

Antimicrobial use and resistance in ruminants

Research to monitor and quantify antimicrobial use and resistance in ruminants will be essential to meet EU reduction targets.

Antimicrobials are one of the main advances in medicine and are a key tool used to fight infectious diseases in humans and animals. However, their misuse has resulted in an increase in antimicrobial resistance (AMR), which has been recognised by the World Health Organization as one of the biggest challenges for both human and animal health. In the last 20 years, human infections with multi-resistant bacteria, for which no antimicrobial treatment is effective, have increased worldwide, and the development of new antimicrobials has been unsuccessful. In this context, a drastic reduction in antimicrobial use (AMU) in both humans and animals is the only approach to reduce AMR.

Publicly available figures on AMU have become best practice both in human and veterinary medicine. On the animal side, most EU countries have data on total antimicrobial sales, with breakdowns by pharmaceutical form and antimicrobial type. However, only countries like Sweden, Denmark and the Netherlands have been recording AMU at species level (e.g., pig, chicken, dairy) for a long time and have achieved significant AMU reductions. The availability of AMU figures at species level is key to monitoring reductions, and will become an EU requirement and an important commercial barrier in the near future. Thus, many countries are now starting data collection systems to have databases for the different species and production systems (Figure 1).

Data collection in Ireland

The pig and poultry sectors are the main users of antimicrobials because of in-feed use to prevent disease. Chicken farmers have done an exceptional job in reducing AMU and now they are producing with low or no antimicrobials in many cases. This is the case in Ireland, where chicken production is probably one of the lowest users. The Irish pig sector also reacted early with the first

national database on AMU in 2019. The first AMU data collection in pigs was done by Teagasc/UCD (AMURAP DAFM ref: 15S676) in 2016, as part of the first iNAP (Irish National Action Plan on AMR), and included one-third of the Irish pig herd. This data showed that the pig industry is responsible for most of the in-feed use of antimicrobials as premix, accounting for 30-35 % of total antimicrobial sales. However, it also showed that the pig industry was not responsible for the use of those antimicrobials classified as oral remedies. Altogether, pigs and poultry are responsible for around 40-45 % of the AMU in animals in Ireland including injectables, premix and oral remedies. The question now, is: who is responsible for the rest?

Intramammary use is probably an easy one to guess, as it is only used in dairy cattle. However, it accounts for less than 3 % of total sales (Figure 2). Then there is a significant portion of the oral (38 %) and injectable (28 %) remedies to be assigned. Small animals and horses are important users of injectables, although they probably do not account for the whole amount. The rest of injectables and the oral remedies are expected to be used mainly for cattle and sheep. It is especially important for public health and commercial reasons to know where these antimicrobials are being used (i.e., dairy, beef, sheep) and what the main causes of use are (e.g., mastitis, lameness, respiratory infections).

Critically important antimicrobials

Other than the total amount of AMU, it is important to consider the use of critically important antimicrobials (CIAs). These are antimicrobials that are used in both humans and animals but that are of special importance to treat human infections as a last resort. In other words, if bacteria develop resistance to these antimicrobials, we will have no treatment left for these bacteria and any infection

