PHARMACY FORECAST AUSTRALIA 2024

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Foreword

Advanced Pharmacy Australia (AdPha), the new trading name for the Society of Hospital Pharmacists of Australia (SHPA) is pleased to present the fourth *Pharmacy Forecast Australia*.

AdPha is the progressive voice of Australian pharmacists and technicians, built on 80 years of hospital innovation that puts people and patients first.

As the peak body committed to enriching patient care by extending advanced pharmacy from hospitals to everywhere medicines are needed, this year's window into the nation's pharmacy future is again centred on hospital pharmacy practice.

In total, 39 recommendations are made across six themes impacting our healthcare system, informed by the survey responses of pharmacy leaders drawn from every state and territory, covering regional and metro areas and hospitals of all sizes. The Forecast is a strategic thought leadership piece on emerging trends and phenomena forecasted to impact pharmacy practice and the health of Australian patients to 2029.

As in previous years, AdPha's methodology sees each theme's data, analysis and recommendations distilled directly from leading pharmacists practitioners (Forecast Panellists, or FPs) based on their local experience in a range of roles, covering all Australian jurisdictions, representing only themselves.

The 2024 report is divided into six themes: Scope of Practice – Unlocking pharmacy's potential; Service evolution – Challenging the how, what and why; Education as a journey; The prescription for a sustainable pharmacy; Digital domination – Embedding pharmacy in digital governance; and Adoption of AI in healthcare.

Through the analysis and recommendations, the Theme Leads provide a provocative exploration of areas of expansion beyond the current scope of practice, with focus on unlocking pharmacy's potential and extending practice outside traditional pharmacy department roles (Theme 1). Leading on from the scope of practice discussion, the *Forecast* will explore service evolution and the dynamics between traditional pharmacist and technician roles regarding changes in upskilling and increased involvement in clinical areas, as well as pharmacist scope to prescribe as part of the healthcare team, and to lead deprescribing (Theme 2).

How the education journey in Australian pharmacy is poised to shift in the coming five years to deliver the skills and support needed to sustain the future workforce? This includes greater specialty education and career recognition to improve job satisfaction and access to multidisciplinary teams (Theme 3).

Critical consideration for the future, there is a spotlight on sustainability as an important topic impacting the profession – spanning environmental, staffing, service delivery and operations issues, medication shortages and concurrent impact on budgets (Theme 4).

On the technological front, the discussion tackles integration and digital transformation in health to streamline processes and optimise operational performance, with consideration around cyber-security threats already prevalent, the pressing need for robust business resilience into the future and why pharmacy must be embedded in digital governance (Theme 5).

And finally, the *Forecast* looks at the omnipresent adoption of AI in Healthcare, including the implications on pharmacists' roles as tools continue to develop that will improve productivity and innovation, while managing concerns around ethics, privacy, security and safety (Theme 6).

On behalf of the Pharmacy Forecast Advisory Committee I thank our fantastic Theme Leads and support teams for their time and contributions. May your words and wisdom be discussed and debated, for it is through contests of ideas we make the biggest gains in advancing pharmacy and improving patient care, everywhere.

Russell Levy
Chair, Pharmacy Forecast Advisory Committee

Introduction and Methods

Over a series of workshops the Pharmacy Forecast Advisory Committee (see Acknowledgements) identified and interrogated key issues forecast to positively or negatively affect hospital pharmacy practice in the coming five years to 2029, with input from the policy and advocacy priorities and activities of Advanced Pharmacy Australia (then trading as the Society of Hospital Pharmacists of Australia).

The Advisory Committee expanded and refined the 'long list' through an iterative process, resulting in a final set of six themes, each with six focused topics on which the survey was built.

Survey respondents – called Forecast Panellists (FPs) – were nominated and selected by the Advisory Committee using the same criteria as previous editions and asked to respond to the questions as stated in this report based on their first-hand knowledge of current conditions in their region of work.

2024 Forecast Panellists

Responses were received from 175 FPs for the 2024 survey. Representation was captured from across all Australian states and territories: Vic (27%) and NSW (22%), Qld (19%), SA (12%), WA (11%), NT and Tas (3%) and the ACT sitting at 2% response rate. Most of the FPs (95%) had been in practice for greater than ten years, and 58% had been in practice for greater than 20 years. Most FPs held the title of Chief or Director of Pharmacy, and all held senior positions. Most FPs indicated their primary practice setting / organisation was in the public sector (85%) and (13%) indicated private. Over half of FPs described their primary practice setting / organisation as a metropolitan hospital (65%), while 29% indicated they were from a regional/rural hospital. Government/NFP departments or agency representation saw 6% representation and 7% were from academia. Forecast Panellists reported their primary practice setting / organisations offered a diverse range of services, including home health or infusion care (60%), specialty pharmacy (68%), in-patient care (86%), ambulatory care (66%), paediatric care (48%), and hospice care (28%).

User Guide to *Pharmacy Forecast Australia 2024*

Each section of this report summarises one theme's survey responses in detail, with the results discussed, and used to inform recommendations that will stimulate strategic and policy planning. It is intended to stimulate thinking and discussion, providing a starting point for individuals and teams who wish to proactively position themselves for potential future events and trends rather than be reactive when they occur.

An Overarching Perspective

NACCHO represents the Aboriginal and Torres Strait Islander community-controlled sector whose service models represent innovative, multidisciplinary care. Aboriginal Community Controlled Health Organisations (ACCHOs) lead Australia's health system in the way that coordinated care is overseen by local governance and integrated with many other health-related services, such as legal services, youth programs and health promotion programs.

Accordingly, Advanced Pharmacy Australia's aspirations should be congruent with such a model. Advanced pharmacy practice sits naturally within a large multidisciplinary environment like an ACCHO, where specialised pharmacists can provide services that are complementary and coherent with the overarching objectives of the healthcare system and needs of the clients and community being served. It is heartening to see many themes within the *Pharmacy Forecast Australia 2024* Recommendations that are consistent with NACCHO's experience related to emerging and advanced pharmacy practice.

Education for pharmacists in this environment should be 'a journey'; responsive to the needs of clients and capability of the organisation within which they practice. Upskilling in a diverse range of disciplines, including cultural training, digital literacy and specialised clinical development, is an essential ongoing investment for pharmacists working in the ACCH sector. Many ACCHOs have systems to assess the outcomes of this development through clinical audit systems and community feedback loops.

Unlocking pharmacists' potential has been a focus in ACCHOs, as diverse community needs necessitate a coherent and holistic approach to meet communities' priorities. Often senior pharmacists within ACCHOs will assume broader stakeholder and clinical governance roles.

NACCHO has supported evolving and enhancing pharmacist service provision when effectively integrated into the primary care environment, including support for ACCHO pharmacists accessing MBS items and undertaking advanced clinical training. Through delivering services that are collaborative and dynamic, the sustainability of pharmacy workforce can be maintained. We hear pharmacists find the variety and nature of services in ACCHO highly rewarding and as clients and communities receive the care they need this supports the satisfaction of the providers of this service.

Digital and technological advancements offer many benefits if used effectively. The equitable and safe application of digital health strategies is also essential for Australians. Without adequate consultation and governance behind digital health and artificial intelligence strategies for medicines management, there is a risk that some Australian's will be left behind. It is incumbent on pharmacist leaders and decision-makers to consider how rapidly advancing technology can be employed ethically and equitably. The Australian Alliance for Indigenous Genomics (ALIGN) is an exemplar of robust governance applied to an emerging field within healthcare. As the *Forecast* alludes to, fostering collaboration between pharmacists, healthcare providers (such as ACCHOs), technology developers, and regulatory bodies is necessary for effective digital strategy implementation.

Mike Stephens
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Pharmacy Forecast Australia 2024

THEME 1 – Scope of practice: Unlocking pharmacy's potential

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Theme Leads: Diana Sandulache, Katie Ambrose
Student Support: Thaddeus Chai, Alyza Basas

INTRODUCTION

Scope of practice for health professionals is a central topic in discussions on the future of Australian health care, with the Australian Government currently conducting the *Unleashing the Potential of our Health Workforce* review (the Review).[1] Expanding the scope of practice for hospital pharmacists and pharmacy technicians by identifying and developing specialised skills is essential to strengthen the healthcare system and enhance patient care in this evolving environment.

Collaborative practice is the cornerstone of hospital operations and essential for the development of the pharmacy profession. Advanced Pharmacy Australia's submission to the Review outlines the importance of team-based collaborative care and highlights the need for funding models to support its development.[1]

The creation of new roles for pharmacists and pharmacy technicians must be supported by investing in pharmacy educators and establishing structured educational programs to ensure successful outcomes for both practitioners and patients.

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PHARMACY CONTRIBUTION TO MULTI-DISCIPLINARY HOSPITAL LEADERSHIP AND GOVERNANCE

The majority (72%) of Forecast Panellists (FPs) were optimistic of pharmacists and pharmacy technicians contributing to and influencing high-level hospital leadership and governance by 2029 (Figure 1, Item 1).

With a growing focus nationally on safe and accessible healthcare, it is critical to integrate experienced pharmacists and technicians into multi-disciplinary teams within hospital leadership and governance. Their expertise in quality use of medicines and medication safety will offer unique perspectives that enhance decision-making processes, promote patient safety, and optimise therapeutic outcomes. Involvement in areas such as system redevelopment, formulary management, policy development, and quality assurance initiatives will ensure a comprehensive approach to healthcare delivery, ultimately leading to improved patient care and operational efficiency within hospitals.

Efforts to expand the roles of pharmacy technicians beyond traditional tasks are ongoing globally. In the United Kingdom, technicians are being trained to take on more responsibilities, including clinical support and patient counselling, allowing pharmacists to focus on more complex clinical tasks.[1] In Australia, Advanced Pharmacy Australia has recognised the importance of developing and optimising the crucial role of technicians in hospital pharmacy by supporting evidence-based expanded roles and welcoming technician input within its organisational governance.[2] This is demonstrated by the recent changes to the SHPA Constitution in 2024, introducing an elected Pharmacy Technician Board Director.

To strengthen their leadership skills and contributions, experienced pharmacists and technicians contributing to hospital governance will benefit from advanced leadership training. Many hospitals already offer these programs and, in 2023, Advanced Pharmacy Australia (formally known as SHPA) launched its Leaders Program in partnership with Lumos Leadership to unlock this potential in Australian hospital pharmacy.

These examples demonstrate how the pharmacy profession is evolving globally, with pharmacists and technicians taking on expanded roles in leadership and governance, digital health, and other non-traditional areas to better support healthcare systems and improve patient care.

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SUPPORTING RURAL AND METROPOLITAN PARTNERSHIPS THROUGH DEDICATED PHARMACY EDUCATORS

Most FPs (76%) believed it was likely the transfer of knowledge or skills between metropolitan, regional and rural pharmacy services would be facilitated by dedicated educator positions within major hospital pharmacies nationally by 2029 (Figure 1, Item 2).

Recruitment of pharmacy staff, particularly those with specialised knowledge or education experience, can face additional challenges in remote and rural services.[1] Metropolitan sites, that likely have additional resources or funding, can partner with rural sites to provide expertise and share resources. Conversely, the exposure to unique clinical scenarios in the rural setting and subsequent development of practical problem-solving skills can benefit pharmacists working primarily in metropolitan settings, fostering a symbiotic relationship.

Practice is underpinned by appropriately trained pharmacy staff, which must be supported by ongoing investment in education and training. While dedicated educator positions vary widely across states and locations, the 2024 revision to the *Advanced Pharmacy Australia (formally SHPA) Standards of Practice for Clinical Pharmacy Services* will provide guidance for required ratios of educators based on department size.[2]

A recent example of successful transfer of skills and resources between different sites is the establishment of TrialHub in 2020; an Australian-first program in which the Alfred Hospital in Melbourne, Victoria, partnered with regional, rural and outer-metro hospitals to assist them in establishing their own clinical trials units. The program included a dedicated clinical trial pharmacy micro-credentialing program, with support offered by dedicated pharmacy educators and clinical trials specialists through site visits, resources and support periods.[3]

To ensure the FP's vision becomes a reality, priority must be placed on the initiation and development of such partnerships by major hospitals, with roles being appropriately resourced and protected.

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SCOPE OF PHARMACIST-LED OUTPATIENT CLINICS

FPs acknowledge the potential future responsibility that pharmacists will have in titrating medicines in pharmacist-led ambulatory clinics, with a large majority of FPs (70%) supporting the likelihood of the concept by 2029 (Figure 1, Item 3).

Pharmacist-led outpatient clinics have become embedded in pharmacy professions around the world, including in Canada, the United Kingdom and the United States. Pharmacists can initiate, titrate or cease medications either via independent prescribing rights or via protocol driven frameworks. Evidence has shown benefit for the outpatient management of heart failure and diabetes.[1] In Australia, the implementation of outpatient pharmacy clinics has slowly grown over time, although activities are generally limited to completing medication histories and providing education. Studies have shown implementation of pharmacist recommendations in outpatient clinics can optimise care for patients and prevent medication-related harm. In a retrospective study of 18 clinical pharmacist roles in Australia, pharmacists effectively identified and resolved medication-related problems, with 18% of the pharmacists' recommendations preventing a high-risk medication-related harm event.[2,3]

While there is no current mechanism to support independent pharmacist prescribing, titration of medication could occur via collaborative prescribing or as per protocol prescribing, such as for anticoagulant titration.[4]

Pharmacist-led outpatient clinics could take place before admission, after discharge or within the primary care setting, thus frequently addressing transitions of care that are linked to a high risk of medication-related errors. Their potential and importance to practice is also reflected by the inclusion of pharmacist-led outpatient clinics medications across a variety of SHPA Standards of Practice, including Cardiology, Mental Health and Oncology and Haematology.[5]

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PHARMACY PLAYS AN IMPORTANT ROLE IN THE FUTURE OF DIGITAL HEALTH

In *Pharmacy Forecast Australia 2023*, experts discussed the likely roadblocks regarding organisational and digital readiness in preparation for the implementation of artificial intelligence (AI) into Australian hospitals. This year's Theme 2: Scope of Practice examines the bigger picture of digital health, and the specialty roles that pharmacists and pharmacy technicians can play in hospital digital health teams.

FPs were optimistic with 90% of responses (56% very likely, 34% somewhat likely) acknowledging the importance of embedding specialty trained pharmacists and pharmacy technicians into hospital digital health teams (Figure 1, Item 4).

The digital health landscape in Australia is amid a new wave of transformation, with the Australian Digital Health Agency (est. 2016) having recently developed a digital health strategy and roadmap. The National Digital Health Strategy 2023-2028 encompasses initiatives to support a digitally enabled, person-centred, inclusive and data driven health system.[1]

The career of informatics pharmacists in Australia is in its infancy compared with international counterparts. The limited number of informatics pharmacists in Australian healthcare results in them generally working independently without broader collaboration, leading to duplication of work and reducing the potential for innovation. Funding for informatics pharmacist roles in Australian health organisations is often limited or non-existent, and the potential of these roles is still emerging and remains underutilised.[2]

Implementing and utilising complex digital systems requires extensive multidisciplinary collaboration between technical and clinical specialists. By incorporating digital and clinical expertise, pharmacist informaticians are well positioned to develop, maintain, and evaluate digital systems used to deliver safe and effective patient care. Informatics pharmacists form a unique part of the digital health team, as they approach informatics with a focus on quality and safe use of medicines. Pharmacist inclusion in digital health teams will also ensure that the needs and skills of pharmacists are considered when designing new products and systems.[2]

Hospital pharmacists who specialise in health informatics are an essential resource, however, there are not currently enough pharmacists with the required level of expertise in this field. Inadequate training and understanding of digital systems could pose safety risks to patients.

The role of the pharmacy technician must also be considered in the future of digital health due to their responsibility for accurately maintaining and updating systems (i.e. electronic health records [EHRs]), assisting with telehealth services, utilising pharmacy management systems and facilitating medication reconciliation. The digital transformation of the healthcare sector has created a demand for technicians with skills in managing digital systems proficiently. It is expected that technicians who excel in utilising digital health systems may be considered for specialised roles within pharmacy informatics in the future, expanding the scope of practice and capability of the technician role further.[3]

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CREDENTIALLED PHARMACISTS AND PHARMACY TECHNICIANS ORDERING AND INTERPRETING SCREENING AND DIAGNOSTIC TESTING

More than half (63%) of FPs indicated they believe it is likely pharmacists and technicians could be credentialled to identify, order and provide clinical interpretation of diagnostic testing and make recommendations to patients by 2029 (Figure 1, Item 5).

Diagnostic testing confers multiple benefits, saving patients' time and reducing health system costs, leading to overall economic and social benefit.

