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Achieving responsible medicines use – communicating with farmers

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All human behaviour is complex, and when complicated scenarios of animal health and welfare, responsible use of antimicrobials (AMs) and the immediate and long-term effects of such use on antimicrobial resistance (AMR) are combined, the complexities multiply.

A number of variables can influence the use of AMs on farms, and mixed messages can leave veterinarians and farmers not knowing where to turn.

- Lack of specific knowledge about causative organisms of disease due to limited rapid and cost effective diagnostics
- Complexities of the number of available AMs that can be used for treatment
- Perceived ability (or inability) to deal with numerous and ever-changing problems occurring on farms
- Shifting sands of agricultural economics (farm gate prices, subsidy levels, etc.)
- Their own observations of AMR on their clients' farms

Speksnijder and others (2015) have shown that farmers who had personally been subjected to isolation measures in hospital due to colonisation with methicillin-resistant *Staphylococcus aureus* (MRSA) were more motivated to reduce their use of AMs than those without personal experiences of resistance.

Farmers may feel the need to do their part to assist with the problem of AMR, but may not know where to start.

Some studies show farmers may be unconcerned that AM use in animals may be linked to increased levels of AMR amongst farm staff (Friedman and others 2007, Buller and others 2015).

The problem

Farmers must keep the best interests of their animals and their operations in mind, and their use of AMs is closely tied to these goals. But what limitations exist that hinder them - even with the best of intentions - in the most prudent use of AMs?

- **Lack of awareness/Differing perceptions of AM use**

Farmers may or may not be aware of the problem of AMR. In a survey of pork producers carried out by ADAS a decade ago, 90% of farmers thought the situation of medicines use on farms was acceptable (Wheeler, 2004), even though many in the public sphere feel that AMs are drastically overused in animal agriculture, including pig production (Morris and others, 2016). More recent studies show up to 90% of dairy farmers believe they are following best practice, whilst almost half are unaware of advice such as the Responsible Use of Medicines in Agriculture (RUMA) guidelines (Jones and others 2015, RUMA 2015). Farmers may be aware of the problem of AMR and feel they have a role in limiting its development, but they are faced with reconciling this with their responsibilities as proponents of animal welfare, including ensuring animals receive adequate treatment (Buller and others 2015, Jones and others 2015).

As veterinarians, we must be aware that farmers may view the use of AMs differently to us. In a study by Coyne and others (2014), **the main burden of responsible use of AMs was attributed to the veterinarian as the professional considered to be the most trusted source of information on**

AMs by pig farmers. Interestingly, this study revealed **a mismatch between the views of veterinarians and their clients: while veterinarians perceived that they were under pressure from clients to prescribe antibiotics (be it worries over possible litigation, competition from other veterinarians who would be willing to prescribe or just the burden of responsibility that comes with being the prescriber), farmers considered interactions with their veterinarian to be a partnership**.

Farmers felt the responsibility of the decision to prescribe AMs rested with the veterinarian, although they felt that decisions about actual antibiotic use on farms were made very much through consultation between farmers and vets (Coyne and others 2014).

Farmers, however, may not always ask directly for advice on AM use. Some even feel that their veterinarian might disapprove of them decreasing their antibiotic usage (Jones and others 2015). That farmers and vets see their roles as different may be true across many segments of veterinary practice, and should always be considered when speaking with farmers about potential treatments. Veterinarians should seek to build and/or maintain trust between themselves and their clients, in order to explore possibilities for change outside of their usual and expected relationship (Buller and others 2015).

Jones and others (2015) in their survey of cattle farmers in the UK, reported that only 17% asked for advice from their veterinarian before using antibiotics; 55% specifically stated that they did not ask for advice.

- **Inappropriate use**

Even if they are aware of the issues around AMR and responsible AM use, farmers may believe they are using AMs appropriately, or in a way necessary to maintain the health and welfare of their animals. While farmers might welcome decreasing bills for medicines, animal health and welfare remain at the forefront, and many farms are driven to maintain or to increase productivity and yields.

