

BSAC Vanguard Series: The future of healthcare workers and antimicrobial stewardship—educate, innovate, or pay the price

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In delivering global healthcare, and in the context of antimicrobial resistance (AMR) and antimicrobial stewardship (AMS) where information and knowledge is rapidly evolving, it is universally accepted that education and training of the healthcare workforce underpins the implementation of AMS and the effective use of existing and new health care technologies, therapies and informatics. Despite this, resourcing healthcare workforce education and training is often seen as a low priority, particularly in the resource-limited settings where the burden of AMR is greatest and healthcare resources are the most stretched. Therefore, it is disappointing to observe that, when funding the multi-dimensional AMR and AMS response, specific funding earmarked to support the development and implementation of both traditional and, increasingly, innovative education (particularly in the form of digital learning) is insufficient or lacking. In this article, I propose several novel strategies for addressing this deficit and to steer us to learn from the significant developments and support for education during the COVID-19 pandemic. If we do not invest in both traditional and innovative forms of education, our ability to create a well-trained healthcare workforce to deliver high-quality care and treatment, with better patient outcomes against AMR, will evaporate—and we will likely pay a far higher price as a consequence.

Ambition versus limitation

The healthcare workforce of the 21st century transcends boundaries of institution, discipline, and nation. Education, therefore, must help individual practitioners succeed by providing knowledge and understanding of different cultures, languages, systems, and geographies. This view of the world accords with the results of a prominent global survey¹ in which 75% of CEOs said a skilled, educated and adaptable workforce should be a top priority for business and government. There remain, however, significant challenges to fulfilling this ambition.

Entrenched approaches to education, whether in academia, government, healthcare, or industry, tend to focus on knowledge production linked to intellectual property, patents, publications, conferences, and courses (including e-courses)—and less on outcomes such as changing practice at the bedside to improve the safety and quality of care. To make matters worse, the lack of experienced and well-trained healthcare workers (HCWs) across many regions has been aggravated by the COVID-19 pandemic.

In addition, the desire and ability to deliver basic continuous education at scale is a huge challenge, particularly in resource-limited settings. HCWs often operate in an environment where time and resources for education are scarce—or just not considered a priority by management. As such, it can be a challenge to send employees for training because of budget cuts and understaffing.

This, then, is often the context in which antimicrobial stewardship (AMS) education and training are delivered.

Transform the approach

To transform this approach, we must demonstrate how a skills-based education can help staff function in challenging conditions that demand strategic reasoning, insightfulness, effective communication, perseverance, and craftsmanship, to resolve complex problems.

This is where e-learning is already playing an important role. Not only does it help institutions of all sizes save time and money, it also provides a continuous source of education that maintains learners' motivation through a range of interactive mixed media that can be paused and continued later or repeated until the participant has grasped the essentials.

Emerging evidence also suggests e-learning, when combined with face-to-face education (blended learning), leads to participants making faster progress than they would through traditional instructor-based methods alone. In some cases, this is translating into improved behaviours and outcomes.²

One of the biggest barriers to combating antimicrobial resistance (AMR) is the failure to implement effective interventions. This is particularly true for AMS programmes, regardless of healthcare setting. Inadequate provision is often the result of a fractured relationship between context, available resource, social influence, professional identity, motivation, and behaviour.³

AMS education and training underpin the effective implementation of critical interventions (such as the use of new or existing

vaccines, antimicrobials, diagnostics, or informatics)—which is why they are deemed core components of AMS checklists at local and national level,⁴ and why they are included in the WHO curricula⁵ and competency frameworks⁶ for HCWs.

In 2018, a global mapping exercise⁷ concluded there are many organizations working to develop and share open access educational resources, with governments, hospitals, and professional societies appearing to lead the way. However, these programmes were unequally distributed across countries and regions, with many more in North America and Europe than in Africa or Asia.

Opportunities for action

The survey also identified several opportunities for action including increased engagement with students, improvements to pre-service education, recognition of AMR courses as part of continuing medical education, the need for more context-specific resources, and better platforms for online sharing.

Indeed, acknowledgement of the latter can be seen in the recent call from Wernli and colleagues⁸ for the creation of an open access online learning platform for ‘One Health’ AMR, which would prove useful to a range of stakeholders, including HCWs, public health practitioners, policymakers, industry representatives, and consumer groups.

Several platforms are emerging (see the British Society for Antimicrobial Chemotherapy’s Infection Learning Hub,⁹ the work of the Fleming Fund,¹⁰ and WHO’s collection of resource materials¹¹), but all need further development to embrace global resources, the broader AMR agenda, and multi-functionality.

Proof of this uneven development begs the question: why is there such a gap between intent and action? One reason is that those tasked with the delivery of education and training have not been given adequate funds from the government departments responsible for executing national action plans. Competing priorities for limited resources make funding of educational activity a low priority.