Extending the scope of pharmacy practice to include the ordering and interpretation of laboratory testing promotes patient-centred care via collaborative practice with other healthcare professionals. It has the potential to improve patient outcomes by enabling targeted therapeutic drug monitoring, facilitating prescribing, optimising medicine efficacy and minimising toxicity.

Pharmacists are well positioned to identify at-risk or poorly supported patients and to work with them to assist in their disease management. With the authority to order and interpret patient laboratory tests, pharmacists could ascertain whether further medical treatment should be sought, or whether pharmacist-led care interventions would be appropriate for the patient's clinical need, allowing them to receive appropriate treatment with minimal delay.[1]

Pharmacists in comparable overseas countries such as the Canada, New Zealand, the United Kingdom and the United States are already authorised to order and interpret laboratory tests, under varying regulations and requirements.[1]

Pharmacists in Australia have the clinical knowledge and competencies to undertake ordering and interpretation of laboratory tests, however these competencies are being underutilised due to the legislative barriers that are limiting their scope of practice.[2] Therefore, their value to the health system and to all Australians is not being utilised to its full advantage. The development of standardised guidelines and frameworks would create opportunities for clinical pharmacists to work to their full scope of practice in Australia; and a push for referral rights in Australia for some tests has been raised as a priority over the next five years by pharmacy organisations.

Specialist clinical pharmacists with expertise in antimicrobials and the therapeutic management of infectious diseases have already proven to play a key role in antimicrobial stewardship (AMS) in hospitals, aged care and community settings. AMS pharmacists work with microbiology and infectious diseases teams to develop and maintain antimicrobial prescribing guidelines, protocols, and training for clinicians about safe and effective dosing practices.[3] Some AMS pharmacists may already be involved in ordering laboratory diagnostic tests relating to the management of infection in a patient.

With appropriate education, training and competency assessments, pharmacy technicians could undertake administrative activities pertaining to ordering and interpreting laboratory testing under the supervision of a pharmacist. The *Standard of Practice for Pharmacy Technicians to support Clinical Pharmacy Services* currently includes providing administrative support for stewardship activities and screening patient clinical information, medicine levels and laboratory data against the defined reference range to facilitate clinical prioritisation.[4]

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OPPORTUNITIES FOR TECHNICIAN-SPECIFIC FOUNDATIONAL AND ADVANCED RESIDENCY PROGRAMS

Recently, training programs delivered by Advanced Pharmacy Australia (formerly known as SHPA) were incorporated into the Australian and New Zealand College of Advanced Pharmacy (ANZCAP)'s recognition programs for pharmacists. Two-thirds (67%) of FPs envisioned similar opportunities for hospital pharmacy technicians to complete technician-specific foundational and advanced training programs by 2029 (Figure 1, Item 6).

Questions relating to certification and nationally consistent credentialling programs for hospital pharmacy technicians were asked in *Pharmacy Forecast Australia 2021* and *Pharmacy Forecast Australia 2022*, with FPs responding positively and demonstrating ongoing optimism for the development and formalisation of learning pathways for hospital pharmacy technicians.

In 2016, an Advanced Pharmacy Australia (formally known as SHPA) white paper exploring the role of the hospital pharmacy technician identified the importance of education and training, and the role that professional bodies like Advanced Pharmacy Australia could play in the credentialling of technicians.[1]

There is evidence of successful implementation of clinical pharmacy technician residencies in the United States, credentialed and supported by the American Society of Health-System Pharmacists (ASHP), with the program enabling the technician resident to develop skills and abilities over the course of twelve months that would typically take several years of work experience to achieve.[2]

Currently, the lack of consistent training nationally – with the majority being in-house and often unstructured – can result in technicians not having the necessary knowledge and skills to adequately take on the wide-ranging role of a hospital pharmacy technician.

The structure of a standardised training program for foundational and advanced technician training could revolutionise the training and career pathway for hospital pharmacy technicians and create a unique opportunity for hospital pharmacies to build and strengthen a highly skilled and agile technician workforce. A purposely designed and accredited technician training program focusing on the necessary skills and knowledge to excel in foundational and advanced hospital technician roles could, in turn, enable more pharmacists to practice at their full scope.

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EXPANSION OF PHARMACIST ROLES IN MULTIDISCIPLINARY CARE TEAMS

FPs acknowledged the advanced-scope role pharmacists will play in multidisciplinary healthcare teams, with nearly two-thirds (17% very likely, 47% somewhat likely) anticipating national integration by 2029 (Figure 1, Item 7).

Clinical pharmacists are routinely integrated into multidisciplinary healthcare teams, often operating in unit-based services where they participate in ward rounds, multidisciplinary team meetings and research and governance activities.

The expansion of pharmacists' roles should be pursued with input and support from the multidisciplinary team. Non-pharmacy health practitioners have expressed a need for more specialised pharmacists and an increase in expanded scope of practice activities such as a partnered pharmacist charting.[1,2]

The terms advanced and extended practice are often used interchangeably and may require additional credentialing or formal approval at an organisational level.[3] Examples may relate to activities such as partnered pharmacist charting, stewardship or attendance at MET calls. It may also include expanded roles that do not yet exist. Co-designing future roles will enable more rapid and substantiable development for the pharmacy profession, ensuring greatest patient impact.

The continued development and expansion of pharmacist roles is supported by Advanced Pharmacy Australia's Specialty Practice program and the Australian and New Zealand College of Advanced Pharmacy (ANZCAP), both embedded in the Australian pharmacy landscape through the *Transformation 2024* strategy.[4]

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INDEPENDENT PHARMACIST PRESCRIBING

FPs had mixed feelings about independent prescribing, with 61% foreseeing a likelihood of future opportunities for hospital pharmacists to independently prescribe, and 39% expressing pessimism towards this occupational advancement by 2029 (Figure 1, Item 8).

The Australian Health Professionals Prescribing Pathway describes several possible frameworks for pharmacist prescribing in Australia, including autonomous prescribing, prescribing under supervision and prescribing via structured prescribing arrangements.[1]

Pharmacist collaborative prescribing models were a focus in previous *Pharmacy Forecast Australia* reports, with the Partnered Pharmacist Medication Charting (PPMC) model demonstrating a significant reduction in medication errors[2].

The Pharmacy Board of Australia's position statement on autonomous prescribing highlights that its implementation would necessitate additional regulation and the creation of accredited educational programs to provide the qualifications needed for endorsement. Further accreditation of pharmacist prescriber education programs would advance the autonomous prescribing space for pharmacists.[3,4]

Internationally, the implementation of pharmacist prescribing includes independent prescribing. In Alberta, Canada, pharmacists can independently prescribe, while in the United Kingdom from September 2026 all newly qualified pharmacists will be independent prescribers on the day of registration.[5,6] The majority of these initiatives are in community practice, where a medical practitioner is not available.

In the community pharmacy sector, autonomous prescribing initiatives have been piloted, including prescribing for urinary tract infections, oral contraceptives and other minor ailments. In 2022, pharmacist prescribing for urinary tract infections was made permanent in Queensland, after evidence the service was safe, appropriate and improved access to treatment.[7,8]

As there are no local examples of independent prescribing in the hospital sector at present, pharmacy departments must stay updated on evolving evidence and practices both locally and internationally to avoid falling behind.

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CONCLUSION

The future of pharmacy practice in Australia holds significant promise for advancing healthcare delivery and patient outcomes through expanded scopes of practice for pharmacists and technicians. By embracing collaborative, team-based care models that leverage the full extent of pharmacist and pharmacy technician skills, pharmacy will play an important role in strengthening the Australian healthcare system.

Now is the time to advocate for the development and/or expansion of and investment in initiatives such as independent pharmacist prescribing, initiating pharmacist-led outpatient clinics, and enabling the ordering and interpretation of diagnostic tests, all of which will enhance patient care and safety. Moreover, dedicating resources to educator roles and expanding technician career pathways will ensure continuous professional development and standardised knowledge across the profession. Advocating for integrating pharmacy leaders into local hospital governance teams will further empower the profession to drive impactful changes in service delivery and digital health initiatives.

Effective implementation of these advancements requires proactive measures such as supporting early career pharmacists and technicians in developing advanced leadership and systems thinking skills through mentoring and leadership programs. Advocating for pharmacy input into local hospital leadership and multidisciplinary teams will ensure pharmacy expertise contributes to informed healthcare decisions.

By aligning the recommendations within the scope of practice theme with collaborative healthcare practices, Australia can pave the way for a future where pharmacists and pharmacy technicians play crucial roles in delivering patient-centred, efficient, and effective healthcare services nationwide.

RECOMMENDATIONS

1. **Empower pharmacists and pharmacy technicians for leadership roles beyond pharmacy**

Enable pharmacists and pharmacy technicians to pursue opportunities in leadership and governance positions outside of the pharmacy department by developing their advanced leadership skills and highlighting potential pathways utilising their existing skills.

2. **Promote metropolitan-rural pharmacy partnerships**

Champion the development of metropolitan partnerships with rural and regional pharmacy services through dedicated resourcing for pharmacy educators and promotion of successful programs.

3. **Expand pharmacist-led outpatient clinics**

Expand the role of pharmacist-led outpatient clinics, integrating Partnered Pharmacist Medication Charting or per protocol prescribing, to enable pharmacists to modify medicines.

4. **Integrate pharmacists and pharmacy technicians in digital health teams**

All hospital digital health teams should include pharmacists and pharmacy technicians in the development and management of digital systems. Health informatics training needs to align with these roles.

5. **Empower pharmacists and pharmacy technicians to order and interpret laboratory and diagnostic tests**

Advocate for legislative changes to remove barriers that currently limit practitioners' ability to order and interpret laboratory and diagnostic tests.

6. **Support formalised pharmacy technician training programs**

Advocate for the development and implementation of structured, nationally consistent training programs for pharmacy technicians akin to the ANZCAP model for pharmacists.

PARTNER PERSPECTIVE

National Rural Health Alliance

Moving towards outcomes: Scope of Practice Review and Rural Pharmacy

The Scope of Practice Review led by Professor Mark Cormack is nearing its final phase, with a report and implementation plan scheduled to be released in October. The Scope of Practice Review aims to enhance health outcomes and access for historically disadvantaged groups, including Aboriginal and Torres Strait Islander Australians and those in rural and remote areas. It also seeks to improve job satisfaction among healthcare professionals, address legislative barriers and state/territory idiosyncrasies and address workforce attrition in primary care.

Rural Australians, who make up about one-third of the population, or 7 million people, face unique healthcare challenges due to limited access. Currently, nearly 45,000 people live more than an hour's drive from primary healthcare services. Lack of access contributes to higher mortality rates often resulting in between 12 – 16 years shorter lives, and greater disease burden compared to urban areas.[1]

In these communities that often rely on locums, or fly/drive in and fly/drive out services which are useful in addition to existing long term care, can and should not be the only answer. With limited available healthcare professionals, rural pharmacists are already a part of the local health professional team and provide communities with vital services that often bridge the gap between healthcare providers.[2] Pharmacists are well trusted members of the healthcare system and rural communities, making them well-positioned to engage in important healthcare screening and service provision and educational conversations with their communities.

Operating to full scope of practice is foundational to attracting and retaining the rural health and pharmacy workforce. A recent survey of rural pharmacists noted that a lack of staff presented a significant workforce challenge, however, the ability to work to full and potentially expanded scopes and working with other healthcare professionals in a multidisciplinary team were strong motivators for rural work.[3]

The NRHA envisions the outcome of the Scope of Practice review will provide the first steps towards healthcare equity and policy changes that place rural population health needs and rural practice at the forefront.

An approach specifically for rural, remote and regional Australia is required, and a link with the other reforms including Working better for Medicare review (distribution levers), GP incentives and thin markets reform and the outcome of the National Health Reform Agreement, will ensure that the distribution and scope of workforce builds capacity and addresses need.

Through creating robust policy and regulatory frameworks, Scope of Practice has the potential to change the healthcare landscape towards building healthier and equitable futures for rural Australians and the healthcare workers who support them.

Susi Tegen, Chief Executive Officer

Carmen Ellis, Policy and Research Officer

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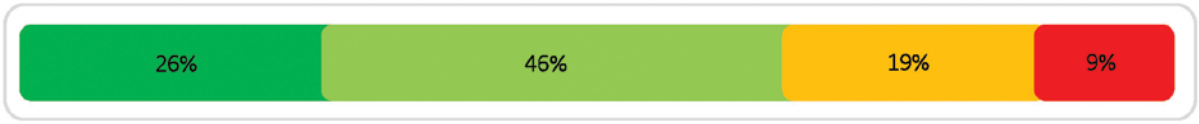
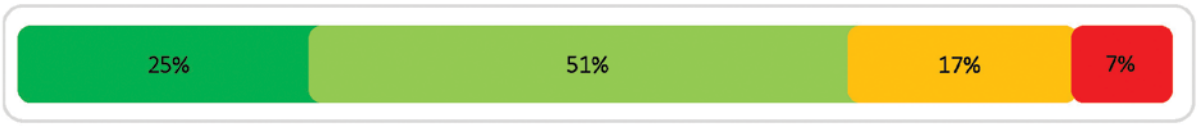
FIGURE 1. Scope of Practice: Unlocking pharmacy's potential

Forecast Panelists' responses to the question, "How likely is it that the following will occur by the year 2029 in the geographic region where you work?"

1. In the majority of hospitals within Australia, scope of pharmacists and pharmacy technician practice will be extending outside traditional pharmacy department roles to embrace positions within high level hospital leadership and governance.



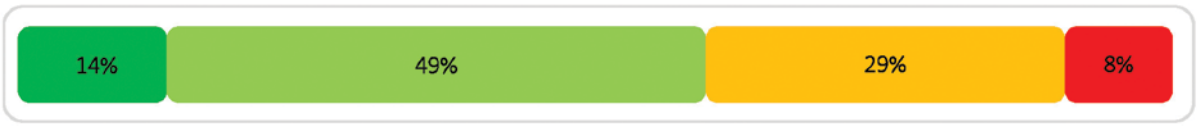
2. Major hospitals in each state and territory will have dedicated educator positions within their pharmacy teams to support the transfer of knowledge/skills between metropolitan, regional and rural pharmacy services.



3. Pharmacists will be individually responsible for titrating medications in pharmacist-led ambulatory clinics.

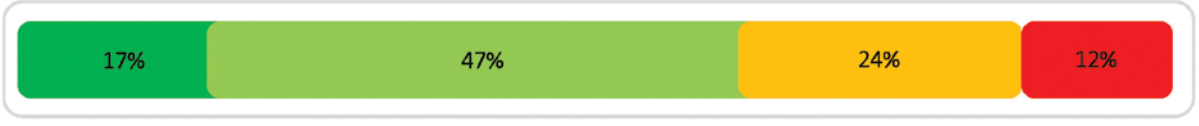
4. The majority of hospitals will have specialty trained pharmacists and pharmacy technicians embedded in hospital digital health teams.

5. Pharmacists and pharmacy technicians will be credentialled in various aspects of identifying, ordering, and providing clinical interpretation and recommendations regarding pathology and microbiology results.

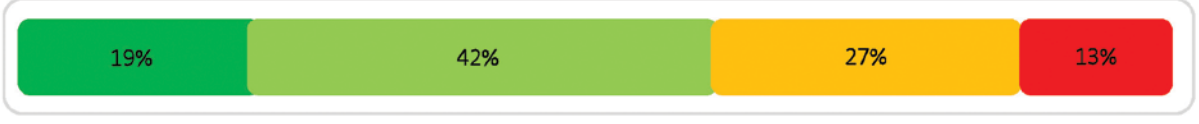


6. Pharmacy technicians will have opportunities to complete technician-specific foundational and specialist residencies (i.e. in model of ANZCAP Resident Training Program and Registrar Training Program).

7. Multidisciplinary medical teams will always include an advanced/expanded scope pharmacist.



8. Collaborative team-based pharmacist prescribing will progress to independent pharmacist prescribing in hospitals.



THEME 2 – Service evolution: Challenging the how, what and why

Advisory Committee Leads: Peter Smart, Melissa Faehrmann
Theme Leads: Vinod Chellaram, Tony Lai
Student Support: Ashleigh McGowan, Minh Han

INTRODUCTION

Over the next five years, the scope of pharmacists in Australian healthcare settings is anticipated to continue to expand exponentially and in a variety of capacities. Pharmacists will play a vital role in managing complex, novel treatments such as advanced therapeutics, which are already changing the landscape of treatment options. Clinical stewardship roles are evolving beyond traditional areas to encompass a broader range of high-risk medicines, and though advancements in electronic health records (EHR) and big data analytics, providing opportunities for comprehensive medicines management with a more proactive, preventative application.