The complex environment of farmer decision making, influenced by cultural ideals as well as technical, societal, economic and institutional challenges all influence farmers' actions and decisions with regards to AM use.

Economics plays a part:

- Cost motivates AM prescribing (Gibbons and others 2013) and AM usage (Coyne and others 2014). Specifically, high production costs and the resultant inability to reinvest in infrastructure may mean that farmers rely upon AM use in the short term instead of making longer-term investments needed for new buildings (Coyne and others 2014, Buller and others 2015).
- Farmers may see AM use as a tool that can be used to produce more and cheaper food (Stevens and others 2007) or to enhance performance parameters (Moreno 2014).

It is our belief (Tisdall and others 2016), that the most viable way to keep animal health and welfare in balance with economics is for farmers to work closely together with veterinarians to establish and utilise fit-for-purpose, live and active herd health management (HHM) with strategies that specifically focus on medicines use.

When the decision to use antibiotics is taken (by the veterinarian prescribing and, potentially, the farmer administering the medicine), clarity about what types of AMs are appropriate must be provided. In the UK, recent work suggests that >90% of farmers use intramammary antibiotics at

dry-off and in the treatment of mastitis during lactation (Brunton and others 2012), and many of these use AMs listed as critically important for human health (CIAs) - almost 1/3 of UK dairy farms chose a 4th generation cephalosporin as their first choice treatment for mastitis along with a 3rd generation cephalosporin as one of the two most frequently used injectable AMs (Brunton and others 2012). Calves are also often provided with waste milk potentially contaminated with AMs (Brunton and others 2012). In some countries in Europe, the use of 'blanket dry cow therapy' administered to all cows is forbidden, which may limit the amounts of AMs used. Already some major milk buyers are demanding similar requirements of their dairy supply chain, and similar legislation may follow in due course.

Farmers look to their veterinarians to assist in the decision making process around which AMs to use, and veterinarians must have the information and advice ready to answer their questions clearly and informatively.

Farmers can be influenced in many ways:

- **By their own professional identity and pride in farming**
- **By their own personal values and internal moral and ethical considerations**
- **By the need to make a living**
- **By external rules and regulations** (from governments, milk buyers and food retailers)
- **By their veterinarians**
- **By their peers**
- **By society** (including the press, independent assessments such as the O'Neill Review on Antimicrobial Resistance (O'Neill et al., 2016), etc.)

What tools do veterinarians have available?

- **Improving veterinary-farmer communication**

When speaking to farmers about most topics (including medicines use), veterinarians find it easiest to slip into the role of expert with the 'right' answer (Bard and others submitted). Doing this, however, may cause us to miss out on opportunities to problem solve along with farmers. It is important for us, instead, to foster collaboration and power-sharing, allowing farmers to share their wealth of knowledge so that together we can devise solutions and even generate new knowledge. Indeed, changing the nature of communication between veterinarians and clients has already been recognised as a process important to the future of the veterinary profession (Vet Futures Project Board 2015), and veterinarians are encouraged to work '*in partnership with clients',* which, in turn, helps them '*convince them* (clients) *of the value of preventive services*'. The British Veterinary Association Animal Welfare Strategy also suggests that this change in communication is critically important (British Veterinary Association 2016). This, however, may be more difficult than it seems - while veterinarians recognise their influence and the need for them to be proactive advisors, figuring out what to do can still be a challenge (Jansen 2010). Perhaps further communications training for veterinarians might be welcomed.

