IPAC

Integrating Pharmacists within Aboriginal Community Controlled Health Services to improve Chronic Disease Management (IPAC) Project

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Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) *to improve Chronic Disease Management* (IPAC) Project.

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Overview

The Integrating Pharmacists within Aboriginal Community Controlled Health Services (ACCHSs) to improve Chronic Disease Management (IPAC) Trial provided evidence that pharmacists integrated within ACCHSs enhanced service provision and significantly improved quality of care and health outcomes for adult Aboriginal and Torres Strait Islander patients with chronic disease. The IPAC trial delivered significant benefits to patients, health services staff, and other stakeholders across the 18 ACCHSs that participated. This application seeks support for a nationwide program roll-out for ACCHS with funding for services to employ a pharmacist(s) integrated within the service setting, starting from a threshold employment level of 0.2 full-time equivalent (FTE), increasing proportionately according to service size, with additional remote loadings as appropriate.

Background

In Australia, Aboriginal peoples and Torres Strait Islanders are five times more likely to die from chronic disease before the age of 75 years (premature mortality) than other Australians (2011-15).[1] This profound health disparity has generated many policies and programs to encourage better chronic disease prevention and management within primary healthcare services. Yet, despite their higher burden of disease, medication underutilisation, and inappropriate use of medications by Aboriginal peoples and Torres Strait Islanders persists when assessed within primary health care settings.[2 3]

Increasingly, studies are reporting that the addition of pharmacists within primary healthcare teams enhances quality prescribing,[4] biomedical outcomes,[5 6] and reduces hospitalisation.[7 8] Co-location of pharmacists within general practice has been demonstrated to enable greater communication, collaboration and relationship building among health professionals.[9] However, the impact of integrated pharmacists on health outcomes for patients with chronic disease, in Aboriginal health settings, has needed further investigation.

The project explored if integrating a registered pharmacist as part of the primary health care (PHC) team within ACCHSs (the intervention) led to improvements in the quality of the care received by Aboriginal and Torres Strait Islander peoples with chronic diseases, when compared with prior (usual) care. It was anticipated that pharmacists integrated within these settings would facilitate increased access to medication-related expertise and assessments, which when coupled with increased engagement with participants, staff and other stakeholders, would result in improved services and quality use of medicines as outlined in the proposed theory of change for the IPAC Project (Appendix 3).

Methodology

The IPAC trial was a pragmatic, non-randomized, prospective, pre and post quasi-experimental study (Trial Registration Number and Register: ACTRN12618002002268) implemented in three jurisdictions: Victoria, Queensland and the Northern Territory.

The project adhered to community-based participatory research (CBPR) principles.[10] This approach ensured clear benefits to project sites, acceptability and sustainability of the intervention within ACCHSs, and ultimately, transferability to other Primary Health Care (PHC) services. For this reason, study outcomes were compared before and after the intervention without the use of control sites, for within-subject comparisons (with repeated measures). The project assessed any changes in study sites that occurred pre to post intervention through serial health systems assessments and qualitative methods.

ACCHSs in geographically diverse settings in the three jurisdictions that met the established site eligibility criteria were invited to participate in the project. Each service was offered an integrated pharmacist (aggregated 0.57 FTE for up to 15 months duration) under a service agreement with the PSA.

The pharmacist intervention involved delivery of ten core roles, which were classified as either patient-related roles or as systems and health practitioner-level roles. Activities targeting patients included the assessment of medication management through medication reviews, medication adherence and appropriateness, medication-related problems, improving patient medication knowledge and giving preventive health advice. Medication management reviews comprised either a Home Medicines Review (HMR) or a non-HMR which was defined as a comprehensive medication management review comprising some or all of the elements of a HMR, but not fulfilling all relevant HMR criteria stipulated by the Medicare Benefits Schedule (MBS). Pharmacists at each ACCHS undertook an audit of medication appropriateness and an assessment of underutilisation, for a sample of participants at the rate of 30 participants per one full time equivalent (FTE) integrated pharmacist pro rata. Pharmacists also provided patient education and preventive health activities.

Activities targeting health professionals and systems included conducting education sessions, responding to medication-related queries, reviewing prescribing and mentoring new prescribers, participating in case conferences, undertaking drug utilisation reviews, and liaising with community pharmacies and other stakeholders to ensure continuity of care and transitional care that supported patients discharged from hospital.

Primary expected outcomes included improvements in clinical endpoints (glycated haemoglobin, systolic and diastolic blood pressure, lipids, cardiovascular risk, albumin:creatinine ratio) from baseline to end of study. Expected secondary outcomes included improvements in estimated glomerular filtration rate, prescribing indices [medication appropriateness index (MAI), measures of medication overuse defined by the MAI, and underuse defined as potential prescribing omissions based on clinical practice guidelines], self-reported measures of medication adherence, self-assessed health status, and health service utilisation indices such as Medicare Benefits Schedule claims. A qualitative assessment of stakeholder and patient perceptions was also undertaken. Economic analysis included a cost-consequences analysis and a cost-effectiveness analysis. A costs-consequence analysis was undertaken due to the complex nature of the intervention and multiple outcome measures that are difficult to measure in a common unit. The cost-effectiveness analysis was undertaken for: (i) participants with a clinical diagnosis of T2DM with pre- and post-measures of HbA1c and (ii) participants selected for MAI assessments at baseline and at the end of the study, with potential prescribing omissions used as the relevant outcome measure. A cost-utility analysis was undertaken for participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, with changes in HbA1c during the trial period being mapped to lifetime quality of life changes based on the findings of a systematic review.[11]

Project Governance

The IPAC project was conducted through a partnership between the Pharmaceutical Society of Australia (PSA), the National Aboriginal Community Controlled Health Organisation (NACCHO), and James Cook University (JCU) College of Medicine and Dentistry, guided by a Memorandum of Understanding that outlined communication and governance processes which were grounded in Aboriginal and Torres Strait Islander leadership and self-determination.