There is growing recognition of the need for around-the-clock pharmacy services, reflecting the critical importance of continuous medicines management and support for patients and multidisciplinary colleagues during non-standard hours. The potential for pharmacists to work from home, in non-hospital settings, and without geographical barriers, indicates a shift towards more flexible and accessible pharmacy services. Promoting the integration and utilisation of pharmacists at transitions of care and collaboration with general practitioners (GPs) may also enhance patient outcomes and continuity of care.

PHARMACIST'S EXTENDED ROLE IN ADVANCED THERAPEUTICS

Advanced Therapeutics includes the use of genetically modified organisms (GMOs) for treatment, such as CAR T-cell and TCR therapies for cancer and bacteriophages for bacterial infections. CAR T-cell and TCR therapies have significantly improved outcomes for refractory or relapsed cancers by targeting specific genetic or molecular pathways, leading to high efficacy and long-term remission.[1-3] Bacteriophages offer a novel approach to treating infections, especially in the context of rising antimicrobial resistance, by targeting and killing bacteria, and enhancing lytic activity for severe and multidrug-resistant infections.[4-7]

Gene therapy medicinal products (GTMP) are also a key component of Advanced Therapeutics. Two TGA-registered GTMP are voretigene neparvovec (marketed as Luxturna®) – which uses viral vectors to deliver therapeutic genes for inherited retinal diseases, and onasemnogene abeparvovec (Zolgensma®) – a PBS-registered gene therapy for spinal muscular atrophy (SMA). This therapy modality is expected to have a growing impact in the next five to ten years with over 4000 therapies currently in development, highlighting the ever-evolving landscape of precision medicine and its potential to address previously untreatable rare genetic conditions in areas such as neurology, haematology and metabolics.[8-9]

Forecast Panellists (FPs) acknowledge the increasing role of managing advanced therapeutics' operational and clinical aspects, with a significant proportion (69%) suggesting that resources will be specifically deployed to this function by 2029 (Figure 2, Item 2). This shows increasing awareness of advanced therapeutics as a treatment option in Australian hospitals. Despite this however, FPs were divided on whether advanced therapeutics would be routinely prescribed and dispensed to patients, showing a near-even split of opinions on the likelihood of this happening (Figure 2, Item 1). This possibly indicates that the adoption of advanced therapeutics by Australian clinicians is still in its infancy.

This may further be attributed to clinicians' lack of training and education, limited organisational readiness and feasibility, scalability of the supply chain or the actual versus perceived challenges of navigation through regulatory and governance frameworks of advanced therapeutics.[1, 10-14] The increasing opportunities for use of phages in the community setting is yet to be fully explored. Newly released international guidelines, alongside work performed by Advanced Pharmacy Australia (formally known as SHPA) and NSW

Health, have been valuable in filling these gaps. These include the Therapeutic Products Policy Directive and Advanced Pharmacy Australia Pharmaceutical and Advanced Therapeutic Products Governance Education Package. Additionally, Phage Australia is leading research on the compassionate use of phages in Australian hospitals through a standardised treatment and monitoring protocol to assess the safety and tolerability of bacteriophage therapy for adult and paediatric patients (STAMP study).[15]

In a similar way, an increasing number of international publications and tools are being used to guide and educate pharmacists about their roles in CAR-T cell therapy that can be adapted to the Australian healthcare context, especially regarding the management of toxicities.[16-20] The Centre for Excellence in Cellular Immunotherapy at the Peter MacCallum Cancer Centre is collaborating with pharmaceutical companies in CAR-T cell therapies, with significant investment and partnership with the Australian government.

While there may be centres of speciality that initially administer advanced therapeutics, more hospitals will be taking over patient care post-dosing. As such, interhospital collaboration, transparency in organisational workflows and standardised policies across Australia are needed to facilitate the routine use and the importance of dedicated pharmacist roles in advanced therapeutics.

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ADVANCING CLINICAL STEWARDSHIP ROLES

Clinical pharmacist stewardship roles have evolved from well-established antimicrobial stewardship (AMS) to other subspecialties in Australia and overseas, including analgesic (opioid), anticoagulant, antipsychotic and nephrotoxin (kidney) stewardship.[1-7] The uptake of electronic health records (EHR) in more healthcare systems, coupled with 'big data' advances, has enabled the advanced scope of clinical pharmacy (medical) stewardship activities.[8-10]

Big data in the EHR space refers to the vast and complex datasets generated and collated through the digitisation of healthcare information.[11] Using big data as a clinical decision support tool challenges the dogma of delivering traditional ward-based clinical pharmacy services with stewardship opportunities.[3, 12-16] Stewardship pharmacists can provide high-level clinical services not limited to a designated ward, but hospital-wide, focusing on a systematic review of high-risk medications rather than going down the list of ward beds sequentially.[17-21]

Despite these benefits, FPs view stewardship/preventative roles as not matching traditional clinical pharmacy/ward-based roles by 2029, where 69% indicated it was unlikely to occur (Figure 2, Item 3) The profession aims to deliver comprehensive clinical pharmacy services to all patients, but current workloads hinder this goal; workloads remain which result from past efforts to serve many patients with limited full-time equivalent budget constraints. With demand for pharmacy services rising, reassessing staffing through a traditional pharmacy ward-based approach is viewed as crucial.[22-26]

A possible hybrid approach may include speciality roles where ward designation (e.g. emergency, critical care, oncology, haematology, bone marrow/solid organ transplant, and paediatrics) overlaps entirely with medical stewardship roles (e.g. AMS, opioid, anticoagulant, antipsychotic, and kidney) (Image 1).

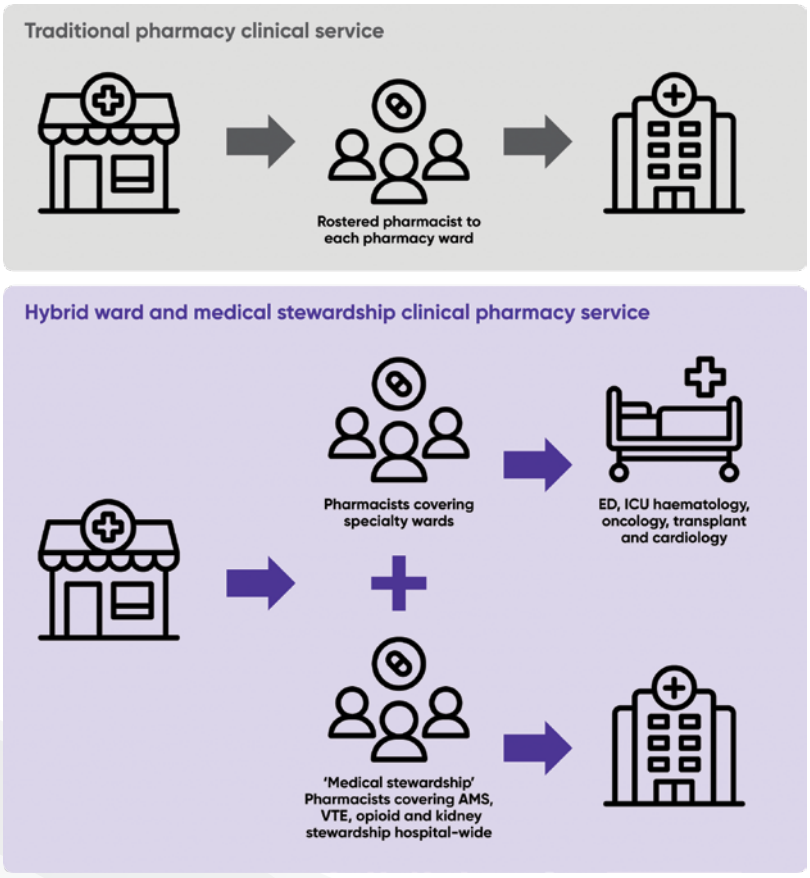

Image 1: Hybrid approach of ward pharmacy and medical stewardship clinical service

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PHARMACY AROUND THE CLOCK

Hospital pharmacists are integral to the healthcare system, and their value extends well beyond the confines of traditional working hours. The expertise and vigilance during nights, weekends and holidays are crucial for ensuring seamless and high-quality patient care around the clock.[1-4]

During these non-standard hours, hospital pharmacists are often on the front lines of critical situations, providing essential support in emergency scenarios where swift and accurate medicines management can significantly impact patient outcomes.[5-6] Hospital pharmacy roles are instrumental in navigating complex drug therapies, resolving medicine-related issues, and advising on potential drug interactions and adverse effects. Responsibilities extend well beyond the supply of medicines and involves close collaboration with physicians, nurses and other healthcare professionals to develop and adjust treatment plans tailored to each patient's unique needs.[5]

The Partnered Pharmacist Medication Charting (PPMC) model has further strengthened the role of the clinical pharmacist across the hospital as an integral part of reducing length of stay and medication errors.[10,12] If these models of care have been shown to work so effectively then the question to ask is: why are they often limited to traditional business hours?

Increase in population and demographic changes seen in Australia continue to place pressure on current healthcare infrastructure, resulting in hospitals in metropolitan areas constantly facing bed blocks and being forced to extend the operating hours of services such as day oncology and dialysis. This subsequently increases the use of high-risk medicines across more hours of the day, requiring a corresponding response in pharmacy service provision.

Medical and nursing colleagues are routinely involved in patient care around the clock but are expected to manage and adapt to workflows that vary in level of engagement and involvement with pharmacists, which can further create confusion, irritation and potentially introduce unnecessary and avoidable risks. Encouragingly, 57% of FPs agreed by 2029 at least a quarter of hospitals will likely have pharmacists employed to provide services around-the-clock and across the week (Figure 2, Item 4). This indicates there is recognition of an increasing demand for pharmacy services beyond the 9-5 model.

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PHARMACY AROUND THE WORLD

FPs were evenly split when considering whether pharmacists will be routinely employed in working-from-home or out of hospital settings by 2029 (Figure 2, Item 5). The expansion of Electronic Medical Records (EMR) in various hospitals across Australia has been a strong enabler for this and reduced the need for documentation duplication.[1] It is possible there is a relationship between FPs responses and how far their local health services have advanced down this digital path.

The dramatic expansion of healthcare delivery models experienced in recent years will continue as services like telehealth and virtual clinics are introduced and rapidly mature.[2] Regions that have embraced this technology can provide multiple health services with access to highly skilled specialty pharmacists, access they would have otherwise struggled to secure due to geographical or capacity challenges. This is particularly pertinent for hospitals and their patients in rural and remote areas, where patients can access healthcare from their own home, avoiding previously required significant travel or inconvenience.[9] There are also advantages to individual pharmacists, providing options for upskilling and professional and career development without being restricted by their place of residence and the service scope of local hospitals.

Examples of this already exist within the Australian setting with Canberra Hospital employing Australian registered clinical pharmacists located in Western Australia, Canada and Europe. This flexibility is critical to being able to enforce a workflow that demands a clinical pharmacist check for all medicines between prescribing and administration.

The evidence suggests that employing health professionals who work from home can enhance accessibility, efficiency, and patient care while offering significant benefits to both healthcare organisations and professionals.[3]

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HOSPITAL WITHOUT WALLS

Hospital pharmacists extend their vital roles beyond the walls of the hospital, significantly impacting patient care prior to and after discharge. Their involvement does not end when a patient leaves the hospital; rather, it transitions into a crucial phase of ensuring continuity of care.

Hospital pharmacists often collaborate with outpatient pharmacies, primary care physicians, and other healthcare providers to manage medication therapy and address any potential issues that may arise once patients are home. This includes providing detailed medicines counselling, managing complex drug regimens, and addressing questions about medicines use, side effects, and interactions.[2] By bridging the gap between hospital and home care, hospital pharmacists play a pivotal role in preventing readmissions, improving patient outcomes, and enhancing overall health management. Their proactive approach in managing medicines beyond the hospital walls reflects a comprehensive commitment to patient well-being, emphasising the importance of this role in the continuum of care.[1]

An example of this is placing a clinical pharmacist as part of the transition to community team. In a general practitioner (GPs) pharmacist model, the pharmacist works closely with GPs to provide comprehensive medicines management and patient care. Often collaborating with GPs to ensure safe and effective use of medicines, manage chronic conditions, and optimise treatment outcomes. This role can include reviewing and advising on prescriptions, conducting medication reviews, and providing patient education.[5]

In this model, the role should be considered as an advanced specialised role where a credentialling and training package requires development with relevant hospital pharmacy departments. This may also include placement in the hospital pharmacy for a period to understand the information required. The focus should be on enhancing adherence and acting as a first line to medicines management issues. This role becomes the point of contact between hospital pharmacy at home programs and the community pharmacy and may require working with Medicare to include pathology requests and access to other investigations under federal funding to allow the pharmacists to perform the role.

Interestingly, over half of FPs (57%) believed that by 2029 hospitals are unlikely to employ pharmacists to look after patients beyond the hospital setting (Figure 2, Item 6). This might be due to the various funding mechanisms across facilities and between state and commonwealth funding, which confounds the governance of these services out of the hospital.[4] Several conditions might be challenging for general physicians to manage, and this gap may contribute to multiple hospital admissions which would compromise the quality of life for these patients. Additionally, some patients may find it challenging to manage the administration of several medicines and need access to hospitals on regular basis to make sure their care is not compromised.[3]

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CONCLUSION

Pharmacists could and should be more widely deployed as medicines experts to support service evolution over the next five years. While funding and governance challenges remain, these developments point towards a more dynamic and essential role for pharmacists in the future of Australian hospital pharmacy services.

With an increasing number of treatment types that will require advanced pharmacy review and intervention, the profession must evolve to provide services that can meet the demand of patients, multidisciplinary colleagues and the specialised workforce in Australian hospitals, transitions of care, aged care and GP clinics.

RECOMMENDATIONS

1. **Increase advanced therapeutics knowledge**

Improve education and training to equip pharmacy staff with the knowledge and skills of advanced therapeutics in clinical practice and medical stewardship pharmacy roles.

2. **Expand advanced therapeutics within the profession**

Improve interhospital collaboration and networking of pharmacy workflows, governance and policy/guideline development of advanced therapeutics and medical stewardship roles.

3. **Deliver clinical pharmacy services through collaborative working models**

Explore hybrid models of clinical pharmacy service delivery with specialty ward pharmacists and medical stewardship

4. **EBA review on 24/7 working models**

Organisations review current enterprise bargaining agreements to identify barriers to hospital pharmacists working seven days a week.

5. **Expand virtual care models for high-risk patients**

Expand pharmacy at home roles to support high risk patients as part of virtual care incorporated with at-home monitoring technologies.

6. **Increase funding for care of high-risk patients**

Review and advocate for hospital funding to enable hospital-led pharmacy services to provide care for high-risk patients within the hospital catchment.

7. **Increase access for pharmacists to Medicare funding**

Review Medicare funding to allow pharmacists access to investigational claims to provide care and patient recommendations.

PARTNER PERSPECTIVE

Australian Medical Association (AMA)

Australia is already seeing early, positive results for patients to from the novel, advanced therapies in recent years. One area where we have seen this have an impact is in paediatrics where children with rare disease can now access potentially transformative and life changing therapies. For progressive or life-limiting illnesses, this can mean huge benefit – longer life span, a slowing of disease progression, and even reductions in symptomology.