One simple tenet of good communication that we can all practice more is asking - and then listening. Instead of assuming that we know and understand the constraints of the farmer, we can make an effort to ask open questions and really listen to farmers, actively trying to understand where they are coming from. In fact, current research suggests that **the 'typical' veterinary approach to herd health management is underpinned by a lack of awareness of farmer goals and attitudes** (Derks and others 2013, Bard and others submitted), so taking this small step could make a big difference. To improve communication, veterinarians would be advised to spend time exploring farmer motivations, allowing them to encourage engagement with veterinary recommendations by aligning

these recommendations with existing farm priorities, whilst building a better interpersonal relationship through a shared understanding of farmers' perspectives.

Veterinarians often fall into the familiar pattern of providing information and expertise, asking for farmer input infrequently (Bard and others in preparation).

When asked by farmers, or when given permission to share what they know, veterinarians can seek to offer farmers support in responsible use and reduction of use of medicines in a number of ways:

1) By detailing the evidence base or research associated with their advice,
2) By offering up the experiences of other farmers,
3) By talking about the views held by the veterinary profession (themselves, their particular veterinary practice, and veterinarians as a whole), and
4) By comparing their views to other, external influencers (such as milk buyers and government regulators).

Our ongoing research suggests that veterinarians and farmers alike would benefit from a more farmer-orientated approach to HHM, such as deliberately eliciting farmer motivations and experience as well as explicit use of empathy and emotional support (Bard and others in preparation). Used appropriately, these processes can enhance veterinary-farmer engagement and potentially improve the uptake of advice on farm, advice pertaining directly to medicines use or to the many other aspects of herd health.

Unfortunately, many veterinarians fail to directly ask about a farmer's specific motivations behind choices (such as what AMs to use in which cases), and misunderstanding ensues. We often assume that farmers are motivated by economic constraints (monetary cost, input of time, improvement of yields). However, *research suggests that a simple economic argument is rarely enough to stimulate a change in farmer behaviour* (Greiner and others 2009). Indeed, farmer polls looking directly at this topic report that farmers value a healthy herd above the 'rational' economic arguments that veterinarians may be tempted to default to in conversations (Leach and others 2010). As veterinarians, therefore, we would be wise to *ask* farmers before assuming we understand their goals and their rationale for medicines use.

- **Participatory approaches**

In addition to improved communication, participatory approaches are methods that actively involve farmers on the front-lines in sharing what they already know, about how they feel and about what ideas they have for managing AM use and AMR on their farms. *Good communication skills* and a *trained facilitator* are required for these types of approaches to work well. They also involve buy-in and hard work from participants. As farmers may be used to their veterinarian just telling them what they ought to be doing, they may initially find it difficult to come up with solutions themselves. Using these approaches might seem like hard-going at first, but, in time, farmers develop the skills necessary to work alongside each other and alongside their veterinarian to solve their own problems (van Dijk and others in review). These participatory approaches empower farmers and allow them to use their ingenuity to find answers on their own farms, and then to transfer these answers to others. Participatory approaches also often involve farmers talking together to share best practice and co-develop ideas for innovative solutions. Sometimes a problem seen through fresh eyes or the solutions another farmer has been able to implement on one operation can be enlightening and inspiring to those who have yet to take the leap to make a change.

In our experience, using participatory approaches such as devising AM stewardship policies together can reap great rewards – in our work with producer groups supplying a major UK retailer, 95% of farmers offered the opportunity to participate in designing their own policy engaged with the

process, along with all of their veterinarians (van Dijk and others in review). Four months after implementation of the policy, almost 75% of farmers also indicated that they had changed their AM use (van Dijk and others in review). Other ideas may be for farmers to engage in discussion groups, Stable Schools (Vaarst and others 2007) or other types of groups where they can share information and critique AM use practices on their own and others' farms.

