



Institute
and Faculty
of Actuaries

Antimicrobial resistance inquiry

IFoA response to Health and Social Care
Committee

29 June 2018

About the Institute and Faculty of Actuaries

The Institute and Faculty of Actuaries is the chartered professional body for actuaries in the United Kingdom. A rigorous examination system is supported by a programme of continuous professional development and a professional code of conduct supports high standards, reflecting the significant role of the Profession in society.

Actuaries' training is founded on mathematical and statistical techniques used in insurance, pension fund management and investment and then builds the management skills associated with the application of these techniques. The training includes the derivation and application of 'mortality tables' used to assess probabilities of death or survival. It also includes the financial mathematics of interest and risk associated with different investment vehicles – from simple deposits through to complex stock market derivatives.

Actuaries provide commercial, financial and prudential advice on the management of a business' assets and liabilities, especially where long term management and planning are critical to the success of any business venture. A majority of actuaries work for insurance companies or pension funds – either as their direct employees or in firms which undertake work on a consultancy basis – but they also advise individuals and offer comment on social and public interest issues. Members of the profession have a statutory role in the supervision of pension funds and life insurance companies as well as a statutory role to provide actuarial opinions for managing agents at Lloyd's.



Health and Social Care Committee
House of Commons
London
SW1A 0AA

29 June 2018

Dear Dr Wollaston

Institute and Faculty of Actuaries' response to Antimicrobial resistance inquiry

1. The Institute and Faculty of Actuaries (IFoA) welcomes the Committee's inquiry into antimicrobial resistance (AMR). The IFoA recognises the clear threat to society that AMR represents, and its potential to adversely affect the health prospects for current and future generations.
2. AMR impacts the actuarial field primarily through its effect on models of mortality and morbidity. As an example an increase in AMR could affect the amount of capital a pension scheme or life insurance company is required to hold in order to meet its future obligations. These institutions form a core element of the UK's financial economy and have the potential to impact wider society, especially given that the cohorts of the UK population in receipt of these products are expected to reach a peak within the next 20 years. An emerging trend such as AMR could mean that capital is used inefficiently in reserving for the expected cost of these products, creating a significant cost to the economy.
3. The IFoA's Antibiotic Resistance Working Party have been involved in drafting this response. The working party studies the rise of AMR and how it has become an increasing concern to the medical professions, health services and governments of the world's major economies. The working party is developing a simple modelling framework to allow actuaries to develop their own views on the likely impact of AMR on mortality and morbidity, developed in a UK context but would be expected to be readily transferable to other countries.
4. The resulting model should enable an improved framework informing this emerging trend, complementing existing actuarial models. However, the model could have wider usage outside the pensions and insurance industry, such as:
 - a. Analysis of the impact to the wider economy through lost productivity e.g. owing to absence from work from prolonged treatment of infections or unavailable surgical procedures that would require anti-biotics.
 - b. Resource planning for the NHS, supplementing existing population projections and stresses on the NHS. As an example, AMR could have a variable impact to the NHS by reducing hospital stays through increased mortality, whilst at the same time

increasing critical care cost / resource requirements due to the increased severity of infections.

5. The UK AMR 2013-2018 strategy cites “*better access to and use of surveillance data in human and animal sectors through new arrangements that facilitate greater consistency and standardisation of the data collected across the system and encourage improved data linkage*” as a key area of focus. To this point, our working party have experienced a number of barriers to conducting the aforementioned project which we believe would add to the existing evidence base on the issue of AMR.
6. In particular, they have struggled to obtain detailed and accurate data on fatality and recovery rates due to resistant infections and where data does exist, it is biased to reflect only the most severe cases. Access to more useful data would significantly improve the accuracy of the working party’s modelling, and potentially enable it to be expanded for wider use outlined in section (4).
7. To date, the working party has developed an extrapolation approach to varying resistance over time and applied this to a multi-state model, projecting the change in mortality and morbidity over time. The initial modelling exercise focused on E.coli with data obtained from the Public Health England dataset. Data is derived from the ONS, Public Health England and the EARS network. Where there are missing data points, the working party have used academic papers to produce an estimate. Existing modelling work published in the medical literature uses a variety of methods with some also utilising a multi-state model to simulate the economic or healthcare burden of AMR.
8. Limitations on the type of data available means that there are some issues and challenges with the current model output, and future modelling exercises. As such, an improved data set would be extremely valuable in refining the current parameters and further developing the model, for example, data to differentiate death rates for resistant and non-resistant strains.
9. We believe that a collaborative approach could help to improve the accuracy of the modelling achievable by us and others. Improved data would enable the working party to develop functionality beyond those required for the actuarial field through sharing of data which the working party have hitherto found elusive. This includes accurate infection and mortality rates from resistant pathogens and recovery from resistant infections, split by gender and age.
10. The working party plan to further develop the model looking at five other pathogens with a view to a full model release in February 2019. The model will provide an indication as to which of the main pathogens identified by the World Health Organisation are more critical in a UK context to changes in mortality and morbidity. This could be of assistance in determining the priority order for mitigating AMR in the UK. We would be happy to share this with the Committee upon completion.

Should you wish to discuss any of the points raised in further detail please contact Catherine Burtle, Senior Policy Analyst (catherine.burtle@actuaries.org.uk / 0207 632 1471) in the first instance.

Yours sincerely,



Marjorie Ngwenya
Immediate Past President, Institute and Faculty of Actuaries