

Decision making for antibiotic use

Fergus Allerton, Koen Pouwels and John Buckell detail the use of discrete choice experiments for working out inferiority margins to guide antibiotic use decisions.

The One Health dangers from antimicrobial resistance (AMR) have been repeatedly highlighted in *Companion* amid calls for greater veterinary engagement with a wide variety of stewardship initiatives. Antibiotic over-prescribing is common in both human and veterinary medicine potentially driving antibiotic resistance without any benefit for the patient. The BSAVA/SAMSoc PROTECT ME poster (version 3 published with the December 2022 edition of *Companion*) was developed to try to guide prescribers to optimize their antimicrobial use. The recommendations within these guidelines are derived from the limited evidence available in the literature and consensus statements.

Robust clinical research is urgently required to provide support for this guidance. Ideally, randomized-controlled trials (the pinnacle of the evidence pyramid) should be pursued to establish the need (or lack thereof) for antibiotics in situations that are frequently encountered in veterinary practice (e.g., pets with acute diarrhoea or vomiting, prophylactic antibiotic use around surgical procedures) and to determine the optimal duration of antibiotic use (e.g., for sporadic cystitis). A potentially important route to reducing antibiotic use could be by shortening antibiotic course duration but any recommendation to do this must take into account any anticipated detrimental effects (e.g., under treatment, increased recurrence of infection).

In any study evaluating the impact of management with and without a treatment or with different treatment durations, a difference in outcome may be seen; however, when does a difference in outcome actually matter and justify the proposed treatment? These differences are called non-inferiority margins and these help to assess whether and how treatment can be safely reduced. Until now, decisions about non-inferiority margins have been made by a small group of experts designing the trials, which is a pragmatic but suboptimal solution. It would be preferred to involve the end users when choosing the non-inferiority margin since ultimately it is their opinion that matters!

Instead of directly asking survey participants about their preferred non-inferiority margin, there is a large body of evidence that shows that discrete choice experiments (DCEs) better approximate true

preferences of respondents. Using DCEs we can estimate acceptable non-inferiority margins as well as the relative importance of (modifiable) facilitators and barriers of choice that are in line with best antibiotic stewardship. By running these DCEs in multiple countries we hope to identify the preferences of small animal veterinarians across the world. We use multiple DCEs in one survey to maximize the information gained from one study.

What is a DCE?

Discrete choice experiments (DCEs) are a research method for investigating the potential effects of policies prior to their implementation. Based on consumer choice theory, DCEs can be used to evaluate consumers' stated preference for goods or services, for example a tobacco product, as a function of a set of different attributes. E-cigarette attributes might include flavours, nicotine concentrations, device characteristics, and warning labels. Using an experimental design, consumers are asked to choose between two or more products, with the levels of the different attributes varying across several choice trials (Figure 1). How different levels of the attributes affect the choices is then analysed to determine preferences. This information can then be used to estimate the effects of different policies on tobacco product choices, such as banning menthol from all tobacco products versus only from cigarettes.

DCE methods have been used to examine features of tobacco products that may not yet exist or for which inadequate data are available from surveys.

Similarly, the resulting preference data can be used to estimate the effects of policies that have yet to be implemented. It is also possible to examine preferences for different attributes by subgroups, such as youths or older adults, and/or those who currently use a product and those who do not, to anticipate the potential effects of regulatory policies on these subgroups.

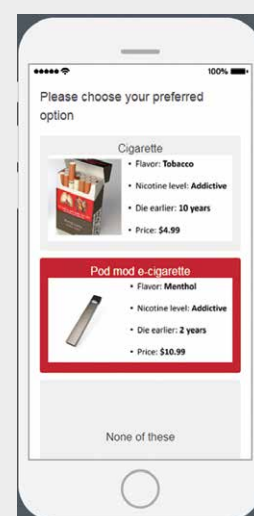


FIGURE 1: Example choice scenario (smartphone version).

