSA	National Sheep Association
PCU	Population Correction Unit, which is used to help measure antibiotic use. PCU takes into account the animal population as well as the estimated weight of each particular animal at the time of treatment with antibiotics
PCV2	Porcine Circovirus Type 2 viruses
PCVAD	Porcine Circovirus Associated Disease
PI	Persistently Infected (with BVD)
Prophylaxis	The treatment of an animal or a group of animals, before clinical signs of infectious disease, in order to prevent the occurrence of disease or infection. Also called Preventative treatment.
PRRS	Porcine Reproductive and Respiratory Syndrome Virus, also known as Blue Ear Disease
PVS	Pig Veterinary Society
QMS	Quality Meat Scotland, the levy board representing the red meat industry in Scotland
RABDF	Royal Association of British Dairy Farmers
Red Tractor	A food assurance scheme which covers production standards on safety, hygiene, animal welfare & environment
RUMA	Responsible Use of Medicines in Agriculture Alliance
SHAWG	Sheep Health and Welfare Group
SSPO	Scottish Salmon Producers' Association
SVS	Sheep Veterinary Society
Therapeutic treatment	The curative treatment of a sick animal or group of animals following the diagnosis of infection and/or clinical disease in those animals.
VARSS	Veterinary Antimicrobial Resistance and Sales Surveillance, a collection of reports from the VMD providing the details of UK veterinary antibiotic resistance & sales surveillance
VMD	Veterinary Medicines Directorate
WHO	World Health Organisation

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