

Integration and connection: the key to effectiveness of large-scale pharmacist-led medication reviews?

Andrew Husband ,^{1,2} Anna Robinson-Barella^{1,2}

¹School of Pharmacy, Newcastle University, Newcastle upon Tyne, UK

²Newcastle NIHR Patient Safety Research Collaborative (PSRC), Newcastle University, Newcastle upon Tyne, UK

Correspondence to

Professor Andrew Husband;
andy.husband@newcastle.ac.uk

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Our population is ageing and with increased age, comes more frequent presentation of people living with multiple long-term conditions (MLTCs), who are likely to experience polypharmacy and the risk that accompanies taking multiple medications. These risks disproportionately affect the most socioeconomically deprived people in our communities, including those from minority ethnic groups, among whom the incidence of MLTCs is higher¹ and acquired at an earlier age.² Polypharmacy increases the prevalence of errors relating to the medicines use process, defined as including prescribing, dispensing, administration and monitoring of medication. Estimates in England report around 237 million medication errors per annum with avoidable errors costing around £98 million each year resulting in 1700 deaths.³ In the USA, around 7 million people per year are affected by medication errors at a cost of around US\$21 billion.⁴ While not all of these errors are clinically significant, there remains a large burden of morbidity associated with medicines use resulting in annual global costs of around US\$42 billion.⁵ Given the worldwide magnitude of this challenge, there is a need to consider realistic solutions, at scale, to reducing harm and costs associated with medicines use. These considerations should centre on proactive interventions targeted at the medicines use process, aiming to identify and support those people at highest clinical risk. Within a healthcare professional workforce, specially trained in safe and effective medicines use, pharmacists are ideally placed to do this, providing they are appropriately integrated into healthcare teams and crucially have access to clinical information systems to allow safe decisions to be made in response to medication reviews.

In this issue of *BMJ Quality and Safety*, Craske *et al*⁶ have undertaken a systematic review of the literature with the aim of understanding which aspects of pharmacist-led medication reviews are associated with positive outcomes. The review examined papers with a high, medium and low degree of bias from a range of countries around the world set in both primary and secondary care. The authors concluded there is evidence that pharmacist-led reviews can influence various outcomes such as total number of medicines prescribed, improved adherence to medication regimens and reduced number of hospital re-admissions, among others. While these findings demonstrate that pharmacist involvement in medicines reviews creates positive outcomes, there remain some key challenges about how best to integrate and connect this healthcare professional workforce—particularly those pharmacists who work in community or retail pharmacy outlets—namely around (1) The design and purpose of medicines reviews, (2) Identification of the highest risk patients, (3) Integration of pharmacists into the wider healthcare team and (4) Their ability to access patients' clinical records to make alterations to treatment.

Pharmacists have the education and skills to effectively review complex therapeutic regimens. This is true internationally, where the focus of education has mainly shifted from the manufacture and supply of medicines to the clinical management of patients. In the UK, from 2026, all pharmacists will join the General Pharmaceutical Council (GPhC) register as independent prescribers once they have successfully completed foundation training. Despite providing a significant prescribing resource, this does come at a cost in training. Undoubtedly, there



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will be an expectation of demonstrable outcomes from this workforce in the future.

In the community, pharmacists have been acknowledged as an accessible and convenient healthcare provider that is acceptable to the general public,⁷ and for people from disadvantaged communities who are disproportionately affected by polypharmacy;^{8,9} this appears to be consistent for different countries around the world.¹⁰ The key challenge in effectively deploying pharmacists to undertake medication reviews is in ensuring that reviews are designed to achieve person-specific, individualised outcomes, rather than being general tools, which are possibly trying to be ‘all things to all people’. The idea that a medicines review can focus on issues including medication safety, adherence, improved clinical outcomes and reduced hospital admissions is not reasonable—in fact, this could have the potential to limit effectiveness and possibly even compromise safety. Instead, use of a clear model to help direct the structure of reviews, such as the Bristol Medication Review Model, could offer potential¹¹ from the perspective of the health professionals undertaking reviews, but perhaps more importantly from those who commission services. It is plausible that when patients know what to expect from a medication review and the potential benefits therein, they are likely to engage more positively with the process.

