The Economics Of Animal Health

The world economic crisis has highlighted a need to reassess public resource allocation for animal health services, and to question the balance of cost-sharing with the private sector. Added to this general economic context, animal diseases are emerging with increasing frequency (BSE, influenza viruses, blue tongue, Schmallenberg virus) and several known diseases have re-emerged.. Therefore animal health professionals need to have an understanding of the application of economics to animal health, and the current economic crisis makes the need for these skills all the more urgent. In fact, the need for economic skills in animal health has never been greater. Economics can add value to disease impact assessments, assisting understanding of people's incentives to participate in animal health measures, and refining resource allocation of public and private animal health budgets. In general, the best use of economics will improve decision-making on animal health at a number of levels.

Economics applied to animal health is a relatively young field in relation to other fields of study (Howe and Christiansen, 2004; Rushton *et al*., 2007). It is concerned with "making rational choices and decisions in the allocation of scarce resources for the achievement of competing goals", thereby providing the greatest benefit to society (Morris, 1999; Rushton, 2009). The need for economic skills in animal health appears to have never been greater. In the international livestock industry indeed, there is an increasing demand for disease impact assessments and improvements in the allocation of resources for disease surveillance and control for which economics can add value. Discussions are intensified on who should bear the costs of animal health (and disease), and cost-sharing frameworks, which require economic expertise, are being developed to redistribute the financial burden of disease (Rich and Perry, 2011; Schwabenbauer, 2012). Moreover, emergence and re-emergence of animal diseases is strongly related to people's behaviour, and an understanding of incentives through the use of economics allows more refined approaches to disease management. After all, farming is a human activity that interacts with numerous biological systems and therefore provides an ideal platform for social science to aid in addressing problems in natural science.

Are 'Economics of Animal Health' and 'Economics for the Veterinary Practice' Different?

There are interesting discussions about the divergent nature of animal health economics and the economics of veterinary practice. We offer an alternative view to the bilateral relationship that is often proposed. First, animal health economics and the economics of veterinary practice fall under the same umbrella and second, that economics is a small, but essential, part of understanding the veterinary practice as a business.

Are the questions not the same when looking at an outbreak of avian influenza in a poultry flock or diagnosing a case of canine parvovirus? What are the economic consequences of a disease, what is the value of diagnosis, of treatment or of prevention? Aside from the different emotional attachment to a companion animal, this is nothing more than a matter of scale: 3000 turkeys or one greyhound. I think decisions are different, but the decision "problem" /"question", etc are the same.

In terms of veterinary practice economics, running a veterinary practice goes far beyond mere economics and finance. There is concern that there is an over-simplification of the softer needs of the veterinary business as it is not an inanimate object; it is a living, breathing, changing entity that is highly responsive to attitudes and decisions of its stakeholders. To add complexity to the argument, these stakeholders (be they owners, staff, clients, suppliers or government regulators) have increasing demands which this entity must a) be cognisant of and b) be capable of providing a response to. For example, staff may want new facilities such as a new lunch room or gymnasium or perhaps a different roster system, clients may be demanding new communications strategies (e.g. on-line booking, tweets, text reminders of consultations), owners may see the need for new high-cost equipment, government regulators may demand higher animal welfare or food safety standards than ever before or higher business tax rates. Thus, veterinary practitioners are in the challenging position of having a dual role, namely being a civil servant operating under government regulations to promote animal health and welfare, while at the same time providing a service to clients with varied needs and demands. There are human resources (including leadership) to consider, the psychology of the vet-patient-client competing values triad, the marketing of the veterinary practice, the financial management of the veterinary practice and, above all, the business strategy of the practice which paves the way for the business' future direction (need we use the cliché of the cargo ship setting sail into uncharted waters?). This is all about the allocation of scarce resources, but it is infinitely more complicated than book-keeping and investment analysis.

To ensure that animal health professionals are adequately equipped with knowledge on addressing economic and business issues within their industry, the NEAT project ("Networking to enhance the use of Economics in Animal Health Education, Research and Policy Making in Europe and beyond") was developed (http://www.neat-network.eu/). Funded by the the EU's Lifelong Learning Programme, it aims at developing and strengthening educational materials and delivery methods to animal health professionals at undergraduate university level and beyond. It is a community of animal health economists or professionals with a particular interest in the field; all 60 partners (mainly from European countries) of the project have strong links through training, research and consultancies to the animal health services and livestock sectors of member states. The project runs 2012-2015 and will also disseminate key knowledge of animal health economics and business to a wide range of animal health professionals.

The Major Questions for Animal Health Economics and Production

Based on their experiences with trans-boundary, food-borne and endemic diseases, Rushton *et al*. (2007) identified several avenues of enquiry that are necessary for the future development of a robust animal health industry. In brief, these questions are:

- How can one guarantee not just reasonably priced livestock products (food security), but also food that has low or almost no risk in terms of spreading disease (food safety) and from farming and processing systems that guarantee that animals are treated humanely (animal welfare)?
- What is the optimal level of resource allocation to the detection and prevention of exotic and emerging diseases?
- Is there a justification to allocate public resources for campaigns to control and eradicate endemic diseases?
- What methodologies can improve the implementation of animal disease control programmes that are assessed to be nationally economically profitable?
- In an animal health system, what roles should the public veterinary services and the private sector play to improve the welfare benefits from animal disease control investments?
- At the international level, where do responsibilities lie for the control of trans-boundary disease? This is particularly relevant for countries that are poor and have the potential to export livestock products, but have difficulties in achieving OIE/WHO regulations to enter into attractive export markets.