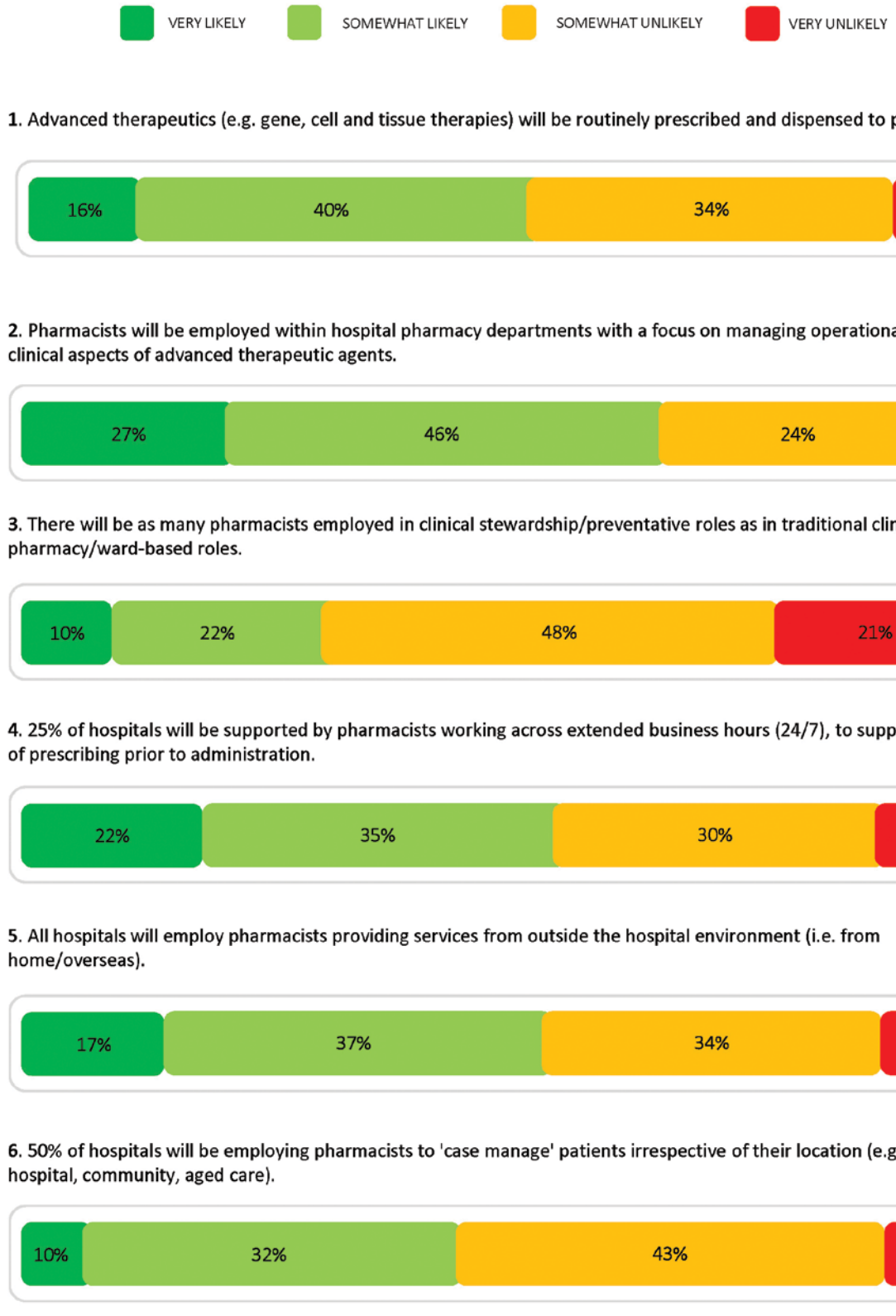
The AMA is excited by these developments and I would love to say that access to advanced therapeutics in our public hospitals will be routine in five years' time, but the reality is we have a long way to go first. We will need genuine investment in infrastructure and workforce to realise the full potential of these groundbreaking (expensive) medicines. This will include support and resourcing to train our doctors and pharmacists in the prescription and dispensing of advanced therapeutics.

With a significant investment from the Commonwealth into our public hospitals coming with a new NHRA next year, there is opportunity. Unfortunately as the AMA's Public Hospital Report Card 2024 demonstrated again, our public hospitals are at breaking point. The next NHRA must allow for rebuilding capacity in our hospitals and encourage improved performance. We need to see the states and territories working with the Commonwealth to achieve this and create a steady foundation for the routine use of advanced therapeutics.

Prof Steve Robson, AMA President

FIGURE 2. Service Evolution. Challenging the how, what and why

Forecast Panelists' responses to the question, "How likely is it that the following will occur by the year 2029 in the geographic region where you work?"



THEME 3 – Education as a journey

Advisory Committee Leads: Russell Levy, Margie Butnoris
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INTRODUCTION

Education is a critical journey for pharmacists, shaping not only their professional expertise but also contributing to opportunity for recognition, remuneration, and responsibilities as advanced practitioners. Through continuous learning, pharmacists enhance their skills and knowledge, positioning themselves for greater professional acknowledgment and increased earning potential. Moreover, education plays a crucial role in building workforce capacity and capability, ensuring that the pharmacy profession can meet the growing and evolving demands of patient care and our health care system.

RECOGNITION: NATIONAL CREDENTIALING TO SUPPORT ADVANCED PHARMACY ROLES

More than half (63%) of Forecast Panellists (FPs) indicated it was unlikely that nationally recognised credentials for extended scope of practice would be mandated across all healthcare facilities by 2029 (Figure 3, Item 1).

There are compelling reasons for a national credentialing program that would recognise advanced pharmacy scope of practice. National credentialing would yield resource efficiencies by streamlining the credentialing process and reduce duplication associated with the design, maintenance and implementation of robust credentialing programs. Centralised credentialing would facilitate an equitable distribution of resources and create opportunities nationally. It would also align with the need for a more mobile and agile workforce (Advanced Pharmacy Australia (formally known as SHPA) *Advanced Pharmacy Green Paper*)[1] that would recognise prior credentialing and ensure transferability between states, organisations and settings.[2]

The establishment of a national credentialing framework is anticipated to encounter several significant challenges. A national framework necessitates achieving consensus on the definitions and descriptions of extended scope of practice activities. Comprehensive consultation, both within and outside the profession, is crucial to ensure that the process is equitable, transparent, credible and defensible.

Additionally, it is essential to align terminology and definitions with those used in other health professions with extended scope of practice. Such alignment will facilitate a common understanding among external stakeholders and ensure that legislative changes are integrated within a coherent framework. Specifically, the proposed framework must be supported by state and territory poisons legislation and be endorsed by relevant authorities such as the Australian Pharmacy Council, and the Australian Health Practitioner Regulation Agency, as well as indemnity providers. A centralised directory of credentialed practitioners would be highly beneficial. While increased regulation will enhance legitimacy and bolster consumer confidence in extended scopes of practice, it is imperative that such regulation does not become overly restrictive or stifle innovation and the development of new practices.[3]

A centralised approach would not diminish the role of local credentialing functions which are uniquely positioned to evaluate the need for extended scopes of practice within their local context and determine the processes for verifying and documenting these credentials. For example, credential verification may involve the presentation of valid and current continuing professional development documentation. Additional required evidence might include proof of the outcomes and benefits of extended scopes of practice, demonstrated through positive patient outcomes and supported by contemporary workplace-based assessment tools and professional practice portfolios. Ideally, a centralised register of nationally recognised credentials, integrated with general registration records, would provide a consolidated and comprehensive source of information.[4]

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REMUNERATION: CONSISTENT REMUNERATION OF ADVANCED PRACTICE ACROSS ALL JURISDICTIONS

Many FPs did not believe health systems will remunerate advanced pharmacy practice achievement by 2029, with 66% indicating it was unlikely to occur (Figure 3, Item 2).

In the current hospital pharmacy landscape, remuneration is governed by hospital pharmacy awards, which are industrial agreements outlining minimum wages and conditions for employees in the sector. Awards vary across states and territory and are negotiated by the relevant unions and employers' associations. They vary considerably in terms of recognition of advanced pharmacy practitioners, with different criteria for career progression and limited accommodation for advanced roles not associated with managerial responsibilities.[2]

Remuneration should properly reflect the value and impact of pharmacists' skills and contributions. To achieve this, pharmacists' value must be recognised not only within but proven to those outside of the profession. Establishment of the Australian and New Zealand College of Advanced Pharmacy (ANZCAP) represents a pivotal step toward gaining broader recognition both within and beyond the profession. ANZCAP credentials must be awarded through a transparent and rigorous process, to withstand scrutiny by employers and suitably support the case for appropriate remuneration, whether at the individual level or through collective enterprise bargaining. Given the increasing budgetary pressures on the public healthcare system, employers face the challenge of justifying remuneration within a constrained budget. Advanced pharmacy practitioners must therefore not only demonstrate their individual accomplishments and contributions to enhance the pharmacy profession, but more critically, demonstrate their value to healthcare outcomes in specialised roles.[1]

To complement ANZCAP's recognition efforts, the opportunity to perform advanced pharmacy roles remains a critical priority. Advanced pharmacy roles should aim for scalability across diverse health settings and provide clear evidence of value relative to cost outcomes. For instance, initiatives like Partnered Pharmacist Medication Charting (PPMC) underscore the importance of a robust research culture that fosters coordinated, multi-centre collaborations to accelerate meaningful results. Such evidence of impact on patient and healthcare outcomes can be instrumental in justifying pharmacists' remuneration.

Proven advanced pharmacy roles, performed by highly trained and skilled pharmacists may open avenues for leveraging funding via fee-for-service or value-based healthcare models. This approach can further substantiate the case for appropriate remuneration aligned with advanced practice and reflect the true value of pharmacists working at top of scope in the contemporary and evolving health care landscape.[3]

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RESPONSIBILITIES: EXPECTATION THAT RECOGNITION OF ADVANCED LEVEL PRACTICE INVOLVES MENTORING AND TRAINING

FPs were not convinced (65% stating it was unlikely) that by 2029 all pharmacists practicing at an advanced level will be expected to partner with universities to mentor, train and educate successive generations of pharmacy workers, despite the fact that for some workplaces, this is already expected (Figure 3, Item 3).

In accordance with the *National Competency Standards Framework for Pharmacists in Australia*, advanced pharmacy practitioners influence and develop nationally recognised or higher education programs.[1] This expectation aligns with the principles of a mature profession, as outlined by the Pharmacy Board of Australia's Code of Conduct, which mandates that practitioners contribute to the development of the pharmacy workforce through teaching, supervising and mentoring.[2]

Advanced practice is characterised as a continuum and a journey. Although advanced practitioners often possess considerable expertise in a narrow practice area, a breadth of experience across various sectors of pharmacy is desirable. Such breadth can enable practitioners to appreciate the diverse perspectives and challenges inherent in contemporary pharmacy practice, thereby equipping them to shape today's pharmacy education for tomorrow's pharmacist practitioners. This breadth of experience could be attained through networking opportunities, both informal and formal mentorships, thoughtful career planning and the innovative roles that would allow pharmacists to work concurrently in, or move between multiple sectors, including universities.

The sustainability of collaboration with universities must be considered. Relying solely on individual ambition, diligence or goodwill may lead to burnout. There is increasing focus on practitioner wellbeing, work-life balance and legislation regarding the right to disconnect.[3] Furthermore, intergenerational expectations regarding the distinction between the responsibilities of employers and the responsibilities of individual professionals – in areas such as work, upskilling, and continuing professional development – are becoming increasingly blurred.

Agreements between universities and workplaces that support opportunities for secondments, conjoint appointments, or honorary positions may help to facilitate advanced practitioners' contributions to higher education and the development of the pharmacy workforce. Ultimately, these collaborations can mutually benefit from shared knowledge, resources and opportunities for advancement.

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A NATIONAL AND INTERNATIONAL PHARMACY WORKFORCE

FPs were pessimistic in their view that significant numbers of international universities will have established curricula designed to produce international candidates to meet Australian workforce shortfalls, with 74% indicating it was unlikely to occur by 2029 (Figure 3, Item 4).

Pharmacy workforce shortages have been a significant ongoing issue in recent years, and internationally trained pharmacists are a key element of the Australian pharmacy workforce comprising approximately 15% of workers.[1,3] The international pharmacy workforce plays a critical role in addressing global healthcare needs, with many pharmacists seeking to practice in countries like Australia.[4] To become registered in Australia, international pharmacists typically undergo a process that includes assessment by the Australian Pharmacy Council (APC), completion of a supervised practice program, and passing the national registration exam.[2]

Given the increasing demand for pharmacists in Australia, there is potential for international universities to develop curricula tailored to produce graduates ready for the Australian market. Such programs need to align with Australian accreditation standards, ensuring that graduates meet the same competency requirements as domestic students. Looking at models used in other health professions, partnerships with international universities to produce pharmacists for Australian care settings could take several forms, each with its own advantages and challenges.

Curriculum alignment and accreditation: One model involves international universities aligning their pharmacy curricula with Australian standards, with the aim of having their programs accredited by the APC.[5] This approach would ensure that graduates possess the necessary competencies to enter the Australian workforce directly.

Joint or dual degree programs: Another model is the establishment of joint or dual degree programs, in which students spend part of their study in an international university and the remainder in an Australian institution. This model is currently in use in Australian medical curricula.[7] Such programs allow students to gain an international perspective while also meeting the specific requirements of the Australian healthcare system.

Exchange and placement programs: A more flexible partnership model involves exchange programs in which international pharmacy students complete specific placements in Australia as part of their degree. There are already several Australian universities who offer international placements of up to 12 months and such partnerships could be adapted to allow international students the opportunity for extended placements in Australia. This model allows students to gain hands-on experience in the Australian context while still completing their primary degree overseas.

International bridging programs: Lastly, international universities could collaborate with Australian institutions to create specialised bridging programs that prepare graduates for the Australian market. Bridging programs already exist for registered nurses and midwives.[6] These programs can be delivered either overseas or in Australia and focus on the specific competencies and knowledge areas required for Australian practice.

Each of these partnership models offers unique benefits, while also facing challenges, but all share the common potential of new educational pathways to address Australian pharmacy workforce issues.

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WORK READY GRADUATES

FPs strongly disagreed with the proposition that by 2029 all students graduating from universities will be work ready, removing the need for an intern or pre-registration year, with 89% indicating this would be unlikely to occur (Figure 3, Item 5).

Pharmacy education in Australia is in a state of flux. Currently, like many countries, the pathway to registration as a pharmacist in Australia is completion of an accredited pre-registration university program, either via a specialised four-year bachelor degree or a combination of a non-specialised bachelor degree with a specialised three-year master's program, followed by a one-year supervised practice internship and completion of external assessments including a written and oral exam. The Australian Pharmacy Council standards support quality and variety in workplace integrated learning but does not mandate a specific number of hours, hence the number of experiential learning hours included in the various Australian pharmacy programs is variable.[1]

Instead, the Pharmacy Board of Australia are responsible for overseeing pharmacists' registration standards, which currently mandate a supervised practice year during which pharmacy interns must complete a fixed number of hours.[2] In contrast, in the United States, Canada and much of Europe, and in most allied health disciplines, the extended experiential learning period is integrated within the university program to replace the need for a supervised practice year. Such integrated degrees would shift the responsibility for supervised practice to the university.

Competency-based education (CBE) offers an alternative to these existing educational models.[3] Gaining momentum across various health professions, including pharmacy, CBE is advocated as an education model that is responsive to societal healthcare needs, and aligns with the principles of continuing professional education. Aspects of CBE, such as Entrustable Professional Activities, have already been incorporated into education and training programs. However, a defining feature of CBE is 'time-variable education'.[4] This aspect is often overlooked because current university programs and legislative frameworks do not accommodate this. To fully realise the benefits of CBE, the pharmacy profession must determine if this is the right approach for pharmacy education in Australia. If deemed appropriate, it will be necessary to consider whether we are ready to undertake the necessary and substantial reform of the current educational and training framework in Australia.

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DIGITAL COMPETENCE

FPs were evenly divided on whether all pharmacists will have upskilled to competently utilise Artificial Intelligence (AI) as an efficiency tool to augment their practice by 2029 (Figure 3, Item 6).

AI is an emerging technology and generative AI (Gen AI) applications are now more accessible.[1] Gen AI has a range of applications in the clinical setting, dispensing and procurement, patient interface, and even in providing feedback and assessment in health professionals' education. Its application in the workplace, education, healthcare and therapeutics will undoubtedly transform pharmacy practice. Therefore, the current and future pharmacist and technician workforce will need continued education to lead, shape and leverage the evolution of AI in medicines, pharmacy practice, drug discovery and research. Practitioners require a baseline, general level of digital literacy to enable an understanding of Gen AI applications and their limitations for safe and ethical use (see Theme 6: Adoption of AI in health care).

Upskilling the health workforce in Gen AI technology should start with a defined digital health capability framework, which pharmacy professional organisations can then adapt and incorporate into competency standards for pharmacists and technicians. Such capability statements could then form the basis for educational and training content across the continuum, from undergraduate through to training and continuing education programs.

Pharmacy professional bodies should set the agenda and vision for the role of pharmacists and technicians in shaping how AI is developed, validated and implemented. Regulatory and accrediting bodies will be instrumental in promoting the logistical, resourcing and workforce-related considerations necessary for enhancing the skills of the general pharmacy and technician workforce. While policy will offer broad direction, practical experience will also shape policy. Local practices, driven by a select group of early adopters and leaders with the requisite skills, aptitude and team capacities will lead the implementation of innovative applications of Gen AI in pharmacy practice.

Higher education providers already have institutional action plans in place to responsibly implement Gen AI technologies while mitigating its associated risks. While it is expected that future pharmacy graduates will be well versed in AI and its application in health and research, this would need to be fostered through intentional collaborative efforts that integrate higher education and the workplace, by ensuring access to training versions of applications that enable learning to be conducted in a safe and authentic environment. Undergraduates may have novel cross-curriculum digital health opportunities that span health and technology to enhance their education. A translational research approach in health technologies will continue to be paramount.