Even with a focused review structure, there are vast numbers of patients who experience polypharmacy and MLTCs, and we need to be able to understand where the greatest risk is, rather than simply defining polypharmacy as greater than five medicines (or wherever that arbitrary line lies). There is a role for artificial intelligence (AI) in highlighting medicines risk and, thus, providing the opportunity to focus on (effective) pharmacist-led medication reviews in both primary and secondary care. Shirazibeheshti *et al* examined the use of a mean-shift clustering AI technique to identify patients at highest risk from polypharmacy using a database of 300 000 UK-based patients. They concluded that identification of risk was more efficient using the AI algorithm and that such techniques could easily be integrated within existing healthcare management systems.¹² Reynolds *et al* have been funded by the National Institute for Health and Care Research (NIHR) in the UK for a project entitled AI-MULTIPLY (Artificial Intelligence for Multiple Long-Term Conditions (multimorbidity)), which aims to use AI methods to define where the greatest risk occurs in the interplay of specific medicines within individual therapeutic regimens and associated long-term conditions. This work is at an early stage, but it has the potential to allow identification of those patients who are most likely to experience adverse outcomes and therefore allow targeting of workforce resource.¹³ Such approaches, involving the integration of AI into healthcare systems, require inclusive data capture to best reflect, assess and predict individual risk. This provides the opportunity

to design a proactive medication review system to identify problems before they occur, thus potentially reducing adverse outcomes and associated cost.

Perhaps the most challenging issue in this area is the integration of pharmacists, both within healthcare teams in the context of working practices, but also through the information technology (IT) systems used to support care. Crucially, Craske *et al* identified that the ‘setting of practice’ for the medication reviews was important, with evidence indicating that reviews carried out in primary care were potentially more effective, led to reductions in clinical biomarkers, and improved adherence to treatment and quality of life. Primary care in this context encompassed care that was delivered at an individual’s home, within a care home facility, as well as *via* community and hospital services—and, therefore, could include pharmacists working in community pharmacies, which have the key benefit of accessibility without long appointment waits. Extending beyond this, in the review conducted by Hayhoe *et al*, the integration of pharmacists into primary care teams demonstrated positive impacts extending cross-sector; specifically, reductions in general practitioner (GP) appointment numbers were reported in primary care, while emergency department attendance rates in secondary care also reduced.¹⁴ This review showed there was an increase in primary care usage associated with more frequent interactions with the pharmacist, arguably a desirable outcome within reason. Rahayu *et al* have previously reported improvements to therapeutic outcomes and healthcare team functioning (including partnership, coordination, cooperation and decision-making) following the integration of pharmacists within multidisciplinary teams for the management of long-term diseases.¹⁵ To successfully enable pharmacists to make medication changes, perform follow-up reviews, and proactively target and deliver on medication reviews for those most in need, they must be fully embedded into healthcare teams across both primary and secondary care settings. There are good examples of funding being made available for pharmacists embedded in general practice to focus on medicines optimisation and improve access in primary care. The Additional Roles Reimbursement Scheme in England¹⁶ is one such scheme and has resulted in many clinical pharmacists working in these integrated posts.

A key aspect of working safely and effectively in teams is connectivity, and core to that is the ability to effectively share information and work from centralised records. This is crucial in maintaining the safety of patients, many of whom have complex medical histories and are cared for by multiple agencies and health professionals. At present, pharmacists working in community pharmacies have limited or no access to clinical records and, although there are examples of improved communication (with the Electronic Prescription Service in England

and access to the National Health Service Summary Care Record, which contains limited information about patients' medication, allergy status and significant diagnoses), there is still some way to go to achieve better connection with broader health IT infrastructure for pharmacists working in community pharmacy. In some countries pharmacists have almost no links to clinical records and indeed do not have their own medication record system for dispensed medicines. This has clear implications for safety and is a key area to improve to allow pharmacists to have a better impact on medication safety. Connectivity is particularly important when considering how community pharmacists might contribute to proactive medication review for the management of complex polypharmacy in patients with MLTCs. The implementation of 'Pharmacy First' in England during January 2024, uses a system called GP Connect,¹⁷ which provides interoperability between pharmacy information systems and those held by general practitioners. This does address some of the concerns held around pharmacists accessing full clinical records, including data controller concerns and access of information outside of the medication record.¹⁸ Equally, it allows for exchange of information between GPs and pharmacists in a way that has not previously been possible. There are limitations with this system in that it is designed for routine processes such as minor ailment management or pharmacy contraception services. It does not support urgent transfer of information and access to full clinical records remains limited. Perhaps most importantly, the ability for pharmacists to adjust treatment following a medication review, take responsibility for that adjustment and for it to be clearly visible to other health professionals managing the patient's care is not something this system is currently built for.

While pharmacists working in hospitals and general practice are well integrated into multi-disciplinary teams and have full access to patient records to be able to undertake complex medication reviews, those working in community pharmacy remain detached. Given the network of community pharmacies in most countries around the world, their accessibility and convenience and their reach into communities who traditionally have poor access to high-quality medical care, there is clearly a huge opportunity to build a proactive medication review service, led by pharmacists, which has the potential to improve medicines optimisation. The working patterns of community pharmacists are changing because of automation and centralisation of supply. Their role in the clinical management of prescribing is also underused. By connecting and integrating community pharmacies into wider

healthcare structures they can provide substantial input as hubs for medicines optimisation and safety.

X Anna Robinson-Barella @AnnaRobPharm

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ORCID iD

Andrew Husband <http://orcid.org/0000-0001-8162-8278>

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