- **Accurate records of medicines use**

An essential component in bringing about change on farms is the ability to measure the difference you are making. William Thomson Lord Kelvin, who lived in the 19th and early 20th century, famously said, "*When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it ,… your knowledge is of a meagre and unsatisfactory kind.*" This quote applies just as strongly today – if we cannot measure where we are starting from in AM use on farms and accurately keep track of the changes we are making, we cannot expect to really show if we are achieving anything. Although veterinary prescribing data and on-farm use of AMs does exist, it currently is not in easily accessible formats in most veterinary practices, nor on most livestock operations. Tools such as medicines audits (Tisdall and others 2016) allow us to better quantify the use of medicines on our farms and to compare changes we might make going forward, or to benchmark veterinarians' or farmers' use of medicines against one another for continued comparison, as well as to prove what is possible. ADAS has previously reported farms recording performance were more likely to report improvements, and that farmers, more often than not, find record-keeping helpful (ADAS UK Ltd. 2007). Measurement also helps motivate better farmers to keep improving (Whay and Main 2015).

Without a structure to accurately record and collate data on medicines usage, however, our ability to quantify use on farms is limited. At the University of Bristol, we have been partnering with the Vale Veterinary Group and FarmVet Systems Ltd - makers of the innovative, cloud-based and mobile software VetIMPRESS - in order to develop a nation-leading, innovative tool that can provide veterinarians, farmers and other third parties with quick, easy and accurate access to the information they require to make data-driven, detailed decisions about medicines use on farms. It is important that these recording tools are useful to farmers and that veterinarians can easily use the data within them to analyse patterns of AM use and help them make good decisions on farms as well as review the progress that is being made (Escobar-Tello and Buller 2014). Tools like these help to improve overall communication between farmers and veterinarians, as data are viewed in real time and evidence-based decisions can be taken and evaluated. Because farmers often view farm work and paperwork as separate things, it is important that we understand how farmers keep records and use these records (to prevent time-consuming processes like double entry of data, etc.) and to make this type of data easy to access and use (Escobar-Tello 2015). Our partnership is interested in extending our work in the area of medicines use to other farming consortia, veterinary practices and organisations interested in accurately recording and using medicines data on farms to drive sustainable and responsible use, and would welcome input from organisations with similar aims. We believe this creates exciting potential in relations to medicines use on farms that is not replicated anywhere else in the industry today.

- **Benchmarking**

As has been done in the Netherlands (Bos and others 2016), veterinarians and farmers may in future be benchmarked against one another in order to provide comparisons of AM usage and to encourage reduction of usage. A great use of accurate records that helps farmers and veterinarians alike keep track of how they are doing and compare that to how others are doing, benchmarking can be very powerful, but must also be reconciled with other external and internal pressures on AM use. Used well, benchmarking may serve to cultivate a culture where farmers can engage with an achievable (because it can be done by others) and desired level of medicines use as compared with their *status*

quo, thus triggering a powerful motivation to change. Cultivating this gap between actual and desired states is a significant step in the process of motivating change. Benchmarking may also lend itself well to incentive schemes for medicines conservation, or friendly competitions between farmers to reduce unnecessary AM use (Buller and others 2015).

- **Active herd health management**

As described by Tisdall and others (2016), working closely with farmers to establish and refine fit-for-purpose, live and active HHM with strategies that specifically focus on medicines use is crucial to this process. Escobar-Tello and Buller (2014) have previously encouraged the understanding of HHM as '*a process – rather than a document - that farmers perceive as integral to their professional pride and identity*'. Re-contextualising HHM in this way will help all parties in using these better as tools to achieve health and welfare improvements and to encourage more responsible AM use . Currently, research suggests that many HHM strategies are not formulated with active help from farmers and stockpersons (Escobar-Tello 2015), but using the knowledge of those for whom HHM is aimed could help veterinarians to uncover more about farmers' practical knowledge and, at the same time, encourage participation, ownership, community and a sense of professionalism (Escobar-Tello and Buller 2014). It is worth a try!

