

Knowledge Translation is everybody's business

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Successful application of research outcomes into routine healthcare practice rarely occurs as an immediate result of their publication¹. A much-cited example is the 40-year delay in the British Navy's adoption of vitamin C for the prevention of scurvy, despite substantial evidence of benefit from the first ever controlled trial conducted by James Lind in the 1770s². The delayed adoption of research outcomes is often referred to as the evidence-practice gap³. Whilst science has moved on in the 200+ years since Lind's study, the gap still persists, contributing to inefficient use of resources and avoidable mortality and morbidity. The more recent 10-year delay in the adoption of prenatal corticosteroids to prevent preterm birth despite unequivocal but under-collated evidence, is estimated to have cost the lives of tens of thousands of babies⁴. Similar 'gaps' have been shown with the translation of basic science results into clinical practice^{5,6}.

The need to close the gap seen for outcome→practice has been recognised by research funders, educators and others, as evidenced by their promotion and support of knowledge translation activities "*to achieve the diffusion, dissemination, and application of knowledge*"⁷. Whilst the knowledge translation involved in outcome→practice events might seem less relevant to the basic science community, I would argue that it is everybody's business and that *all* scientists, basic or applied, have a responsibility to be aware of, and engage with, activities to achieve rapid societal benefit from their research.

This was not always my perspective. In my early years as an applied health scientist, I considered my role and responsibility to be more basic: undertake high quality, meaningful research and to disseminate it via academic routes. Job done! Yet, I could see that the uptake of my research, frustratingly, was limited. I learned, somewhat later in my career than I would have wished, that as an applied health scientist, to be effective, my role also involves planning and engaging in active knowledge translation. This includes working closely with organisations and individuals for whom my research is most relevant and whose adoption of my results is most likely to achieve (societal) impact i.e., *“the demonstrable contribution that research makes to society and the economy, of benefit to individuals, organisations, and nations”*⁸. Publication of results in scientific journals reflects academic impact and is only part of the societal impact journey.

These days, my starting point is to identify the *knowledge users* of my research; the individuals who can use these results to inform decision making around policy, practice, education, and further research. My knowledge users are typically distributed across the public, private, and third (voluntary or civil society) sectors including policy makers, healthcare practitioners, educators, health service contractors and commissioners, and patient organisations. For basic scientists involved in pharmaceuticals, biomaterials, and drug delivery, knowledge users will include other basic scientists, manufacturers, regulators, clinicians, (possibly) patients, as well as pharmaceutical and biotechnology companies. Indeed, the involvement of industry has been identified as a major driver for the translation of basic science results into products evaluated by randomised evaluations⁶. I endeavour to identify knowledge users in the very early stages of each project, ideally during the development of the funding application. In so

doing, these individuals and organisations help to shape study design and delivery, and perhaps more importantly, the translation of results into meaningful and accessible outputs.

Knowledge translation requires more than the mere dissemination of information at conferences or the publication of academic papers. Knowledge users' vocabulary, expertise, and remit is likely to differ substantially from scientists in academic institutions and participants at symposia⁹. 'Knowledge' needs to be tailored to engage users and to promote meaningful knowledge exchange: what are the results; why do they matter; how should they be used; what needs to change; what questions remain unanswered? Knowledge exchange combines *"the strengths of each interacting partner and find[s] effective ways of working together to create the evidence needed"*¹⁰. Scientists need to be educated in the art and the science of knowledge translation (KT). The inclusion of KT training into PhD programmes could generate early awareness of, and engagement with, this concept. The Molecular Medicine PhD Program at Case Western Reserve University¹¹, is an example where basic scientists and clinicians are brought together, with the purpose of facilitating translational research. This could help to better align research with actual need and more directly address the global burden of disease¹² rather than 'tinkering around the edges'.

I am both an applied health scientist and a registered pharmacist, and as such, I am a *boundary spanner*; I facilitate knowledge translation and exchange between the academic/scientific communities and healthcare professionals. This role involves *"reaching across borders, margins, or sections to build relationships, interconnections, and interdependencies in order to manage complex problems"*¹³. Many scientists have similar dual/multiple roles including academics with clinical responsibilities, or academic scientists

with pharmaceutical industry or biotechnology posts. Individuals should also explore the availability of 'knowledge brokers' within their organisations; intermediaries who facilitate knowledge translation and exchange¹⁴. Many academic institutions have invested in these posts as part of their Research and Knowledge Exchange services to develop the societal impact of their research activities and outputs.

As scientists, whether we adopt a boundary spanner role, and/or engage with knowledge brokers, we need to be inclusive, aware, and respectful of "*different coexisting realities*"¹⁵. The drivers and metrics of academic success are unlikely to reflect those of non-academic communities and organisations, i.e., the ultimate users of the knowledge we create. The San Francisco Declaration on Research Assessment (DORA)¹⁶ was founded in 2012 to promote greater awareness of the need to measure the quality and impact of research using methods which reflect *societal* rather than solely academic impact. This is further acknowledgement, if more was needed, that knowledge translation is, indeed, everybody's business.

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Biography

Mags is a health services research and registered pharmacist. She is Professor of Health Services Research and Pharmacy Practice in the Strathclyde Institute of Pharmacy and Biomedical Sciences. Her academic career spans over 25 years and has focussed upon the safe and effective use of medicines and effective professional practice. Her research includes the synthesis of evidence and its implementation into practice, policy and education. She is the recipient of Fellowships from the Medical Research Council, Leverhulme Foundation and Health Foundation. Mags has served on a range of national research funding committees, has over 100 peer reviewed publications and is a Fellow of the Royal Pharmaceutical Society. In 2019, she established her own consultancy business, Watson Research and Training Limited (<https://watsonresearchandtraining.co.uk/>).