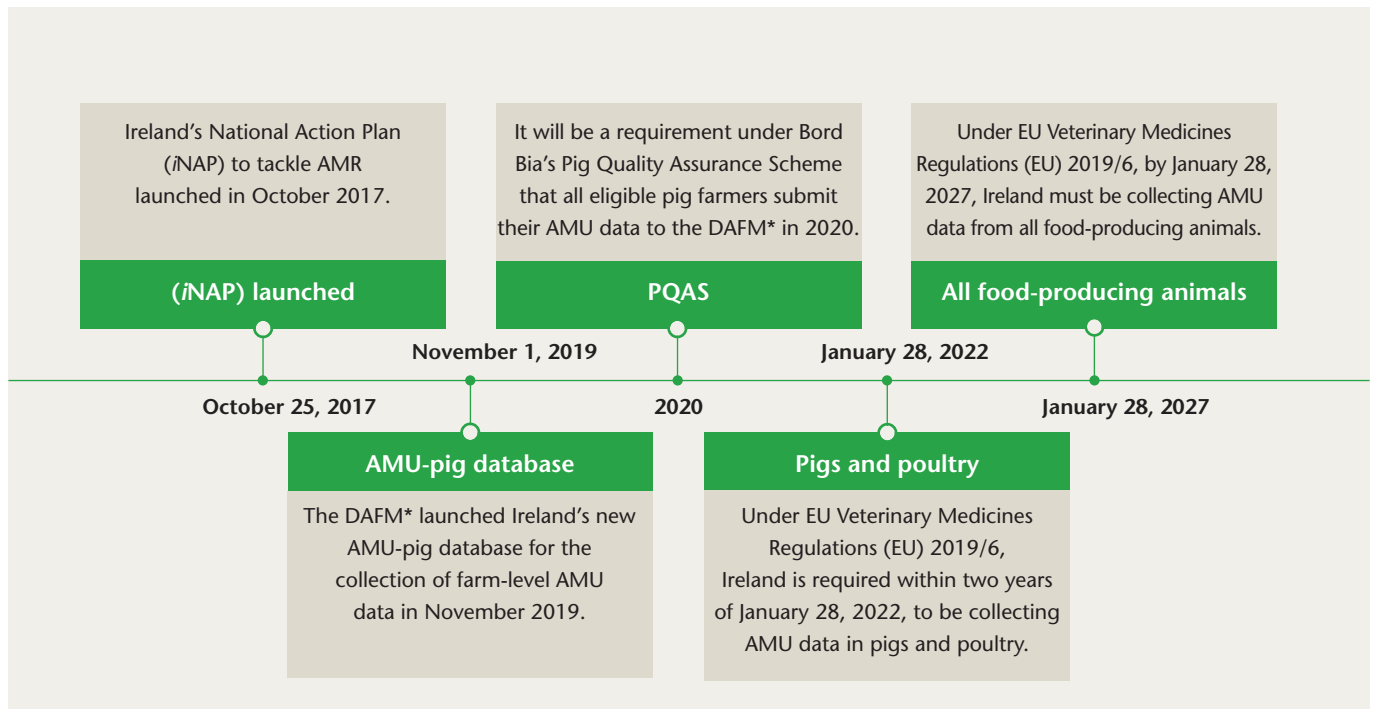


FIGURE 1: Timeline of the main actions taken in Ireland to promote prudent use of antimicrobials. *Department of Agriculture, Food and the Marine.

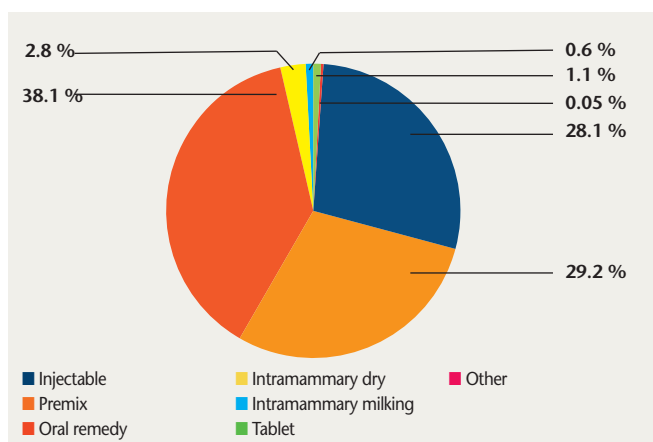


FIGURE 2: Pharmaceutical form breakdown of veterinary antibiotics sold in 2018 in Ireland.

could be fatal. Thus, they should be used as little as possible in animals. The use of these CIAs is low in pigs and poultry in Ireland. In the case of ruminants, some antimicrobials of importance for humans are still in use, such as cephalosporins for mastitis treatment and fluoroquinolones for respiratory infections in calves. However, new EU regulations will place restrictions on the use of CIAs in animals, to ensure that they are only used when no alternative treatment is available, to preserve them for use in human medicine. Under the Farm to Fork Strategy, a key component of the European Green Deal, the European Commission (EC) has committed to taking action to reduce overall EU sales of antimicrobials for farmed animals and in aquaculture by 50 % by 2030. Monitoring AMU at species level will be important for Ireland, to account for the antimicrobials sold and allow for the main areas of use to be identified. Once we

are aware of how the antimicrobials are being used, targeted reduction strategies can be put in place to ensure that Ireland is on track with the EC to reduce antimicrobial sales and the threat of AMR.

Further reading

Martin, H., *et al.* (2020). 'Current antimicrobial use in farm animals in the Republic of Ireland'. *Irish Veterinary Journal*, 73 (11). Available from: <https://irishvetjournal.biomedcentral.com/articles/10.1186/s13620-020-00165-z>.

Authors

Edgar Garcia Manzanilla

Head of Pig Development Department, Teagasc, Moorepark, Fermoy, Co. Cork
Correspondence: edgar.garciamanzanilla@teagasc.ie

Hannah Martin

School of Veterinary Medicine, University College Dublin

Conor McAloon

School of Veterinary Medicine, University College Dublin