- **Education and training**

Many people would support the view that what we need to change prescribing and AM use on farms is education and training of farmers and veterinarians alike. Indeed, veterinarians should be aware (or should be made aware) of the problems of AMR and especially about the use of CIAs (Tisdall and others 2016). Veterinarians should also be well-versed in the pharmacokinetics of the AMs they are prescribing and about requirements for prudent use. Through the British Cattle Veterinary Association (BCVA), colleagues at the University of Bristol and others have previously offered a number of medicines training courses attended by over a hundred keen and forward-thinking practitioners. However, after an initial uptake of meetings attended mostly by those already 'converted' to the ideas of antibiotic stewardship, registrations declined, indicating limited interest from much of the profession. Despite this, new courses incorporating much of our recent research in this area are being prepared for 2017 to assist all those prescribing on farm to do so as responsibly as possible and to improve communication and dialogue with their clients on the topic of antimicrobial usage.

The same drop off in enthusiasm may be found on the farmer front. Veterinary practices may hold farmer meetings to explain their rationale for prescribing and how AMs can be used appropriately (Tisdall and others 2016). New training programmes to introduce farmers to information about how antibiotics work and about why care must be taken in their use are being developed. Simplified information such as lists and classes of AMs (*e.g.* Tisdall and others, 2016, Table 2) can be developed and made available to both veterinarians and farmers. Requirements for attendance at training sessions like these can even be mandated, but we must be careful that they do not just become another 'tick box' exercise that involves veterinarians and farmers going through the motions of what is expected of them. We must find better ways to get both farmers and veterinarians up to speed and interested in this vitally important topic. We should also be aware that these knowledge transfer meetings may be viewed in different lights by farmers, who consider them to be anything from useful and empowering to useless and shaming (Bard and others in preparation). There may also be differing opinions on from where the push for management change should come – is it the responsibility of the veterinarian or of the farmer? Telling people what to do does not work – farmers must take ownership of the problems by exploring and realising them and partnering with others (veterinarians, fellow farmers and other farm advisors) to generate ideas for solutions (Whay and Main 2015). They need to consider and discuss solutions and think through their

implementation, rehearsing the changes they are likely to make, or perhaps testing out possible solutions (Whay and Main 2015).

- **Improving the system**

For long-lasting change to occur, any interventions we implement should also have an impact on the social interactions and the cultural context within which farmers take actions and decisions (Escobar-Tello and Buller 2014). Although it may be difficult, we must investigate and consider the role of cultural ideas about farming and how those influence farmers' actions and decisions. Targeting farmers as active individuals but also as part of a whole in their farming communities and involving them from the bottom up helps to build consensus through dialogue, rather than instituting top-down interventions. In all of this, it would behove us to better understand the relationships between farmers and their cultural and professional communities, and to consider their culture and traditions before we expect things to change overnight (Escobar-Tello and Buller 2014).

Many pathways exist that will help us to make headway on the topic of increased stewardship of AMs. It is, however, easier to gain ground if ideas are based in real world expectations as to what might actually be accomplished. If there is a willingness amongst us as veterinarians to make changes, harnessing that willingness and doing something is a good first step. Make a decision to tackle something you believe in and begin to make changes. It can start with a fairly generic approach like farmer education, putting in place the basics of medicines audits or just broaching the topic with your colleagues or clients. But this effort to understand your clients and their decision-making processes will not be in vain – it all helps in moving us along the road to more responsible use of AMs and in doing our bit to combat AMR.

Table 1. Tools to help veterinarians work together with farmers on responsible antimicrobial use

What we can do	**How we can do it**
Improving veterinary-farmer communication	Foster collaboration, ask and listen (more than talking!), co-create knowledge
Participatory approaches	Actively involve farmers in HHM
Accurate records of medicines use	Use easy methods of data recording and analysis
Benchmarking	Benchmark farms and veterinarians to compare AM use
Active herd health management	Establish fit-for-purpose HHM, specifically focussing on medicines use, and useful on-farm protocols
Education and training	Better veterinarian and farmer training on responsible AM use
Improve the system	Work together to understand the culture of farming

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Conflicts of interest

None

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