In an effort to address some of these questions, knowledge is being created by consortia of researchers in groups like the LCIRAH project (Leverhulme Centre for Integrative Research on Agriculture and Health, see: http://www.lcirah.ac.uk/) which aims to better address complex global issues surrounding the need to feed nine billion people healthily by 2050, by bringing together agri-health researchers from various disciplines (e.g. economics, epidemiology, nutrition science, veterinary science, anthropology, etc.). Further to this, the Network for the Evaluation of One Health (NEOH) Action (http://www.cost.eu/domains_actions/TDP/Actions/TD1404) aims to enable future quantitative evaluations of "One Health" activities. The "One Health" concept addresses complex challenges affecting human health and wellbeing, such as malnutrition, emerging and endemic zoonotic diseases, antimicrobial resistance and climate change through the integration of relevant sciences at systems level. The network plans to develop a science-based evaluation protocol for One Health activities and to coordinate and compare evaluations of existing One Health initiatives at the international level in a networked community of experts.

The Direction of Animal Health Economics Enquiry

An historical overview of animal health economics thinking reveals the major theoretical work by John McInerney, Clem Tisdell and David Leonard. There were also practical applications of economics to animal health by a number of authors including Richard Bennett and Tim Carpenter; and at the International Livestock Research Institute, Kenya. More recently there has been work by the Pro-Poor Livestock Policy Initiative at the Food and Agriculture Organisation of the United Nations (FAO).

With regard to the future, more work has been requested in the area of value chain analysis to reflect the increasing complexity of livestock value chains and the influence of these complex chains on animal health risks within society. New institutional economics was also highlighted as the basis of a more flexible and all-encompassing approach than other theoretical frameworks to understanding the motivations of people living and working in these chains. The responses from the research funders and major research centres has so far been encouraging, such as the EU-funded COMPETE project (http://www.iamo.de/compete/home.html); more work is being funded by the British Research Councils on livestock value chains and on understanding how people involved in these systems behave.

The challenge is how such research is to be used in decision-making from farm to policy-making. With this in mind, an international seminar was held in London in December 2010 (http://www.rvc.ac.uk/Meetings/AHE/Objectives.cfm) supported by Royal Veterinary College, Defra and FAO to discuss how economics can add value to animal health decision-making. One outcome of the meeting was a decision to better disseminate knowledge on the use of economics in animal health, with the aim of making it more of a talking point amongst animal health professionals (with particular emphasis on decision-makers and economists).

The animal health industry covers a range of important areas that constantly challenge us in decision-making processes. Richard Bennett (Reading University) clearly states the case for public intervention to improve resource allocation in animal disease management. Leading thinkers have conducted research on the various aspects of animal health economics. For example, Tim Carpenter (Massey University) and Karl Rich (Norwegian Institute of International Affairs) provide an explanation of risk; Jesus Anton (Organisation for Economic Co-operation and Development) has overviewed the use of compensation in animal disease control and Bob Burden (Serecon Management Consulting) has suggested practical means of designing and implementing compensation with mixed models of funding. An area of increasing importance is the economics of animal disease surveillance, which focuses on the elimination of contagious pathogens from livestock populations kept in expensive facilities. Barbara Häsler (Royal Veterinary College), Keith Howe (Exeter University and Royal Veterinary College) and Katharina Stärk (Safoso and Royal Veterinary College) have attempted to address this issue by proposing a theoretical framework to approach resource allocation decisions for surveillance. In terms of the evaluation of animal health programmes Jonathan Rushton (Royal Veterinary College) *et al*. have examined available methods with examples of their application in The Netherlands and France. Ian Mitchell *et al*. (from Defra) have worked to understand how economics can be used in a policy-making

environment. Karin Schwabenbauer (Federal Ministry of Food, Agriculture and Consumer Protection, Germany) and Michael Seals (Chairman of the Animal Health and Welfare Board for England) have considered the importance of economics in decision-making through the perspective of a chief veterinary officer and farmers involved in government policy-making, respectively.

Despite this extensive research work on animal health economics, there is still further enquiry needed. Research questions still remain on how to measure animal disease impacts and the quality of existing data to prioritise disease management. Is there sufficient analysis of how control methods are selected for epidemic and endemic diseases? To answer these and other key questions requires economists to work alongside animal health specialists, statisticians, sociologists and psychologists and the people involved in the decision-making from farm through to policy levels. Even though the call for interdisciplinary integration is nothing new, it is difficult to implement due to training, thinking and working in uni-disciplinary environments that are often separated physically or administratively. Heady (1952) advocated inter-disciplinary research by observing that "agricultural production economics must necessarily be integrated with that of other physical and social sciences". Putt *et al*. (1988) stated that disease control policy needs an "inter-disciplinary approach involving the close and continuous cooperation of the various disciplines concerned". Perry and Randolph (2004) made a case for a more standardised approach to integrated economic and epidemiological modelling. Interdisciplinary work does not only require an understanding of the basic concepts and terminology of the other discipline(s), but also a willingness to share, exchange and collaborate. This process can be promoted by providing relevant basic training at undergraduate and postgraduate level (as for example done in the NEAT project), awareness-raising in the different professions, networking, the establishment of mentoring schemes, and – particularly at the academic level – the creation of appropriate reward and support structures.

To truly add value with economics it is suggested that the aim is for a better balance between how research is conducted and how it is translated into the policy-making environment.

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