With AI technologies evolving at a rapid rate, a continuing education and collaborative approach to workforce development will be essential. Upskilling the broader pharmacy and technician workforce to a minimum level of understanding is crucial to ensure AI technologies can be leveraged for more efficient, cost effective and safer care.

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CONCLUSION

Education is a journey. It enables practice evolution with improved patient outcomes. Recognition for expertise, endorsed and validated at a national level, should attract appropriate renumeration for clinicians achieving advanced levels of practice. With this privilege comes inherent responsibility to grow the capability of the emerging pharmacy workforce through teaching. New digital technologies present opportunities and challenges for the profession, requiring education to ensure their use can optimise patient care and be integrated into modern practice.

RECOMMENDATIONS

1. **Promote national credentialing for advanced pharmacy roles using a standardised competency framework.**

Achieve consensus on extended scope of practice activities, definitions and descriptions, enabling endorsement by relevant national and state authorities so credentials can be recognised across state boundaries and aid in workforce demand modelling.

2. **Enable advanced pharmacy practitioners to demonstrate their skills through the delivery of improved patient outcomes**

Recognition of advanced practice achieved through a transparent and rigorous credentialing process can justify incremental renumeration when opportunities are taken to link practitioners to activities yielding high healthcare value.

3. **Establish formal agreements between training institutions and workplaces**

Increase opportunities for secondments, conjoint appointments or honorary positions through such partnerships, facilitating advanced practitioners' contributions to education and the development of the pharmacy workforce, benefiting both academic and professional sectors.

4. **Adopt competency-based education models to integrate pharmacy undergraduates into work-based training**

Eliminating the need for a separate supervised intern year after graduation, this integration could also facilitate the adoption of competency-based education, which emphasises time-variable education and aligns with societal healthcare need

5. **Implement a digital health capability framework specifically for pharmacy professionals**

This framework should be adapted by pharmacy professional organisations and incorporated into national competency standards for pharmacists and technicians to serve as the foundation for educational and training content.

PARTNER PERSPECTIVE

Australian Pharmacy Council

The Australian Pharmacy Council (APC) is committed to ensuring high standards of pharmacy education to meet the changing needs of our communities. Our continuing work to set standards and accredit pharmacy degree and intern training programs is a crucial part of the journey for pharmacists to gain registration and support the Australian health care system.

APC supports extended scope of practice, and we are expanding our accreditation work to new education programs that credential pharmacists to work in new roles. In 2023 we developed new standards for pharmacist education programs, specifically for pharmacists to undertake prescribing, medication management reviews and roles in aged care. In 2024 we have started to accredit programs of study against these standards which will support pharmacists to work in these exciting new roles.

Our accreditation activities for pharmacist education programs align with the needs of the states and territories who are creating legislation to support registered pharmacists to work in different ways. It also supports the health system workforce demands of an increasing and ageing population.

APC also continues to support Australian workforce shortfalls in our work assessing overseas trained pharmacists as part of their journey to becoming a pharmacist in Australia.

This includes our new Overseas Trained Pharmacists Readiness Assessment (OPRATM exam), to be first delivered in 2025. The redesigned exam has a stronger focus on therapeutics and the application of knowledge to align with evolving pharmacy practice in Australia and reflects our focus of assuring and advancing quality in pharmacy education and assessment. Through the Australian Pharmacy Leaders Forum, we are leading work with partner organisations in the sector to enable these pharmacists to contribute to our workforce through work-readiness and employment programs.

Professor Sarah Roberts-Thomson (Chair APC) and **Bronwyn Clark** (CEO)

FIGURE 3. Education as a Journey

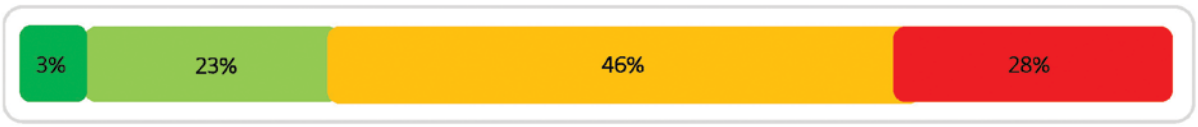
Forecast Panelists' responses to the question, "How likely is it that the following will occur by the year 2029 in the geographic region where you work?"

1. All healthcare facilities will mandate nationally recognised credentialling across an extended scope of practice such as compounding, prescribing, therapeutic drug monitoring and pharmacogenomic analysis.

2. Health systems across all states and territories will remunerate advanced pharmacy practice achievement.

3. All pharmacists recognised to be practicing at an advanced level (e.g. through frameworks such as ANZCAP) will be expected to partner with universities to formally mentor, train and educate the next generation of pharmacists.

4. Significant numbers of international universities will have established curricula designed to produce international candidates to meet the Australian workforce shortfalls.



5. All graduates from universities will be work ready, removing the need for an intern or pre-registration year.

6. All pharmacists will have upskilled to competently utilise AI as an efficiency tool in a variety of clinical and non-clinical practice settings.

THEME 4 – The prescription for a sustainable pharmacy

Advisory Committee Leads: Paul Toner, Melissa Faehrmann
Theme Leads: Centaine Snoswell, Jonathan Nugent
Student Support: Serena Lou, Jack Cullen

INTRODUCTION

In Australia and around the world health systems are under pressure. Ageing populations, rising chronic disease prevalence, economic inflation, environmental concerns, and high costs for new treatments are all weighing heavily on health systems. Sustainability, in its many forms, is an important consideration for individuals and organisations within the health sector. Pharmacists and pharmacies face many sustainability challenges including those related to workforce and services, medicines access and economics, and environmental implications.

Sustainability is a wide-ranging theme and has a significant influence on many aspects of health. In 2022, the Australian Commission on Safety and Quality in Health Care (ACSQHC) published an institutional analysis, policy analysis, and rapid review of the literature to report on sustainability practices and research with a focus on safety and quality.[1] The report identified that many organisations were prioritising sustainability planning and policy development, but Australia did not have any national policies to guide sustainability or standardised metrics against which organisations could monitor.

It was identified 55% of organisations were exploring sustainability measures around workforce and leadership due to its importance for care delivery, with only 9% exploring measures around pharmaceutical use. The research review found environmental sustainability measures were likely to have the greatest impact at scale, making this an excellent area of priority for organisations. This section of *Pharmacy Forecast Australia 2024* focuses on sustainability as it pertains to the pharmacy workforce, medicines access, and the environment.

WORKFORCE SUSTAINABILITY: VIRTUAL CARE

Forecast Panellists (FPs), were very optimistic about likelihood of pharmacists providing regular virtual care to patients by 2029 with 86% indicating it was likely to occur (Figure 4, Item 1). This strong confidence is supported by various factors, including recent advances and uptake in technology and the demonstrated benefits of virtual care. According to *Pharmacy Forecast Australia 2022*, of all the questions under the Future Workforce theme, the strongest level of FPs' agreement was that data derived from newly deployed technology would likely enable a more directed and flexible approach to work.[2]

The ACSQHC defines virtual care as healthcare supported at a distance by information and communications technology.[3] Guidelines provided by ISO 13131 further support the quality planning for telehealth services.[4] Virtual care can be delivered through various modalities, including telephone, videoconferencing, remote patient monitoring, store and forward, and websites or mobile applications.[3]

Current trends indicate that virtual care improves access and quality of care, especially for remote and underserved populations.[5] It aligns well with patient preferences by offering convenience, timely access, personalised care, and a comfortable setting for discussing sensitive health issues.[5] Additionally, virtual care facilitates ongoing monitoring and support with easier follow-up scheduling. It provides an efficient, practical, and sustainable service for patients, while also allowing pharmacists to have more flexible schedules that suit their lifestyles. This flexibility is particularly important for those with additional responsibilities, such as caregiving or further education.

Pharmacists skilled in running virtual care clinics are highly valued by healthcare organisations and hospital pharmacies. Retaining top talent is a priority for hospital pharmacy managers and directors, and virtual care roles enable managers to cast a wider net when advertising positions, as they are not limited to employing pharmacists from the local community. This flexibility supports a more diverse and capable workforce.

Digital enhancements over the last five years have enabled virtual models of care, the integration of new technologies into virtual care supporting more direct and flexible workforce approaches, and enabled pharmacists to deliver more personalised and focused care.[6] Considering the alignment of virtual care with policy guidelines, patient preferences, and workforce needs, it is highly likely that, by 2029, pharmacists will be providing regular virtual care to patients in Australia.

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WORKFORCE SUSTAINABILITY: FLEXIBLE WORK

FPs indicated it was highly likely (83%) the pharmacy sector will adapt to facilitate flexible working arrangements and opportunities offered in other industries, to encourage workforce retention by 2029 (Figure 4, Item 2).

Workforce retention is an acute and ongoing issue for hospital pharmacy. Currently, there are 36,425 registered pharmacists in Australia, with 67% of them aged 25-44. Many become parents in this age group and those entering parenthood would likely benefit from flexible work options. Analysis of Ahpra data indicates a significant number of pharmacists exit the profession between the ages of 40 and 50.[1] These often highly skilled and experienced pharmacists could potentially remain in employment if given the opportunity to work under more flexible arrangements. Flexible work arrangements refer to various employment practices that allow employees to have a degree of flexibility in how, when, and where they work. Types of flexible work arrangements include telecommuting or remote work, flexible hours, compressed workweeks (such as a nine-day fortnight), reduced hours and job sharing.

Flexible work arrangements can be beneficial for both employers and employees. Positive benefits include attracting and retaining talent, developing loyalty and trust, enhancing organisational reputation, and achieving cost savings for both parties. They can also increase employee satisfaction and promote healthier lifestyles by reducing commute stress and accommodating personal needs. These benefits do need to be weighed against potential downsides such as communication issues, accountability concerns, reduced team cohesion, increased isolation, reliance on technology, inconsistent availability, challenges in maintaining work-life boundaries, and potential impacts on career development.

Australian statistics reflect the growing trend towards flexible work arrangements since 2015. In August 2023, 37% of employed people regularly worked from home, slightly down from 40% in August 2021. The main reason Australians worked from home in 2023 was due to flexible working arrangements. The proportion of people working from home for this reason has seen a significant increase, rising from 13% in 2015. Between 2015 and 2019, the primary reason people worked from home was to catch up on work, indicating a notable shift towards flexibility as a driving factor in recent years.[2]

Hospital pharmacy is experiencing this shift towards more flexible workplace practices. Pharmacists who support patient care without providing direct patient care are more likely to be given opportunities to work remotely. However, new technology is also enabling pharmacists with direct patient care responsibilities the ability to work remotely. Traditionally, many pharmacists entering the workforce have expected a conventional Monday to Friday workweek. With the demand for pharmacist expertise outside of normal business hours increasing and the general shift towards more flexible work practices, both hospital pharmacists and employers will need to adapt to the evolving needs of the healthcare sector and the workforce itself.

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WORKFORCE SUSTAINABILITY: SUPPLY AND DEMAND OF HOSPITAL PHARMACISTS

FPs were evenly divided on whether the output of pharmacy university graduates will meet the demand of the hospital pharmacy sector by 2029 (Figure 4, Item 3).

There has been steady growth in pharmacy graduates from Australian universities, with a 2-3% average yearly growth from 2018-23.[2] This is consistent with the growth in registered pharmacists reported by Ahpra. An extrapolation of Ahpra data collected between 2012 and 2023 shows an average growth in the number of registered pharmacists in Australia of 2-3% annually, with the exceptions of the 2020-22 period during which the COVID-19 pandemic led to the creation of the COVID-19 sub-register, explaining a sudden increase of registered pharmacists. Overall, since 2012, the pharmacist workforce has grown by some 35% in the space of a decade, and it would not be unreasonable to predict that by December 2029 there could be upwards of 44,000 registered pharmacists in Australia. Despite this growth, supply of pharmacists in Australia is not expected to meet the FTE demand with a trend towards a further increasing shortfall.[2] One reason for this is the downtrend in the average weekly hours worked by pharmacists which showed decline from 2013 to 2020, although 2021 and 2022 showed a change in this trend.[1] There has also been an increase in the number of hospital pharmacists employed as a proportion of the total pharmacist workforce (from 15% in 2013 to almost 20% in 2020).[1] There has and will continue to be an increased demand for highly skilled and experienced hospital pharmacists to perform complex activities in areas such as education and training, specialist clinical roles, governance and quality assurance, medicines safety and management, digital health and technology, and research and innovation. Today's university graduates will need several years to be able to function effectively in these roles.

As hospital pharmacists are on the Department of Home Affairs skilled occupation list, overseas-trained hospital pharmacists are eligible for a Temporary Skill Shortage Visa (Subclass 482).[3] Despite strong demand for skilled hospital pharmacists and an increase in overseas-trained pharmacists completing Overseas Pharmacist Readiness Assessment (*OPRA™*) or CAOP (Competency Assessment of Overseas Pharmacists) streams through the Australian Pharmacy Council, overseas-trained pharmacists have difficulty securing intern positions to complete their preregistration requirements meaning growth due to immigration has been insignificant.[2]

One reason for the relatively low number of overseas-trained pharmacists undertaking internships is the increase in the Temporary Skilled Migration Income Threshold (TSMIT) to $73,150[4], significantly higher than the award rate for a pharmacy intern,[5] disincentivising employers from employing overseas pharmacists. This issue is relatively new, as the TSMIT was stable at $53,900 over the 10 years until 30 June 2023.

Hospital pharmacy departments wishing to employ experienced overseas-trained pharmacists will need to adapt by offering intern positions that meet the requirements of the TSMIT.

To address the hospital pharmacist skills shortage in Australia, solutions will involve collaboration between hospital pharmacy and universities to ensure pharmacy courses remain a priority, adequate funding to secure intern positions for appropriately qualified overseas pharmacists to enter Australia and increasing the offering of development pathways such as Resident and Registrar training programs delivered by Advanced Pharmacy Australia (formally known as SHPA).

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SUSTAINABILITY OF MEDICATION SUPPLY

A significant proportion of FPs (72%) believe there will be a nationally coordinated strategy to improve communication and/or response to national medicines supply issues resulting from shortages and discontinuations by 2029 (Figure 4, Item 4). Sustainability of medicines supply is a safety issue as supply disruptions can impact patient care and endanger patient health. Shortages and discontinuations have increased in the last decade[1] making it essential that systems for coordinating the communication of and response to these supply issues are addressed to improve sustainability in this essential area of the health system.

Management of medicine stock supplies is a key role of pharmacists and pharmacies as they care for patients. Although this work has become streamlined over the past decades with digitisation of ordering, inventory and storage systems – national shortages and discontinuations continue to disrupt patient care. Australia does not currently have a coordinated strategy for communicating about and effectively responding to these disruptions. Currently, there is limited pre-warning about discontinuations and shortages, and since there is no centralised national response strategy, labour associated with these shortages is duplicated across institutions for tasks like finding alternative products, sourcing them, and acquiring appropriate approvals. Additionally, the immediate requirements for alternative products can cause secondary shortages which exacerbate the supply issues and labour requirements for managing them.

Development of a nationally coordinated strategy would need the following elements to be effective:

- Provide as much warning to pharmacy organisations as possible (hospital and community) either through suppliers or through a centralised system.
- A national or centralised team that can identify alternative products and their sources, rather than duplicating labour by having this activity conducted at each pharmacy.
- Communicate with suppliers and warehouses about the impending shortage or discontinuation so that alternative product supplies can be increased and ordered in advance (by suppliers and pharmacies).
- Streamline emergency approval processes for alternative international products required during shortages.
- Facilitate expedited process for PBS funding for substituted products to maximise access to medicines for patients.

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IMPACT OF COST OF MEDICINES ON HEALTH SERVICE BUDGETS

The majority of FPs (79%) believe it is likely the cost of medicines will outstrip the health service budgets by 2029 (Figure 4, Item 6). Although many mainstream medicines are off patent and have inexpensive generic alternatives, there are various reasons why overall medicines costs are likely to increase, which need to be thoughtfully considered to ensure overall service sustainability. Reasons include new medicines, personalised medicines, and compounded medicines, and costs increase further when medicines fall into two or more of these categories. The belief of FPs that costs will outstrip budget capacity represents an immediate and pressing sustainability crisis within our health system that needs addressing, as budget restrictions in this area will result in inevitable trade-offs in patient care within health services. Coupled with the rising cost of living that will prevent many patients from being able to bear the cost of medicines if they are unable to be funded, Australia is heading for a medicines crisis.

