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A new vision for responsible antibiotic use

through data safeguarding and optimisation in the UK
farm livestock sectors

A simple summary

Contents

Overview.....	2
1. What is ‘Responsible Use’?.....	4
2. The role of data in responsible use.....	5
3. The specific challenges for cattle and sheep data.....	6
4. Why we need to solve our wider ‘data problem’.....	7
5. Barriers to and opportunities for better data.....	8
6. Principles of securing better data outcomes.....	10
7. Ensuring robust and representative data.....	11
8. Conclusions and recommendations.....	12
9. Useful reading.....	13
10. About VSC-AMR and FIIA.....	14

Overview

The UK livestock industry has made huge strides in reducing, refining and replacing antibiotics over the past 10 years, and now has among the lowest sales in Europe. Until now, UK livestock has been able to demonstrate its stewardship of these important medicines through publishing product sales data. However, maintaining this leadership position and making further progress towards ‘responsible use’ will mean making better use of data.

Variability in the availability of antibiotic use or prescription data – as opposed to sales data – is a major challenge to being able to achieve this goal. Only true antibiotic use and prescription data, which we will refer to by the broader term of AMU (antimicrobial use) data, can show what and how much is being used in different livestock sectors. While over 90% of AMU data in the UK poultry, pig and aquaculture sectors are collated and reported, this is not the case for UK dairy, beef and sheep, which are far bigger sectors with more fragmented supply chains.

A second challenge is how to make use of opportunities around data utilisation. If AMU data were able to also capture target conditions and effectiveness of treatment, these data could be combined with disease and resistance surveillance data to help identify patterns. All UK sectors could benefit from exploring this further.

Despite these advantages, barriers to data collection, collation and utilisation persist. In the cattle and sheep sectors, farmers have not always had straightforward, adequate communication or consideration, and this has impacted confidence and trust. There are other barriers, including technical (How can data practically be shared?), motivational (Who benefits and how?), and economic (Who pays, and where do commercial databases fit in?). Improved transparency around data sharing and permissions, better data ‘literacy’, clarity around the risks and benefits, incentives for data owners, and agreement on the end goal would all help to address such barriers.

A report has been compiled by the Veterinary Schools Council sub-group on Antimicrobial Resistance (VSC-AMR) and the Food Industry Initiative on Antimicrobials (FIIA) to look at the challenges of data and how we can overcome them.

The report makes three recommendations to address the challenges around data:

1. A mutual appreciation of appropriate data use protocols;
2. A better understanding of the barriers to improved use of data, by sector and supply chain; and
3. Agreement on how to publish data in the most acceptable way – who, how and what, using which processes – so that confidence and issues with reciprocity can be addressed.

The fully referenced report with further detail on each section can be found at both the FIIA www.fia.co.uk and Veterinary Schools Council www.vetschoolscouncil.ac.uk websites. This summary cover the key points and best practice to take forward.

1. What is 'Responsible Use'?

Responsible use of antibiotics is not the same as zero use, because animals with bacterial infection may require treatment in the interests of their health and welfare. A common 'mantra' within the UK farming industry for years has been that responsible use is: "*As little as possible but as much as necessary*". However, as the focus on antibiotic use has increased, it has become clear that this definition needs to be more explicit and provide better direction for all. An alternative has therefore been proposed:

Responsible use of antibiotics is:

- *elimination of any unnecessary, irresponsible or inappropriate treatments, underpinned by effective disease prevention based on good animal husbandry and veterinary practice;*
- *targeted and correctly dosed use of the most appropriate antibiotic for each situation, species and pathogen, with particular regard to European Medicine Agency classifications; and*
- *administration according to established good practice, balancing disease management, animal husbandry and practicalities.*

The ideal scenario is therapeutic treatment of an individual animal (practical handling considerations accepted), giving rise to an expected response of disease resolution, with no need for any unplanned follow-up treatment. Any deviation from this should initiate a review to examine whether and how such a situation can be avoided in the future.

2. The role of data in responsible use

Our ability to determine and support responsible use of antibiotics starts with data. The UK Government's Veterinary Medicines Directorate (VMD) has been collating sales figures since 1993, with the first UK Veterinary Antibiotic Resistance and Sales Surveillance report (VARSS) published in 2014. Since then, reports have been released annually and have played a central role in the UK's success in halving sales since 2015.

