The following key points emerged from the survey: firstly, the most commonly used key messages revolved around the misuse or overuse of antibiotics causing resistance and making them ineffective; other messages highlighted the role of hand hygiene and the fact that antibiotics do not work against common respiratory illnesses. In addition, most campaigns (80%) targeted the general public and health professionals simultaneously and the lack of human and financial resources and political support were cited as the most commonly encountered challenges to achieving clinical or public health impact. The evaluation of the impact of these campaigns was suboptimal, with no formal evaluation in 60%, and the effectiveness of different messages was not assessed.

It is difficult to compare campaigns across countries as they are often complex and associated with increased knowledge. They may aim to reduce antibiotic use by supporting prescribers in using antibiotics less frequently, reducing the demand for antibiotics from the public and preventing self-medication or sharing antibiotics within households or amongst friends (Filippini et al. 2013).

The O’Neill review recommended a global campaign. However, evidence from this survey and literature review suggested that the same message may not have the same impact when translated into other languages, may be misunderstood or equally may not target the key misinformation or lack of knowledge in different countries.

The international efforts in the current landscape frequently focus on improving the knowledge of the public and health professionals about AMR. While the intended effect of these campaigns has not necessarily been to change prescribing behaviour among health professionals, many have aimed to create a supportive...
climate such that clinicians are capable of prescribing antibiotics only when needed.

There are two international campaigns in progress at the moment. The longest running is the European Centre for Disease Prevention and Control (ECDC)-led European Antibiotic Awareness Day (EAAD) which has been run annually since 18 November 2008 and, by 2013, 43 countries across Europe were participating (Earnshaw et al. 2014). While it is difficult to measure the impact of EAAD, antibiotic use has been reported to have reduced from 42% to 34% across Europe from 2009 to 2015 (European Commission 2010; European Commission 2016). The first truly global campaign was developed by the WHO in 2015 with World Antibiotic Awareness Week.

Both campaigns develop resources for national use, particularly posters and social media messages, and often release annual AMR-related reports to coincide with the relevant dates to enable media and press reports. Both campaigns also require countries to engage in translating, further developing, printing and sharing the resources across their public health and healthcare services. However, they do not particularly focus on or target the general
population unless each individual country dedicates resources to deliver this within their own country.

A fundamental change will require public health efforts to move from static posters and information-based campaigns to dynamic social change movements. This should start at a young age to involve families and communities; for example, e-bug (http://www.e-bug.eu), a PHE-led collaboration in 28 countries, aims to raise awareness of AMR by providing free online games and teaching resources about microbes and antibiotics for children and young people. In October 2017, PHE also launched a national multimedia awareness campaign, Keep Antibiotics Working. Campaign messaging was well received across the media outputs: TV, radio, billboards, press, social media (over 10 million views of the main video, http://antibioticguardian.com/keep-antibiotics-working). Pre- and post-survey tracking demonstrated a positive impact on intended behaviour, with 78% of the public stating that they would be unlikely to ask their doctor for antibiotics (up by 5% from pre-campaign) (personal communication, PHE marketing team). General practitioners reported feeling supported by the campaign in their clinical decision-making related to antibiotic prescriptions.

Initiatives for the future: changing behaviour

As for most health-related behaviours, the gap between raising knowledge and awareness of AMR and changing the public and prescriber behaviour around the use of antimicrobial agents remains a challenge. In the hope of transitioning from awareness to engagement, using an online pledge-based approach among human and animal health professionals, scientists and educators, and the public, PHE launched the Antibiotic Guardian campaign in 2014 (Ashiru-Oredope and Hopkins 2015). Since the start of the campaign (2014) up to 31 December 2017, the website had been visited 470,968 times. This translated into 57,627 pledges from 129 countries. Antibiotic Guardians had pledged from 50% of countries worldwide. An impact evaluation carried out after the first year of the campaign highlighted that those who chose pledges on the website and became Antibiotic Guardians had increased knowledge and behaviour change (self-reported), as well as increased commitment to tackle AMR (Chaintarlí et al. 2016).

Cultural aspects associated with antibiotic use are important factors in explaining cross-national differences in antibiotic prescribing (Deschepper et al. 2008). This information could be used to tailor key campaign messages to the local and regional culture for greatest impact. Indeed, a truly global and effective antimicrobial awareness campaign would spread information that would resonate well culturally in each country. This is highlighted by a recent UK study; Roope et al. (2018) explored the impact of AMR knowledge on doctor consultations for antibiotics and requests for antibiotics when ill with an influenza-like illness, using a risk preference survey. This highlighted that when confronted with this scenario those with poor AMR awareness were more likely to have health-seeking behaviour and ask for antibiotics more rather than less often. Psychologists and medical sociologists seldom participate in the design or implementation of awareness campaigns, but their expertise is suggested both by the Roope study and others as necessary in order to achieve a sustainable change in behaviour (McNulty et al. 2010).

Recommendations

There has been considerable progress in raising the global awareness of AMR as a public health threat since the publication of the O’Neill review in 2016. However, for a global campaign to be effective, more focus is needed on interacting with the public through multimodal media, adapting focused messages for each country and using culture-specific behavioural change approaches.

Key components moving forward include using a One Health approach, where synergies exist, to disseminate information based on rigorous scientific evidence and coordinating multifaceted professional and public initiatives in future campaigns.

Very frequently it is difficult to disentangle the components of a public-facing AMR campaign from education of human and animal health workers and the role of incentivization to reduce antibiotic prescribing by human and animal health clinicians. Future campaigns should look at the impact of all measures and try to determine estimates of the effect of each component on both increasing knowledge and awareness and changing behaviour of both the prescriber and patient.

The O’Neill review recommended a global AMR awareness campaign. This has been partially realized through the WHO World Antibiotic Awareness Week and global public policy initiatives from the UN General Assembly and G20. This momentum will need each country to engage wholeheartedly, defining their local knowledge, attitude and behaviour campaign requirements. Social and cultural determinants for each country will also need to be considered alongside healthcare delivery in order to ensure that we keep antibiotics working for future generations.
REFERENCES