The Australian Government provides large subsidies for approved medicines to standardise costs and try to provide equitable access for citizens.[1] Access to funding for medicines via the PBS is limited in hospitals and agreements permitting this vary between jurisdictions. Although Australia comparatively has some of the cheapest prescriptions in the world for consumers,[2] the systems behind these subsidies represent a specialised area of labour expenditure by hospital pharmacy departments. To sustainably supply medicines and stay within budget, hospital pharmacies need to continually navigate medicines acquisition, supply and reimbursements to ensure that they remain on budget. To remain sustainable, the pharmacy workforce needs to ensure that all medicine supplies meet the criteria for reimbursement including acquiring all appropriate approvals. Additionally, clinical services to reduce medicines errors, reduce medicines related admissions (which have been estimated to cost the health system $1.4 billion annually[3]), and improve deprescribing within hospitals have the potential to positively affect budgets in the long term.[4]

Increasing personalisation of medicines means that new medicines are more specialised, may require compounding prior to administration, and may only be relevant for a small population and therefore require extra approvals and paperwork that is unique for each patient. These personalised medicines and high-cost specialty drugs are contributing to an overall increase in the cost of health care for consumers and the health system.[5,6] Streamlining processes for paperwork and preparation for medicines in these categories could improve the sustainability of their use within hospital pharmacy departments by reducing the workforce requirements and time associated with their supply. This is especially important, given the likelihood that medicines will become increasingly personalised.

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ENVIRONMENTAL SUSTAINABILITY

Most FPs (86%) expect at least half of pharmacies will develop and implement environmental policies to reduce waste from and the carbon footprint of their services within the constraints of recycling services available locally by 2029 (Figure 4, Item 5). As outlined in the introduction, the ACSQHC report highlighted the greatest area for organisations to have an impact at scale is through environmental sustainability strategies.[1] Environmental sustainability is a mature conversation within society at large, with a long history of policy and innovation strategies, like the National Health and Climate Strategy by the Australian Department of Health and Aged Care.[2] Since the provision of pharmacy services includes the supply of medicines, pharmacists and Advanced Pharmacy Australia (formally known as SHPA) have an opportunity to lead this area of health service environmental sustainability through policy development and service innovation.

The immediate problems within pharmacies are that many medicines are provided individually, and that each item requires individual packing. The packaging crisis is exacerbated by factors like items with inner and outer packaging (e.g. oral antibiotic powders for reconstitution), and inclusion of unsuitable dosing aids such as teaspoons, many of which are disposed of immediately in hospitals. These items may or may not be recycled, depending on the dispensary bin options and layout. The pressure of service provision within a hospital pharmacy means that staff are often focused on speed of provision to ensure appropriate patient care and, while this is an important focus, it doesn't consider the environmental impact of the waste produced. This is also true for waste management across wards and departments within hospitals. Moves toward fully closed loop medicines management mean Australian hospitals will be considering unit dosing for patients. Unit dosing robots produce a large amount of plastic non-biodegradable waste and this should be considered when assessing the move towards unit dose packaging. At a minimum, dispensary workflows and bin placement should be reviewed to improve recycling during the dispensing process. Hospitals could also work with suppliers to discuss reducing the unnecessary packaging being supplied. One example that could likely occur to address this topic within the next five years could be changing workflows to encourage reuse of boxes where possible and developing creative policies to repurpose old equipment as other measures to reduce waste.

The impact of metered dose inhalers should also be considered in reviewing the environmental sustainability of local medicines management practices, as these are both disposable and contain propellants which are potent greenhouse gases[3]. Use of nitrous oxide, which has a significant environmental impact[4], and the distribution and use of gases within the hospital like desflurane and CO2.[5-8] Additionally, according to the 2022 Monash report for the ACSQHC only 9% of the organisations investigated were exploring sustainability policies related to pharmaceutical disposal and waste management.[1] Sustainable medicines disposal represents an area for Advanced Pharmacy Australia to become a national and international leader through policy and innovation, with the potential for a significant impact given the volume of medicines processed and used within hospitals.

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CONCLUSION

Sustainability in the pharmacy sector is a complex and important issue that needs a broad approach to address the challenges presented over the next five years, considering workforce changes, medicines supply, economic factors and environmental impact. As healthcare continues to evolve with new technologies, increasing demand for flexible work and the growing complexity of managing medicines, we need proactive strategies to keep hospital pharmacy services effective and sustainable. Virtual care and flexible working conditions will be key to retaining skilled staff, while a coordinated national approach to medicines supply and cost management is crucial to avoid potential crises. The pharmacy sector must also focus on environmental sustainability by adopting policies that reduce waste and improve recycling. By addressing these critical areas, hospital pharmacy can play a significant role in creating a sustainable healthcare system that benefits both patients and pharmacy professionals in the years to come.

RECOMMENDATIONS

1. **Maximise the use of digital technologies to deliver virtual patient care**

Harnes digital enhancements to improve access and quality of care, especially for remote and underserved populations.

2. **Expand flexible working models**

Review and develop flexible working arrangements and make available in all pharmacy departments as a strategy to retain staff.

3. **Improve growth and retention via intern programs**

Fund additional intern positions to support growth and retention in the hospital pharmacy workforce; ensure salaries for intern positions exceed the Temporary Skilled Migration Income Threshold (TSMIT).

4. **Offer training programs for career development**

Hospital pharmacy departments not currently offering AdPha (formerly SHPA) Resident Training or Registrar Training programs should consider how these development frameworks can be implemented.

5. **National leadership on medication shortages**

Implement a centralised coordination of medicines shortages and discontinuations at a national level.

6. **Increase PBS funding**

Review, enhance and implement funding models for access to PBS medicines in public hospitals across all jurisdictions.

7. **Develop and implement environmental sustainability policies**

Develop and implement environmental policies to reduce waste and improve the carbon footprint across pharmacy services, both national policies led by AdPha (formerly SHPA) and local innovations led by sites.

8. **Improve data management and accessibility**

Ensure hospital pharmacy workforce data is readily available to identify current and future needs for pharmacists, interns and pharmacy technicians.

PARTNER PERSPECTIVE

I was delighted to launch Australia's first National Health and Climate Strategy at COP28 in Dubai in December 2023. The Strategy was developed in recognition of the urgent need to address the health risks associated with climate change, and to support our health system to play its part in Australia's transition to a net zero economy. The Strategy sets out a whole-of-government plan, over the next five years, to achieve a sustainable, resilient, high-quality, net zero health system.

Australia's health system produces significant waste and greenhouse gas emissions. It is estimated that greenhouse gas emissions from Australia's health system were equal to 5.25% of Australia's national emissions in 2021-22. The Albanese Labor Government is committed to reducing health system greenhouse gas emissions in the years ahead, in collaboration with health professionals across Australia. Pharmacists will play an important role in achieving this vision, including by reducing waste and greenhouse gas emissions from their services.

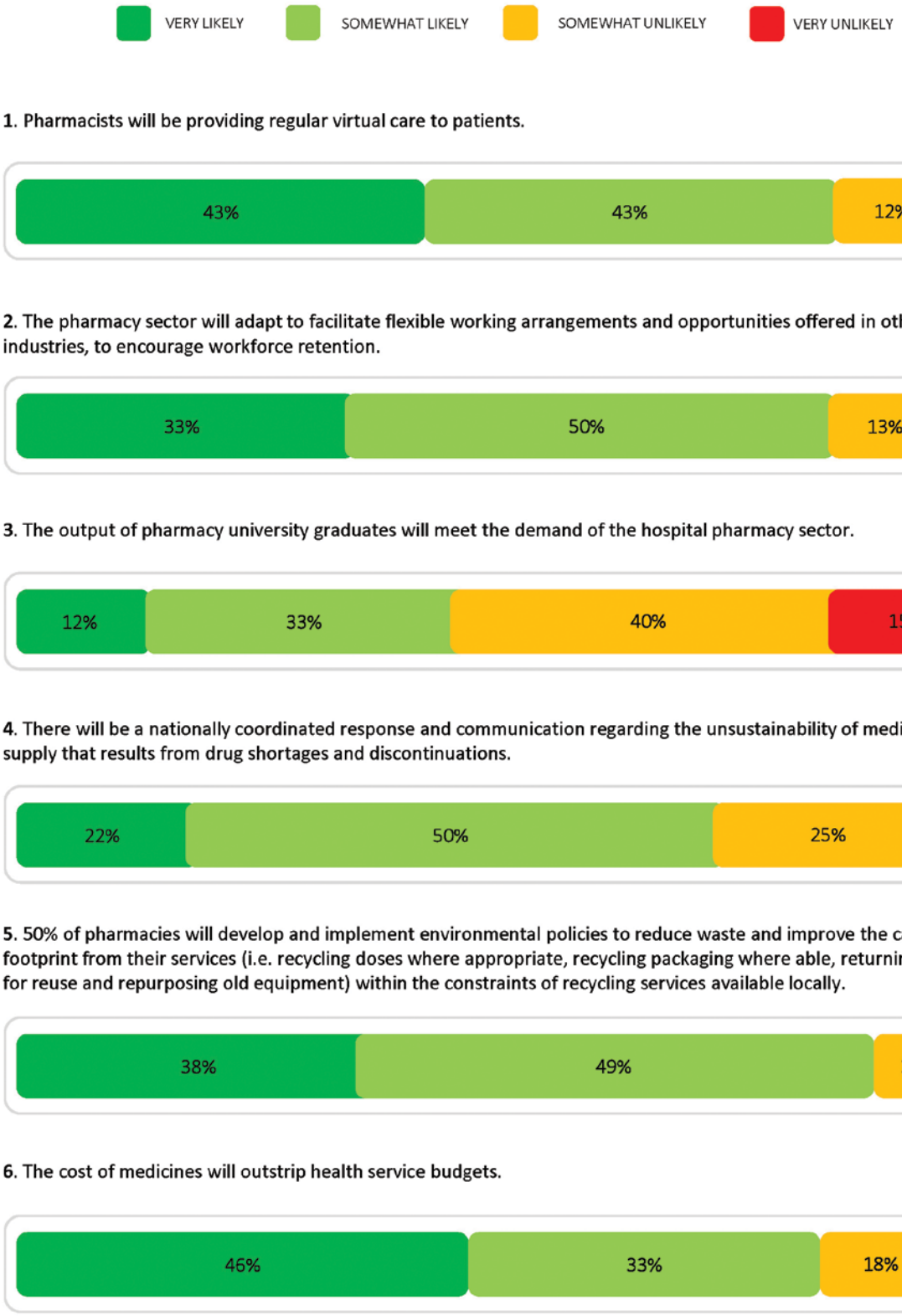
The reduction and sustainable management of health system waste is a priority area of action in the National Health and Climate Strategy, and the Australian Government is committed to reduce waste Australia-wide. We are working towards recovering 80% of all waste by 2030, phasing out problematic and unnecessary plastics by 2025, and halving the amount of organic waste sent to landfill by 2030. We look forward to collaborating with pharmacists on waste reduction and management initiatives, such as the National Return and Disposal of Unwanted Medicines Program, which allows people to dispose of expired or unwanted medicines in a safe and environmentally friendly way via community pharmacies.

I welcome Australian pharmacists' commitment to delivering high-quality and sustainable healthcare for all Australians, and thank you for your continued partnership in this crucial work.

The Hon Ged Kearney MP, Assistant Minister for Health and Aged Care,
Assistant Minister for Indigenous Health

FIGURE 4. The prescription to sustainable pharmacy

Forecast Panelists' responses to the question, "How likely is it that the following will occur by the year 2029 in the geographic region where you work?"



THEME 5 – Digital domination: Embedding pharmacy in digital governance

Advisory Committee Leads: Emma Sykes, Monica Rayson
Theme Leads: Daniel McKavanagh, Ashley Crawford
Student Support: Roseanne Lee, Stacey Konash

INTRODUCTION

There is no pharmacy future in which the digital environment isn't considered an integral part of the profession's growth. However, with technological improvements creating larger pools of data to interpret and respond to, it is imperative the pharmacy sector is equipped to not only be malleable to change but at the forefront of its development.

Digitisation of the health sector, including pharmacy and medicines management processes, are already well adopted throughout Australian health care. Most jurisdictions have implemented, or are preparing to implement, electronic medical records. Digital workflows bring significant change to organisations and a greater reliance on technology; this creates exciting opportunities for delivery of patient care and more efficient workflows, but also creates new risks that need to be considered and planned for.

This theme explores what can be expected as the digital domination of health care continues over the next five years and considerations for pharmacy teams to put into practice now to facilitate safe and effective use of digital health technologies.

PHARMACY GRADUATES WILL BE 'BORN DIGITAL'

Forecast Panellists (FPs) expressed optimism with the majority (82%) believing it will be likely by 2029 that most pharmacy students will graduate with a high level of digital competency (Figure 5, Item 1).

Pharmacy has evolved significantly from its traditional role of medicines supply, as routine use of advanced technologies such as electronic medical records (EMRs), clinical decision support, and telepharmacy has transformed practice and strengthened the role of the profession in supporting quality use of medicines in a digital space. Every year, there are more demands on the health workforce as the delivery of patient care changes and evolves in an increasingly digital society[1]. Australia needs an empowered digital health workforce to achieve generational change across the health system.

Looking to the future, the role of pharmacists will continue to evolve alongside advancements in technology. As health systems become more integrated and data-driven, pharmacists will be expected to harness big data and artificial intelligence (AI) to optimise medicines management (see also: Theme 3: Service evolution). It is evident from the survey response that FPs see the value in digital transformation and expect our graduates to be mission ready for this. One situation where this will become increasingly important into the future is the expansion of personalised medicine, driven by genomic data that will require pharmacists to interpret complex clinical information and tailor treatments accordingly.

The future of pharmacy practice will likely involve greater collaboration with other healthcare professionals through interoperable digital platforms. These virtual multidisciplinary environments will ensure pharmacists can contribute their expertise more efficiently, and further across physical sites.

Partnering with organisations such as The Australasian Institute of Digital Health, the pharmacy profession has an opportunity to build digital health capacity into the existing workforce, by developing professional career pathways in digital health and health informatics and adapting the available competency frameworks.

Educational institutions will play a pivotal role in preparing future pharmacists by integrating digital health competencies into their curricula. Clinical scenario training should be built upon realistic platforms and use current technologies, but also address emerging trends such as AI, machine learning and personalised medicine.[2] Providing students with hands-on experience through simulations and internships in

healthcare settings that are digitally advanced, and settings with lesser digital capability, will enable them to apply theoretical knowledge in real-world scenarios regardless of digital resources.[3]

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DIGITAL SOLUTIONS WILL EXIST TO SUPPORT DISASTER RECOVERY INSTEAD OF PAPER-BASED CONTINGENCIES

Disaster recovery plans are a critical aspect of good clinical governance and risk management but examine most pharmacy department business continuity plans and a paper-based solution forms the basis of the response to a digital disaster. Threats to the use of digital systems can be multifactorial. Pharmacy sectors can be impacted by physical disasters that may impact the use of hardware or physical servers, but increasingly healthcare also needs to manage the threat of cyber-attacks leading to down time or data breaches.[1]

FPs felt cautious optimism, with 63% expressing it was likely that digital solutions will exist to support hospital pharmacies in maintaining business-as-usual activities in the event of a digital disaster by 2029 (Figure 5, Item 2).

Digital solutions can already be used to mitigate the impact of cyber-attacks with data security, and recovery of essential and detailed data, being critical components of disaster recovery activities. Robust data protections, backups and recovery are often digitised processes that can underpin local strategies for digital disaster recovery. The Australian Digital Health Agency provides guidance to support health care providers in developing digital back up strategies to ensure at least one copy of the business data can survive any cyber incident.[2]

Much of the advice for developing digital disaster recovery plans in health has stemmed from primary care settings, where less digital complexity exists than in large hospital organisations. Pharmacy faces some unique challenges when it comes to digital disaster recovery plans. In particular, the use of multiple software solutions (including dispensing, electronic medical records, automated dispensing cabinets and in pharmacy robotics) can require complicated business continuity processes depending on the disaster experienced. As technology is embedded in our hospitals, there is much to learn from other sectors in which digital solutions are essential to business activities. Air traffic control, for example, relies on many continuity protocols including cloud solutions and active standby solutions to minimise digital disaster.[3]

As technological advances occur, the accessibility of digital backups should increase. There will also be policy and legislative levers that influence the response of the health care sector. The National Digital Health Strategy 2023-2028 recognises that critical infrastructure owners need to be supported through regulatory actions which improve security and digital health resilience.[4] Other Commonwealth policy mandates on the horizon, including mandatory electronic prescribing, may create forcing functions to ensure digital defaults exist when business systems are compromised.