Sales data are a useful gauge of responsible use, but they can only provide an indication of the direction of travel and do not – with a few exceptions – reveal use by sector or species. In the UK, some sectors set out to address this lack of information by collating AMU data in order to understand their use of products as well as their sector's contribution to overall sales. Other sectors followed suit, to the extent that UK farming can now provide AMU data for 90%+ of production in the poultry meat, laying hen, gamebird, salmon, trout and pig sectors, all supplied voluntarily to the VMD, with progress against a set of targets reported annually.

However, significant challenges remain with data collection in dairy, beef and sheep. While these sectors are believed to use low amounts of antibiotics on a mg/kg basis, they account for a relatively large percentage of the antibiotics administered to farm animals each year in the UK because they comprise:

- More than half of all farms
- Over 40% of farmgate value
- Around two-thirds of the food-producing animal biomass.

3. The specific challenges for cattle and sheep data

As mentioned previously, a key challenge with the dairy, beef and sheep sectors is there are many farms and these sectors tend to have fragmented supply chains. However, some successful initiatives to collect AMU data are in operation, particularly among the bigger dairy processors, and in Wales through Welsh Lamb and Beef Producers.

The Medicine Hub, developed and administered by the AHDB, now offers a safe and confidential platform through which these different datasets as well as data from individual farms can be brought together. Medicine Hub was able to report data across contributing cattle and sheep farms in 2023 for the first time.

Despite this, barriers to bringing data together in the cattle and sheep sectors persist. Outside of direct or co-operative supply chains, there are few incentives for sharing data, and the logistical challenges of communication and data transfer continue. Concerns also remain among farmers about how data will be safeguarded and used.

At the same time, change is happening in the EU, which has now mandated national collection and collation of AMU data; 2024 is the 'start' date for cattle, and 2027 for sheep. In the UK, collection of AMU data remains voluntary – albeit with the option to legislate if insufficient progress is made. This means a lack of centralised AMU data for cattle and sheep in the UK could potentially be disadvantaging for these sectors on the global market.

4. Why we need to solve our wider 'data problem'

Reputational impact: Regardless of how well a sector is stewarding antibiotic use, without data and evidence to track this, critics and advocates will rely on hearsay and speculation. Collecting and publishing AMU data is important for transparency.

Improving analysis and decision making: Recording and benchmarking AMU enables trends and changes in use to be monitored and understood by veterinarians and farmers, which then supports informed stewardship decisions on farm.

Securing domestic markets: Processors and retailers are under growing pressure to report and compare AMU in their supply chains. An independently-run database provides summary data in a way that safeguards farmer identity.

International competitiveness: With national data reporting by sector now mandatory in the EU but still voluntary in the UK, the dairy, beef and sheep sectors in particular risk falling behind. One consequence could be a competitive market disadvantage.

Disease surveillance and prevention: National-level data could and should allow treatments for a range of conditions to be tracked. This, in turn, would create opportunities to understand treatment practices, disease prevalence and even emerging antibiotic resistance before they become big problems.

Addressing efficiency and environmental impact: Better antibiotic data do not just support good practice in disease management; prevention of disease reduces losses and improves performance, whether this is across milk production, conception or growth rate efficiency. Lower disease rates and improved performance, in turn, link to environmental impact, and improved – and evidenced – sustainability.

Risks of not sharing data: Refusing to openly share information can diminish trust, which is the ultimate currency in the relationship all institutions build with their stakeholders. This includes the relationship between farming, its consumers and wider society.

5. Barriers to and opportunities for better data

a) Obstacles to data capture, use and data 'confidence'

Technical barriers

Use of veterinary products and treatment of animals on farms must, by UK law, be recorded in a medicine book, and antibiotic products must be prescribed by a veterinarian. Hence, these data do exist – but not necessarily in formats that easily allow collection and collation at sector, regional or national level. Lack of rural broadband infrastructure also limits electronic on-farm data capture. *Motivational barriers*

The benefits of data collection and collation are often not made clear to farmers, and perceived risks are amplified through confusion over terminology and poor communication. Good leadership, which sets out the benefits and opportunities to data holders as alongside an honest appraisal of the risks, can help drive engagement. There is evidence that visibility of data and provision of insights together can drive engagement, suggesting that financial gain might be over-emphasised as a motivation.