Instead, it is left to enthusiastic individuals or groups to pursue their own specific training needs and, where appropriate, to share these outputs with others. Those in the private sector may have better access industry-sponsored education. While many such activities are well-intended, and governed appropriately to exclude commercial bias, the quality of content and delivery is variable.

As such, the bigger question is left hanging: how can all stakeholders in this space collaborate to create, disseminate, monitor, evaluate, and sustain global learning that is context-specific and cost-effective? A new approach to funding education is essential if we are to put the very latest medico-scientific advances on AMR and AMS into clinical practice.¹²

For example, the money pumped into new infection therapies, surveillance, laboratory capacity, and rapid point-of-care diagnostics, continues to be substantial. This is exactly how it should be, but I would argue that a portion of these funds should be committed to supporting bespoke HCW education and, where appropriate, public/patient education and innovation surrounding its delivery (for example, through AI, gaming, and virtual classrooms). It stands to reason that if we fail to properly use these innovations in practice, our overall impact will be less.

Learning from COVID

The COVID-19 pandemic has shown us how innovative digital technology can complement traditional healthcare delivery, enhance practice outcomes, and provide a learner-centric and cost-effective method of knowledge exchange.¹³

It has also brought with it unprecedented investment, worldwide, on many fronts—as tracked by Devex.¹⁴ The analysis of who is prioritizing what in the response to COVID-19 is compelling—not least because education ranks as one of the top 10 funded focus areas.¹⁴

This approach is consistent with the fact that investment in HCWs, for example in sub-Saharan Africa, can result in an economic return of up to 10:1—due to increased productivity from a healthier population,¹⁵ potentially reducing the risk of epidemics and the economic impact of increased employment. Despite this clear return on investment, the funding responses to support the education of HCWs in AMR interventions remains opaque.

This is exemplified by an EU survey (2016) of public investment in AMR research. It found that €1.3 billion had been invested across 19 Joint Programming Initiative on Antimicrobial Resistance (JPIAMR) countries—with 63% of 1208 projects funded at national level on therapeutics, 15% on transmission, 11% on diagnostics, 4% on interventions, and 3% on environment and surveillance. Education research and implementation were not even mentioned.

Last year’s Wellcome Trust report, *The Global Response to AMR: Momentum, Success and Critical Gaps*,¹⁶ identified seven priority themes and nine enablers. Optimizing the use of medicines through behaviour change interventions was identified as a critical gap. However, funding to support the development and delivery of innovative education and behaviour change methods was not prioritized as an enabler.

Instead, funding streams to support well-established enablers continue to be prioritized—with a significant focus on the push for new technologies such as diagnostics, new therapies (antimicrobials and vaccines), surveillance and laboratory capacity, better governance, stronger leadership, and informatics.

Recommendations on policies and funding

All National Action Plans on AMR should mandate the provision of a budget for an education and training plan. This commitment could, and should, lead to many significant outputs and outcomes, including the development of national/regional training faculties (aided by a network of local faculties) that can support the spread of training, the creation/development of national resources, gateways to other local, regional, national and international open access e-learning resources, tools for evaluation, and the creation of national metrics on education provision at the level of local and national healthcare facilities.

Looking to the UK Government’s *Global AMR Innovation Fund*,¹⁷ we should either create a new ‘global fund’ or incorporate education into the remit of existing funds and seek contributions from a range of stakeholders involved in AMR.

Another model to consider adopting would be a more bespoke national or regional approach through public–private partnerships,¹⁸ which have become increasingly responsible for

delivering healthcare and education and training, often in low- and middle-income countries (LMICs) (see the interesting case study in Tanzania¹⁹ on the back of health sector reforms in the 1990s). There is also the possibility to crowdsource funds²⁰ for the development of open-access learning resources.

Another option, complementing the approaches above, would be for pharmaceutical companies to set up an education and implementation fund dedicated to HCWs in line with their approach to research into new therapies.

One might also argue, perhaps naively, that a proportion of funding allocated by industry to the marketing of a new technology or therapy could be levied to support education and training through contributions to the sort of global fund referred to above.

Invest now, or pay a much higher price later

Either way, we need a major shift in the current mindset on AMR/AMS education and its delivery—because, as it stands, it is treated as a low priority, not based on measurement of meaningful impact and left to stretched local healthcare facilities or individuals to do and deliver.

As Barack Obama said, ‘Cutting the deficit by gutting our investments in innovation and education is like lightening an overloaded airplane by removing its engine. It may make you feel like you’re flying high at first, but it won’t take long before you feel the impact.’

If we do not invest in traditional and innovative forms of education, our ability to create well-trained HCWs to deliver high-quality care and treatment, with better patient outcomes against AMR, will evaporate—and we will likely pay a far higher price as a consequence.

Transparency declarations

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