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LACK OF CONFIDENCE IN THE SECTOR TO DELIVER DATA TRACEABILITY ON MEDICINES FROM MANUFACTURER TO PATIENT

Over half of FP's (62%) believe it is unlikely the Australian hospital sector will be able to trace medicines use from manufacturer to the patient by 2029 (Figure 5, Item 3). This response is unsurprising as barriers to the delivery of this outcome are likely multifactorial and could involve inconsistency in applying data matrix codes – including lack of regulation for unit dose barcodes, batch and expiry – limited local manufacturing capability within Australia and maturity of technology in the hospital setting to trace medicines.

The optimism shown from some FPs (37%) that this can be achieved could be attributed to successful examples of these systems being used internationally, along with the imperative to improve medicines safety in the context of medicines traceability. Medicine-related problems contribute approximately $1.4 billion in annual health care costs in Australia[1], however closed loop medicines management systems (including medicines traceability) demonstrate potential to reduce medicines administration errors in the hospital setting when compared with paper settings or EMR alone.

The American Society of Health-System Pharmacists recently published results of their national survey into pharmacy practice in hospital settings, which highlighted 73.6% of hospitals are using machine readable coding to verify dispensing in pharmacies.[3] Australia has implemented a regulatory mechanism to support a move towards standardisation of medicines packaging. In 2021, the Therapeutic Goods Administration published their *Standard for serialisation and data matrix codes on medicines (TGO 106)* to facilitate the move towards greater traceability of medicines in the hospital setting.[4]

There are significant shortages of essential medicines and treatments in the Australian market (with intravenous fluids a current challenge at the time of writing) and improved end-to-end traceability could be an essential step in generating the data needed to better predict fluctuating system demand. The potential value of this traceability goes beyond shortage management; such a system could improve recall management, reduce medicine errors and improve pharmacovigilance and monitoring to support patients' confidence in the authenticity of their medicines[5] and medicines information. Clarity around data management and privacy also needs to be considered at the implementation stage so that individual patient privacy is prioritised by all stakeholders involved from manufacture to final administration.

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DIGITAL THERAPEUTICS: FROM THE PHARMACIST TOOLBOX INTO THE PATIENT'S POCKET

Digital therapeutics (DTx) represent a novel class of treatments that utilise software to prevent, manage or treat medical conditions. Initially, these technologies served as adjuncts to traditional treatments, providing support for medicines adherence (blood glucose monitoring), patient education and lifestyle changes. Over the past two decades, digital therapeutics have evolved significantly, gaining recognition from the Therapeutic Goods Administration (TGA) and equivalent regulatory bodies in the United States and Europe, which have all approved several DTx products for conditions including diabetes, depression and chronic pain.

FP's expressed some optimism with more than half (62%) believing it likely by 2029 that more of the pharmacy workforce will trust digital therapeutics as part of their non-pharmaceutical therapy toolbox (Figure 5, Item 4). That is, pharmacists will have the confidence to prescribe or recommend the use of therapeutic interventions delivered as an application or digital resource alongside 'traditional' pharmacological medicines.

DTx offer a personalised approach to patient care and can use real-time data to tailor treatments to individual needs. By providing interactive and accessible support, DTx can bridge gaps in care and ensure patients remain actively involved in their health management. For pharmacists, this means an expanded role in patient care, where they can leverage such technology to monitor patient progress, intervene to improve therapy and provide more comprehensive support within a multidisciplinary team.

The future of DTx in pharmacy practice is likely to be shaped by several key factors. The accumulation of reputable evidence supporting effectiveness will be critical to enhance pharmacist trust and confidence to use and recommend DTx.[2] Moreover, as these tools become more sophisticated, their ability to deliver meaningful health outcomes will increase, further solidifying their place in the toolbox.[2,3]

Regulatory frameworks will also play a pivotal role. Clear guidelines and standards for the development, evaluation and implementation of DTx will ensure their safety and efficacy, fostering trust among pharmacists. Education and training will also be essential, equipping pharmacists with the knowledge and skills needed to effectively integrate digital therapeutics into their practice.[4,5]

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PHARMACY LEADERS ARE CRUCIAL TO DIGITAL INNOVATION INVOLVING MEDICINES

FPs strongly supported the likelihood that pharmacy leaders and specialists will be consistently engaged to provide governance for digital innovations involving medicines, with 80% indicating this is likely to occur by 2029 (Figure 5, Item 6).

Pharmacists are already recognised in health services as integral members of multidisciplinary teams, supporting clinical governance activities. This is in part driven by the expectations set through the Australian Commission on Safety and Quality in Health Care National Standards, requiring organisations to develop robust, multidisciplinary frameworks for medicines governance.[1] Additionally, the Commonwealth Department of Health and Aged Care *Digital Health Blueprint* is underpinned by principles of engaging and uniting health sector stakeholders to support the delivery of strategic digital health initiatives.[2]

The confidence shown by FPs has likely been driven by clinical governance mechanisms influencing digital governance, and a greater involvement and visibility of pharmacists within digital health projects, particularly as many sites embed the use of electronic medical records. Advanced Pharmacy Australia (formally known as SHPA) released its first *Standards of Practice in Pharmacy Informatics* in March 2024.[3] This standard articulates best practice for the provision of pharmacy informatics services, however the fulfilment of informatics roles that can influence the digital health structure, leadership and culture of an organisation, requires advanced level practitioners to develop over the short term.

Many larger healthcare organisations have invested in the development of digital health frameworks that stipulate requirements for governance and investment priorities in alignment with broader strategic plans, but we are yet to see explicit requirements to embed pharmacy leadership into such governance mechanisms. Learnings from digitally mature organisations show strategies are needed to promote evidence-based connected digital health care, and clinical expertise is critical to evaluating the risks and benefits of these technologies.[4]

While FP optimism suggests this is on the horizon across the Australian health sector, there is still the question as to whether this leadership is consulted, or truly embedded. What can be said is these pharmacy leaders will be pivotal in advocating for the digital strategy which progresses interoperable technology to harness safety and efficiency benefits.

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DIGITAL AGILITY TO SUPPORT AND ADVOCATE THE UNIQUE ROLE OF PHARMACY WITHIN HEALTHCARE

FPs expressed an almost even split on the likelihood that most health services will deliver services in accordance with a pharmacy-specific digital strategy by 2029 (Figure 5, Item 5).

The integration of digital strategies in healthcare has evolved rapidly over the past few decades. Pharmacy-specific digital strategies have expanded to address the unique needs of medicines management and patient care with the development of clinical decision support systems (CDSS), electronic medication management (eMM) platforms, and patient adherence tools. Digital tools are now integral to pharmacy practice, enabling clinical record access in real-time, improving clinical decisions and providing more patient-centred care.

Adopting a pharmacy-specific digital strategy can pave the way to enhanced patient safety by reducing medication errors through electronic prescribing matched with CDSS, and can improve the efficiency and effectiveness of pharmacy operations by targeting objectives such as automated inventory management and supply support. These foundations ensure that pharmacies remain agile and responsive to changing healthcare landscapes, ultimately improving patient outcomes and satisfaction.

Several factors will influence the future trajectory of pharmacy-specific digital strategies, however responses from half of the FPs see this as a challenging area to address. Technological advancements will play a crucial role, as emerging technologies such as AI offer new opportunities for enhancing pharmacy practice. These technologies can analyse large datasets to identify trends and optimise medicines therapy management, leading to more effective and efficient patient care.

The peak professional bodies should foster development and implementation of digital strategies to ensure consistency and reliability across different healthcare settings. Some jurisdictions are further ahead than others: The WA Nursing and Midwifery Digital Health Strategy, and Queensland Health Allied Health Digital Transformation roadmap provide a glimpse of how disciplines, at scale, can adopt digital transformation.[1,2] Discipline agnostic organisations such as the Australasian Institute of Digital Health, have frameworks that can be adapted to pharmacy use.

Investment in digital infrastructure and training for pharmacists will be essential to build the necessary capabilities and confidence to utilise these tools effectively.

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CONCLUSION

The future of pharmacy practice is undeniably digital. FPs expressed varied levels of optimism regarding the pace and extent of digital transformation in the pharmacy sector over the next five years. There is a clear consensus that pharmacy graduates entering the workforce will be prepared for working in digital health environments. There is strong optimism that pharmacy leaders and pharmacy digital health specialists will be consistently involved in providing governance of digital innovations involving medicines. Despite the optimism, questions remain regarding how the pharmacy workforce will actually achieve these.

Interestingly, but perhaps unsurprisingly, there was less optimism when it came to preparing for disaster recovery, trust and use of digital therapeutics and traceability of medicines throughout the supply chain. These views are likely a reflection of the ongoing concerns about workforce capabilities, governance, regulation and technological infrastructure in the current Australian healthcare setting. There are many lessons to be learned from the digitisation of industries outside healthcare. While the healthcare sector dwells on its complexity and nuances, it is likely that healthcare consumers and government bodies will continue to drive the digitisation of healthcare, including pharmacy, with the objective of increasing patient-centred care and greater efficiencies.

Pharmacy leaders need to prepare now. Successful implementation of digital health in pharmacy will require strong leadership, careful planning, good governance and collaboration across the nation's health services to avoid siloed advancements and drive a deeper understanding of how technology can support patient-centred healthcare.

RECOMMENDATIONS

1. **Advocate for policies that support the integration of digital health and current technology in pharmacy practice and undergraduate education**

This includes ensuring adequate funding for digital infrastructure, realistic training electronic medical records (EMRs) and decision support systems.

2. **Consider digital disaster recovery as a key criteria for evaluating new technologies and building into digital health strategies.**

Consider disaster recovery and business continuity requirements from the outset of new digital technology implementation. Pharmacists with skills in disaster planning who are crucial to these processes need to advocate with organisational leadership for their involvement.

3. **Invest in digital infrastructure that ensures interoperability of systems to leverage safety and efficiency benefits.**

Without the technological capabilities, the ability to harness the data available from medicines supply chains remains untapped. There is significant potential to improve both safety and efficiency as this data becomes readily utilised.

4. **Advocate for clear and translatable regulatory guidelines and standards for the burgeoning field of digital therapeutics (DTx)**

Pharmacists should be involved in policy development to ensure that there is confidence in the regulation to support the safe and effective use of DTx.

5. **Embed pharmacy leaders as key members of digital health governance pathways**

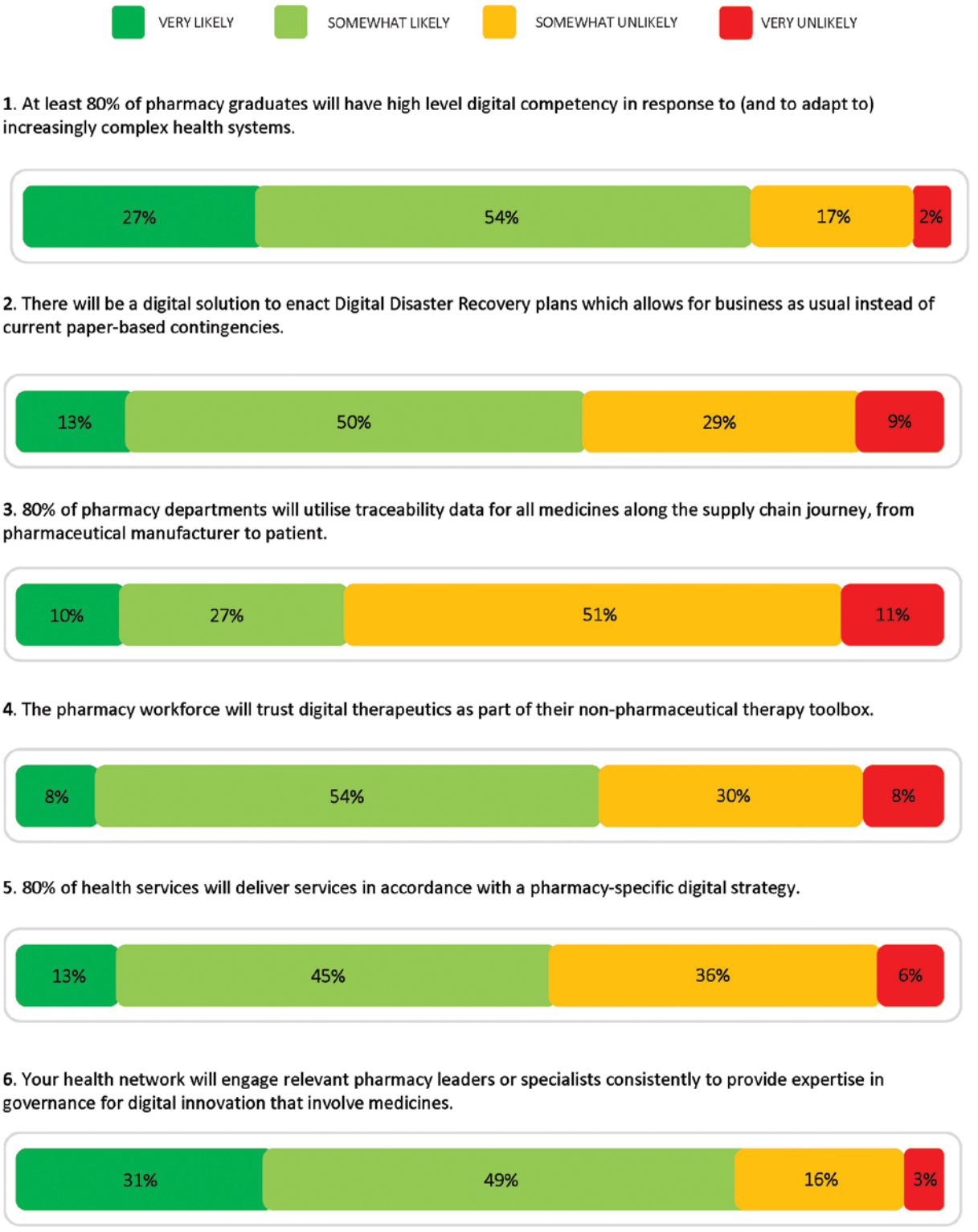
Clinical consultation with pharmacy leadership is necessary to transition towards integrated digital solutions for medicines management, including closed loop medication management and medicines traceability.

6. **Foster collaboration to create a unified approach to digital strategy implementation.**

Collaboration between pharmacists, other healthcare providers, technology developers, and regulatory bodies can drive innovation and ensure digital tools meet the practical needs of pharmacy practice; develop strategies to engage and educate patients about the benefits of digital health tools to enhance adoption and utilisation.

FIGURE 5. Digital domination: Embedding pharmacy in digital governance

Forecast Panelists' responses to the question, "How likely is it that the following will occur by the year 2029 in the geographic region where you work?"



THEME 6 – Adoption of AI in health care

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INTRODUCTION

Generative Artificial Intelligence (AI) catapulted AI into the public domain with ChatGPT seeming to pop up overnight; health care, like many other industries, is scrambling to detail how it will incorporate and adopt AI. While the recent interest has been driven by generative AI, this it is an umbrella term that covers many different pieces of technology and timelines as Machine Learning dates back to the 1950s.

AI can mean different things to different people. Some may use AI as a novelty – an improved search engine, a content creator or a process augmentation tool – or see it as an existential threat to their work. All of these things can be true for different people, and it illustrates the complex considerations and emotions when discussing the topic. Fundamentally, AI is a tool, and we have only just started to scratch the surface on how it will be used in healthcare. The value that it brings needs to be clearly understood and articulated. It can and will have meaningful impacts reducing the amount of effort to undertake some tasks and processes, and it will eradicate the need for some to be undertaken altogether.

There are three key questions to answer. What does this mean for pharmacy? What role will pharmacy play in AI development and implementation? Will the sector just 'let it happen' or look for ways to use developed product, or even play a key role in developing and managing these tools?

WHERE AI WILL HAVE THE MOST IMPACT

Forecast Panelists (FPs) demonstrated considerable optimism about using AI in health care into the future, with 78% agreeing it was likely that AI-enabled augmentation of pharmacy service tasks and processes will have a net positive impact by 2029 (Figure 6, Item 2). FPs were also largely positive (79%) that AI-enabled tools will likely play a role in freeing up time for pharmacists to take on additional tasks, expand scope of practice, and positively impact how pharmacy organisations operate (Figure 6, Item 1).

The area in which the pharmacy profession will feel the most impact in the short term will be from automation of administratively repetitive and burdensome tasks. This positive impact on capacity will be seen as a universal enabler to expand scope of practice at all levels, iterate on improvements in virtual care models and support the sustainability of the workforce in managing the challenges from a rapidly growing and ageing population.[1] Examples in this area are automated collation of medicines dispensing records, summarisation of clinical documentation and proactive dispensing.