Readers are invited to help with a DCE that is integral to the study: Estimating acceptable Non-Inferiority margins for antibiotic stewardship interventions using discrete Choice exPERimenTS (NIFTY PETS). The survey is open to small animal veterinary practitioners working anywhere in the world with translations available for several languages already (Portuguese and Spanish) with more to come. The survey should take less than 5–10 minutes to complete and your answers will help researchers to interpret their results and guideline developers to make recommendations that are acceptable to vets in practice (and thus hopefully adhered to!).

Follow the QR code to access the DCE.

Your input is greatly appreciated. Please also share the link with your colleagues, in the UK and abroad.

The more responses obtained, the greater the confidence in the study findings. This is your chance to dictate what you consider an acceptable cost to not using antibiotics.



(L-R) Fergus Allerton, Companion Editor. Koen Pouwels, Senior Researcher in Health Economics at the University of Oxford. John Buckell, Senior Researcher, University of Oxford. John uses experimental and econometric approaches to answer research questions.

Join the November Antibiotic Amnesty

It's not too late to take part in the November 2023 veterinary Antibiotic Amnesty – sign your practice up to this important initiative to protect the efficacy of antibiotics and prevent environmental pollution.

This November, for the second year running, the veterinary sector is coming together to run the Antibiotic Amnesty campaign which encourages the public to return out-of-date and unused antibiotics to help tackle the growing issue of antimicrobial resistance (AMR).

Following the success of the first ever veterinary Antibiotic Amnesty last year (2022) the collaborative campaign across the veterinary profession is returning and practices are actively being encouraged to take part and contribute to this important initiative.

The campaign is designed to encourage members of the public to bring back unused or unwanted antibiotics to their vet practice for safe disposal. The amnesty is led by a collaboration of UK veterinary organizations, practices and charities to educate owners about AMR and raise awareness of the importance of the safe use and disposal of these important medicines in order to address AMR and prevent environmental pollution.

Companion Editor, Fergus Allerton, a vet working in the Midlands, helps coordinate the veterinary Antibiotic Amnesty: "We want unused antibiotics to be disposed of safely. Studies show that leftover antibiotics are rarely returned to pharmacies or vets and are more commonly disposed of in household waste or down sinks and toilets. This could potentially contribute to AMR and have a negative impact on water quality, aquatic life and wildlife. Last year's pilot amnesty campaign was a great success, and this year we want even more practices taking part.

Working together, the veterinary community can help recover unused and out-of-date antibiotics from

pet owners right across the country. The amnesty is an opportunity for all members of the veterinary team to raise awareness about antibiotic stewardship in general and contribute positively to the fight against AMR."

Ian Ramsey, Professor of Small Animal Medicine at the University of Glasgow and a past president of BSAVA who is also working alongside Fergus on the campaign says: "The Antibiotic Amnesty helps raise awareness of AMR with clients and will allow appropriate disposal and therefore help limit environmental pollution. It is also a great way for the profession to demonstrate its commitment to antimicrobial stewardship."

Since June 2023 it is a regulatory requirement for all practices to actively take back medicines under the RCVS Practice Standards Scheme at veterinary general practitioner level. "But", says Fergus, "...returning unused antibiotics doesn't have to just wait for November's campaign: "If owners have unused antibiotics at any time of the year, then the next time they visit their vet practice it's fine to return the packets – and this is exactly what we would encourage pet owners to do."



Campaign toolkit

A campaign toolkit has been developed for practices and comprises a range of promotional support assets including reception posters, pre-written social media posts, newsletter content, practice guidance documents, client hand-outs, animations for use on practice screens and social media, plus more. The campaign information and toolkit can be accessed via:

www.rumacae.org.uk/vet-antibioticamnesty/

<https://knowledge.rcvs.org.uk/amr/antibiotic-amnesty/>

Practices can also sign up to receive regular email updates about the campaign via: www.rumacae.org.uk/vet-antibioticamnesty/