Economic barriers

There are always questions over 'who pays' for the time and infrastructure involved in data capture and collation. Utilising the services of those with expertise in handling data can incur cost, and lack of funding for data upload has been a barrier to engagement. Apps or other technical solutions which could ease data upload are unlikely to become widely available, however, until there is sufficient demand.

Political barriers

Lack of trust and lack of guidelines are both significant issues. Concerns have been raised about AMU data falling into the wrong hands where there will be misuse or mis-management. Politicisation of data by campaign groups to support a particular ideology is a concern, as is the perceived risk of supply chains rewarding low or zero use of antibiotics, irrespective of whether such use is responsible use.

Ethical barriers

Data sharing has not always been fair, yet it is fair and reasonable that those who submit data to a database should be able to obtain collated and analysed data back in order to use it for their own benchmarking and comparative ends. Without this, there is likely to be insufficient incentive to participate in a voluntary scheme.

b) Opportunities to improve confidence with data sharing and use

Transparency around data sharing and permissions

Farmers and agri-businesses are more willing to share data and have a more open 'data mindset' if the benefits and risks are made clear, and if there is trust around contractual agreements.

Improved data 'literacy', communication and engagement

Understandable and transparent terms and conditions are key – especially clear information about who has access to data, who benefits, and how privacy is managed. Better data 'literacy' helps to build confidence and improve practices, while also maintaining open and transparent governance.

Distribution of risk and reward

Farmers are more willing to share data if other farmers are the main ones to benefit, because farmers trust other farmers the most with their data. Farmers also trust research institutes, but are least willing to share data if agribusiness and government benefit.

A common understanding of 'responsible use'

Agreeing and communicating a clearer definition of 'responsible use' would provide all stakeholders in the industry a goal and shared purpose to improve collection and utilisation of data.

6. Principles of securing better data outcomes

So how can we manage and use data better? Here are 10 agreed common principles:

1. Centralised databases should be developed by trusted and independent third parties so that they are able to gather farm data outside of commercial interests.
2. The primary goal is to establish national-level AMU data for a specific sector or species for reputational and benchmarking purposes, although it is recognised that goals may change over time.
3. An ambition should be to release fully anonymised data for industry-promoting research, subject to formal assessment of the intended purpose.
4. An ambition should be to provide processors and retailers with aggregated (summary) AMU data for their supply chain in a managed and safe way.
5. Individuals or organisations submitting data to centralised databases should expect reciprocity, meaning they should receive aggregated data in return.
6. Each farming sector should be ambitious and proactive in seeking to share aggregated data, wherever 'safe' to do so and in the interests of transparency.
7. Stakeholders governing databases should be transparent, and decisions around when and what to publish or release should rest with them.
8. Any aggregated or anonymised data released, published or shared must be done so with full context for the data provided.
9. Centralised datasets should never release identifiable data without the express permission of the data holder and in line with data protection and privacy regulations.
10. Permissions given by individual farmers to share their data with third parties must be respected by data holders.

7. Ensuring robust and representative data

Representative samples

Collated data from samples of farms, herds or flocks within the national population are rarely representative. Even substantial AMU datasets are skewed and cannot be assumed to be indicative of the whole.

Sector-level AMU data

One sector's AMU figure will be calculated differently from another's (e.g. dairy versus salmon or laying hens), hence it is inappropriate to compare AMU data from different sectors. It is also wrong to compare AMU figures from different farms, or a calculated average of several farms, against a national-level sector figure. If comparing aggregate farm-level data with published national figures is unavoidable, this information should be caveated as above.

'National-level' data

For AMU data to be truly representative, they must be from a large enough and random sample within the population, or otherwise from 100% of the population. As most AMU data are collated from pre-existing datasets for convenience, the lack of representativeness should be noted.