In the medium to long term, the most impactful AI-enabled tools will be seen in domains involving analysis of data streams from collated patient data (e.g. remote monitoring, decision support and alerts). Internet of things (IoT) devices will play an increasing role as remote monitoring in virtualised care models as they are adopted and mature.[2] Data science skillsets will become an expected part of the healthcare worker toolkit, which will require the workforce to adapt and learn these skills to enable its impact.

These short to long term impacts first require a healthy and well-resourced digital ecosystem to be in place to support change. Additionally, the ecosystem should be one that each organisation has control over and that enables combinations of AI technologies (computer vision, machine learning) with integration capabilities to deliver high quality care.

Translating AI models into practice takes time. Training fit-for-purpose AI models from scratch requires large 'cleaned' datasets to be curated, which may or may not contain patient sensitive information. The concern here is the inherent difficulty in obtaining quality and complete healthcare data within digital systems, as existing patient records may be siloed within systems that are not integrated. The incidence of incomplete and inaccurate records is common, and assembly of de-identified data can be labour intensive. Moreover, robust AI systems require rigorous testing – ensuring the code meets industry standards – and integration into existing systems without disrupting workflows is key to return benefit to the healthcare worker. These lengthy processes may impose delays in the deployment of AI systems, requiring leaders to manage expectations that these technologies will take time to implement. Understanding these challenges is imperative while navigating the process of translating AI into practice.[3]

For those looking to begin their AI journey, pharmacy leaders and health services could first explore low-risk practical applications that do not require sensitive patient data to build tacit knowledge in responsible AI (RAI) practices[4] and develop 'quick wins' and learn from these experiences to tackle harder challenges. For example, the implementation of AI in managing supply logistics and medicines storage is an excellent starting point for most pharmacies. Enhancing these systems by identifying potential upcoming shortages or changes in demand, and Look-Alike, Sound Alike (LASA) medicines and containers, can help to improve awareness of these medicines safety principles and decrease the likelihood of dispensing errors. As an extension to this idea, implementing an AI model that could suggest planograms that then mitigate those identified risks would have positive impacts within the dispensary and in imprest areas.

Once fundamentals are established and strategies to mitigate data risk are discovered, other applications that carry greater risk may be explored locally by a team that has experience in translating AI into practice.

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THE BENEFITS OF AI WE ARE LIKELY TO SEE

It is more likely that organisations that leverage AI will be expected to benefit by increasing efficiency, improving population health outcomes, enhancing clinician experience and ensuring the sustainability of a quality healthcare system into the future. Outcome measures, such as disease progression, mortality, readmission, and patient experience, represent the quality and cost benchmarks that healthcare organisations aim to improve.[1] Future governments will increasingly be interested in how these metrics are affected by the use of AI systems and will likely seek for these to be factored into funding mechanisms (e.g. hospital acquired complications) as benefits become apparent and healthcare costs increase from an ageing population.

The effective use of AI-enabled systems can be instrumental in meeting those expectations and goals. Notably, a substantial proportion (79%) of FPs anticipate the likelihood of significant benefits from the introduction of AI-enabled systems in local health services by 2029, highlighting optimism towards AI's potential impact on health care (Figure 6, Item 3). This evident enthusiasm underscores the necessity for practical AI implementation.

The question of what other benefits the workforce will see is dependent on how leaders are motivated to adopt this technology. It can be something to be pushed onto (vendor led) or something actively pulled towards and engaged with (workforce led).

If leaders see AI as a vendor led technology, they will benefit from the convenience of being able to procure 'ready for production' models quickly, compared to locally made models. On the other hand, they may not be positioned to evaluate and question the capabilities, limitations, sustainability and specific use-cases of such hypothetical AI systems due to implications of intellectual property rights.[2] Given these models also need to be continually retrained over time[3], organisations could become dependent on commercial subscriptions for systems that are not completely fit for purpose. When considering vendor led implementation of AI-enabled systems, local health services (particularly regional and remote areas) can face unique challenges when compared to metropolitan regions. Connectivity and reliance on the internet and cloud services are critical factors in adopting these solutions. In regional and remote areas, internet connectivity can be unreliable, making it challenging to fully utilise cloud-based AI systems. Therefore, it is essential to aim for AI systems that can be run locally and onsite, ensuring functionality regardless of internet connection.

The benefit of a workforce led approach is expertise grows within the organisation to implement truly fit for purpose models. Other benefits include that data is (usually) kept in-house, trust in the AI model is usually higher with end users (locally made), limitations on training data are more transparent and costs can be lower as, in many cases, simpler models such as classifiers, decision trees, or linear regression can be highly effective and easier to implement, offering a practical solution without the complexity and resource demands of more advanced AI systems.[1] Given the significant effort to build and set up complex AI systems (e.g. large language models) from scratch, organisations that are mature enough to need such complex models should seek out pre-trained AI models that are closest to their needs and then fine-tune and specify their tasks accordingly. Open-source AI communities, such as HuggingFace[4] are a rich resource to assist in this space.

In a workforce led environment, proactive steps to establish channels of feedback for continuous improvement are essential. Leaders should have a say in developing, implementing and evaluating AI tools, providing insights from the frontlines of patient care to inform the refinement and improvement of these systems.

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HARNESSING AI IS A PEOPLE PROBLEM, NOT A TECHNOLOGICAL ONE

The US government is a leader in planning for large-scale AI adoption with a mandate to recruit and create positions to support the incorporation and utilisation of AI[1] across government departments. Whether it is risk mitigation or the value proposition of AI as the main motivator, taking ownership of the selection, management and oversight of AI utilisation are on the agenda. Not to be left behind, private healthcare institutions have also placed a strong emphasis on AI research and planning as part of their own strategies, with examples from the Mayo Clinic[2] and Mount Sinai Health Service.[3] Not wanting to be left behind, Electronic Medical Records (EMRs) have also announced work with OpenAIs ChatGPT.[4]

Examples like this represent changes happening in the industry. We are downstream of the global markets that create this partnership and development. Advancements like this are crucial to the utilisation and impact of AI, but they do not cover the pharmacy industry end-to-end. Many processes exist outside of the big systems currently used and, for change that will be driven by business, FPs were divided on whether pharmacy departments will have employees specifically to help chart the path through the complexity of AI by 2029 (Figure 6, Item 4). As an industry, the growing representation in pharmacy informatics and technology may absorb this role, but there are considerable differences in the scope and focus of those teams between jurisdictions. Additionally, most of those roles are facing EMRs and not the pharmacy business. If it isn't coming from within the department then where will it come from?

There is a need to develop knowledge across the business in the use of AI technology. Already in the literature there are valid considerations for AI-based clinical decision support systems (CDSS)[5] and where liability sits in the event of harm.[6] For these authors, those considerations must be balanced against the absence of a workforce to undertake a task. The demands on health care, the time to train staff, rising costs and increased patient complexity all contribute to global health care workforce shortages.[7] So, the question remains: if the pharmacy industry intends to harness the overwhelming positive expectations of AI, who will be leading that discussion within the organisation and balancing these considerations? It will be the people and/or groups charged with the responsibility to effectively manage risk, minimise wrong turns and reduce opportunity cost to ensure that there is a robust process for the selection and focus on high value areas specific to AI.

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THOUGHT LEADERS NEED DEEP KNOWLEDGE OF PROCESS, TECHNOLOGY AND VALUABLE TARGETS FOR CHANGE

Technology adoption typically follows an S-curve, a period of early adopter investment in a platform followed by exponential growth before the impact of the technology reaches a saturation point.[1] As a type of technology, AI will likely follow this pattern that has been broadly understood for many years. This is a sentiment that FPs felt strongly positive about, with 90% indicating it was likely by 2029 there will be clear early adopters and innovators in the area of AI utilisation in medicines management and use cases in pharmacy. The peculiarity of recent advances in AI is the power, reach and access. ChatGPT had over 100 million users just 2.5 months after launch.[2]

The value of any technology, and specifically AI, is in its ability to 'fit' a problem as opposed to how new and shiny it is – it is why we continue to see some older models continue to play a critical role in AI, rather than fading into obsolescence. The true value of AI is not the repetition or synthesis of a task that people do – although that can be valuable in some processes – it is the ability to eradicate the need to do a task in the first place.

Applications of AI that truly chip away at activities and tasks that otherwise lead to high costs, training impost and safety risks for the delivery of health care are where the greatest value to health care will be; anything less than that will likely prove to be a novelty.

FPs strongly agree (71%) there will be innovators as AI will feature in some way in pharmacy department strategic plans and roadmaps (Figure 6, Item 6). Innovators think ahead and seek to identify the continued opportunities that result from whatever change is forecast. Problems can occur as perspective is limited by our accumulated knowledge, and that is always changing. At what point are we on the S curve of advancement and adoption, at what point is it valuable to invest to realise benefits, and can requirements be met within the capabilities of computer power into the future? Only time will tell.

The most challenging question might be: what happens if you are downstream of a disruptive innovation, it the disruption happens to you and not from you? For thought leaders in this area, guidance is required to avoid harm, ensure ways to maximise impact and perhaps, most importantly, nurture and create the workforce for the future when some of the tasks currently delegated and required of working staff, have disappeared.

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CONCLUSION

Discussion around AI evokes many thoughts, opinions and feelings. FPs overwhelmingly considered the impacts of AI to be positive across areas of productivity, task augmentation and health service delivery with detail concerning local adoption expected in relevant planning documents. However, sentiment was split on how to get there with far fewer FPs believing they will have roles within their own departments to drive adoption and ensure safety, which somewhat contrasts with global trends to treat AI and its impacts as a problem that people need to focus on. Whatever the course, it is likely that jurisdictions will progress at different rates and have varying experiences.

AI will perhaps be utilised in three stages:

- by the early adaptors and innovators who work through the challenges and potentially realise considerable benefits
- by the people who come on later and select from a range of proven products, but are otherwise consumers rather than innovators
- by the people who join the party so late the advancement of technology may come across as, or actually be, a threat to their service models.

Australian consumers of health care have understandably high expectations related to service delivery. Perhaps the greatest challenge for AI, given the rapidly evolving nature and a rush for adoption in some areas, is to ensure the checks and balances are in place to regulate the industry and benchmark quality standards. Without an ability to rely on such measures through an industry standard or group, it will be the responsibility of each jurisdiction or department to manage AI, which will not be possible without the skills and knowledge to do so.

RECOMMENDATIONS

1. Understand capability and requirements needed for support

The ability of services to recognise and have long term meaningful positive impacts is fundamentally limited by an ability to create and adapt technology that is fit for purpose. Services should understand their digital maturity and work through simpler, less complex technology projects to avoid being overwhelmed or not recognise the risks associated with untested AI.

2. Conduct audit activity to appropriately benchmark the business unit

Pharmacy services should undertake and share broad benchmarking and time in motion studies to fully understand the tasks and processes undertaken by staff in various business areas. This will support prioritising areas with the greatest modifiability and possible impact.

3. Plan for AI focused on people, process and problems

In planning, focus on what people (and skills) are required, what process should be used to make decisions and what problems the adoption (or lack of) AI poses to the long-term sustainability of the business.

4. Ensure fit-for-purpose is prioritised over precision and accuracy

Do not use precision and accuracy, via lab results and training data, as surrogates for the quality of a new technology to meet real world expectations.

5. Beware of AI's 'false prophets'

Ensure health service organisations have the structures in place to properly evaluate AI systems, or can feasibly gain such advice, to reduce the risk of being bound to products that are unsuitable or incompatible with existing systems.

6. Know your intellectual property

Consider the sharing of intellectual property when working with developers, as IP could be contributing to the development and commercialisation of a new product.

7. Advocate for a clearer prime directive

Pharmacy leaders should advocate for stronger regulation of emerging technologies. Current definitions for software as a medical devices leave several loopholes regarding the quality assurances and considerations that need to be in place for the utilisation of AI based systems.

PARTNER PERSPECTIVE

Australian Alliance for Artificial Intelligence

Creating a smart, adaptive health system is key to the sustainability of quality healthcare in Australia. We believe that an Artificial Intelligence (AI)-enabled health service, if developed in a meaningful, careful and collaborative way, will herald major new opportunities, as we develop new models of healthcare that are more personalised, effective and safe.

In November 2023 the Australian Alliance for Artificial Intelligence in Healthcare launched a National Policy Roadmap for AI in Healthcare (the Roadmap) after extensive consultation across its membership, and with the input of peak government agencies, and state, territory and federal departments of health.

At the time Professor Enrico Coiera said, "Australia needs to move fast to safeguard patients and support our healthcare and AI sectors, while both taking advantage of the benefits and mitigating the risks of AI. The governance of AI in healthcare needs to be one of the highest priorities for the nation."

The Roadmap details 16 key policy recommendations across five priority areas:

AI Safety, quality, ethics and security – ensuring the safe use of AI in healthcare

Workforce – enabling essential training and development of the healthcare and AI workforce

Consumers – ensuring health AI literacy

Industry – supporting industry to thrive and be competitive

Research – guiding the research that will protect Australia's national interest.

The healthcare sector stands to benefit tremendously from the power of AI to support precise and personalised medical decision making. However, AI in healthcare requires specific policy attention due to the stringent requirements needed to ensure 'medical grade' AI. These include safety standards, stringent governance to avoid patient harm; a higher burden of regulatory compliance than in other industries, and privacy requirements that are unique to healthcare. AI localisation needs bring specific governance requirements such as provider organisation accreditation.

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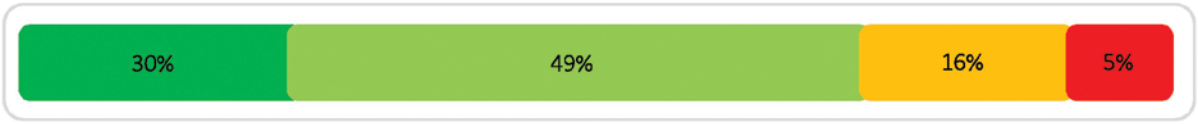
Enrico Coiera, David Hansen, and Karin Verspoor, Co-founders, Australian Alliance for Artificial Intelligence in Healthcare

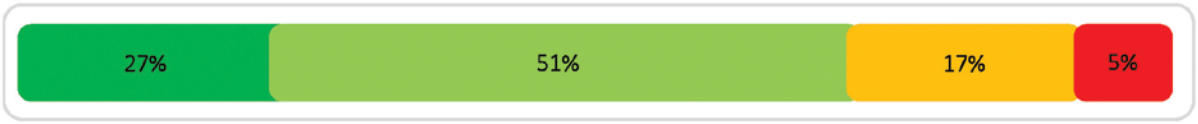
FIGURE 6. Adoption of AI in Healthcare

Forecast Panelists' responses to the question, "How likely is it that the following will occur by the year 2029 in the geographic region where you work?"

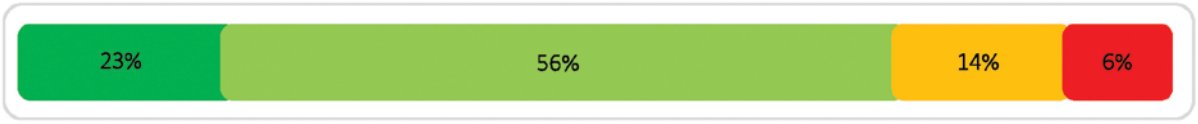
1. AI-enabled tools will allow health professionals to improve productivity, reduce inefficiency, undertake additional roles and/or expand their scope of practice.



2. AI-enabled augmentation of pharmacy service tasks and processes will have a net positive impact on tasks and workflows.

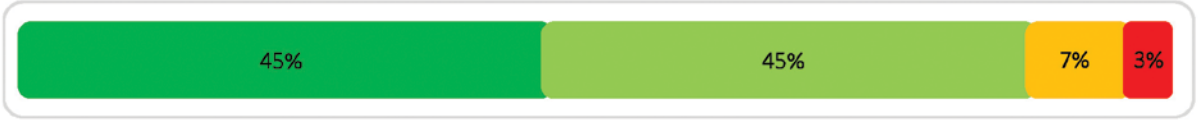


3. The local health service will see significant benefits following the introduction of AI-enabled systems.



4. Pharmacy departments will have employees specifically employed for domain expertise in the utilisation of AI in pharmacy service delivery.

5. There will be clear early adopters and innovators in the areas of AI utilisation in medicines management and potential use cases in pharmacy.



6. Pharmacy departments will have specific details in strategic plans and roadmaps for how AI will be used in the business.