Best practice in data gathering, analysis and presentation:

1. State the target population about which conclusions are to be drawn
2. Define and state the sample coverage (number and percentage)
3. Outline data selection method and data source
4. Comment on any potential bias
5. Include details of any data pre-processing
6. Choose an appropriate metric and detail the methodology used
7. Do not compare 'apples with pears'

Best practice in sharing and interpretation of farm-level AMU data

Farmers should share farm AMU data with their veterinarian. When interpreting datasets made up of farm-level data, it is helpful to have information on the distribution of AMU within the sample; at a minimum, this should include median, inter-quartile range and the full range of datapoints.

8. Conclusions and recommendations

The UK livestock farming sectors have made tremendous progress in monitoring and stewarding antibiotic over the past decade. Despite this, progress is now stalling. It is likely that current activities have achieved as much as they can, and new approaches will be needed to take 'responsible use' to the next level.

Part of this new approach is redefining what 'responsible use' means so that it encompasses not only the decisions around using and administering antibiotics, but also reduces the need to use antibiotics in the first place. Meanwhile, veterinarians must continue to feel empowered and supported to use antibiotics as a treatment when warranted.

It is evident that use of data lies at the centre of solving many of these issues. From farm through to fork, there are significant opportunities for all in improved data sharing, ranging from reputation and trust to competitiveness. In particular, ensuring availability of national-level AMU data across all farm species and utilising those data effectively to anticipate changing disease and resistance rates would be game-changing from productivity and health and welfare perspectives.

A number of barriers to this vision persist, however. Some, such as a lack of confidence and incentive at farm level, may be exacerbated by both perceived and actual failures to share the benefits in previous projects. Others are more specific and concern technological, economic or political barriers. VSC-AMR and FIIA make the following three recommendations as the first steps along a route to addressing these issues:

- 1. Enshrine common principles:** The UK farming industry, from farm to fork, should accept and adopt the principles laid out in Section 6 as an industry standard.
- 2. Understand barriers to data sharing:** A study of barriers to data sharing and use should be undertaken across the UK livestock and aquaculture sectors.
- 3. Agree acceptable methods for publishing data:** The most appropriate data agreements and publishing methods, processes and bodies should be identified to improve confidence and reciprocity.

9. Useful reading

AHDB: Medicine Hub: www.medicinehub.org.uk

Copa-Cogeca: EU Code of conduct on agricultural data sharing by contractual agreement: www.copa-cogeca.eu/download.ashx?docID=2860242

Defra/Veterinary Medicines Directorate: Veterinary Antimicrobial Resistance and Sales Surveillance: www.gov.uk/government/collections/veterinary-antimicrobial-resistance-and-sales-surveillance

FIIA: Code of Conduct on Access to and Use of Industry Antibiotic Data: fia.co.uk/policies/fia-code-of-conduct-on-access-to-and-use-of-industry-antibiotic-data/

RUMA: Targets Task Force 2 (TTF2): www.ruma.org.uk/targets-task-force-2/

10. About VSC-AMR and FIIA

Veterinary Schools Council sub-group on AMR

The Veterinary Schools Council (VSC) is a membership organisation which represents the voices of world-leading veterinary schools across the UK, Ireland and the Netherlands. It engages in representative and policy work to ensure that the voice of veterinary schools is recognised for its expertise, innovation and commitment to the proper care of animals.

The Antimicrobial Resistance (VSC-AMR) group is one of six committees of the VSC. VSC-AMR looks at ways to utilise data currently held by veterinary schools to build the evidence base on the impact of AMR, and develop engagement with antimicrobial research being carried out in other disciplines. The group promotes antimicrobial research and raises veterinary student awareness of the importance of the appropriate prescribing of antibiotics.

Food Industry Initiative on Antimicrobials

The Food Industry Initiative on Antimicrobials (FIIA) brings together 26 retailers, manufacturers, processors and food service companies to promote and support responsible AMU in livestock farming and aquaculture – taking collective action on AMR.

FIIA has agreed policies on Responsible Use of Antibiotics; Measurement of Antibiotic Data; and Access to and Use of Industry Antibiotic Data. It is the last of these that is relevant to this paper, as FIIA wishes to improve understanding of why data are important to all in the livestock farming industry and suggest ways to improve confidence in its handling.



Food Industry Initiative on
ANTIMICROBIALS