ACCHS Recruitment and Support

NACCHO conducted a two-phase Expression of Interest (EOI) site recruitment strategy for the IPAC Project. ACCHS participation required a formal agreement outlining the requirements of each party to the agreement, consent for ACCHS participation in the IPAC Project and consent to install the GRHANITE™ software to enable extraction of deidentified patient specific data.

ACCHSs were required to meet site inclusion criteria for the project reported elsewhere.[12] For example, ACCHS were required to have the physical space to support clinical consultations between the patient and pharmacist, to have a GP prescriber employed within the service, and pharmacist access to patient medical records (clinical information systems) and team-based care.

Pharmacist Recruitment

Integrated pharmacists were selected for the IPAC trial with skills aligned to the expected scope of practice and core roles. Placements within ACCHSs were influenced by the needs, capacity, and preparedness of ACCHSs that was assessed by NACCHO. Local community pharmacies were approached first to see if they were able to offer a pharmacist to work within the ACCHS. If community pharmacies were unable to nominate a pharmacist, or if this nomination was not accepted by the ACCHS in line with principles of self-determination, the ACCHS had the option to nominate an alternate pharmacist. Where a pharmacist could not be identified by this process, PSA utilised a recruitment process involving an Expression of Interest through pharmacist networks and advertising through employment platforms. Pharmacists were engaged via a subcontract through community pharmacy or an employment contract with the PSA.

Respecting the principles of self-determination enabled the ACCHSs to have control of pharmacist recruitment to ensure their 'fitness for the service' with respect to suitable skills and cultural safety. Each ACCHS was responsible for making the final decision on the appointment of the pharmacist. Analysis was not undertaken to compare outcomes arising from differential models of integrated pharmacist employment.

The project team allocated a baseline of 0.2 FTE to each ACCHS (total 4.0 FTE) regardless of service size, to contribute to delivery of core systems and health practitioner-level roles. The remainder of the FTE was apportioned relative to the available FTE remaining and the total active patient numbers of each ACCHS as reported via the ACCHS EOI process. Across the participating sites, the resulting FTE equated to 1 FTE per 8295 active patients. In circumstances where the ACCHS had limited availability of a consultation room, or the pharmacist had limited hours available due to existing alternate employment arrangements, there was a minor adjustment to the algorithm applied to arrive at an FTE agreeable to the ACCHS and pharmacist. Pharmacist FTE was reallocated throughout the project in response to pharmacist turnover and some ACCHSs not continuing with the intervention. Reallocation of pharmacist FTE aimed to ensure service provision to enrolled patients.

Integrated pharmacists fulfilled the following eligibility criteria: registration with the Australian Health Practitioners Regulation Agency (Ahpra); more than 2 years' post-registration experience; and post-graduate clinical qualifications or demonstrated clinical experience. Accreditation to conduct an HMR was preferred, however it was not mandatory for integrated pharmacists. Pharmacists were trained by the PSA to deliver core roles (all within their existing scope of practice). Pharmacists were also provided with ongoing support through regular online communications and mentoring support.

Participant recruitment

Participant inclusion criteria comprised patients with chronic disease who had visited a participating ACCHS at least three times in the past two years relative to the recruitment date into the study (known as 'active' or 'regular' patients). Patients could consent to participate if they were aged 18 years and over and had a diagnosis of:

- Cardiovascular (CV) disease (coronary heart disease, stroke, hypertension, dyslipidaemia and any other CV disease),
- Type 2 diabetes mellitus,
- Chronic kidney disease, or
- Other chronic conditions and at high risk of developing medication-related problems (e.g. polypharmacy).

Convenience sampling kept with the pragmatic project design. Referral and consent processes were developed in consultation with each ACCHS to ensure they were culturally appropriate for the individual site. The integrated pharmacist recorded consent in the ACCHS' clinical information system (CIS). Participants were able to withdraw from the study at any time.

Pharmacist roles

Integrated pharmacists functioned within existing and usual primary health care service delivery systems and focused on pre-determined core roles that included providing medication management reviews; assessing participant adherence and medication appropriateness; providing medicines information and education and training; collaborating with healthcare teams; delivering preventive care; liaising with stakeholders and developing stakeholder liaison plans; providing transitional care; and undertaking a drug utilisation review. Pharmacists' worked with ACCHSs to apply the roles to their individual setting to ensure the intervention was context specific.

Integration model

Pharmacists were integrated within ACCHSs with identified positions and core roles; had shared access to clinical information systems; provided continuous clinical care to patients, particularly on-site within the clinic setting; received administrative and other supports from primary health care staff; and adhered to the governance, cultural, and clinical protocols within ACCHSs as part of their shared vision.

Ethics approval

Ethics approval for the project was received from four ethics committees in the three jurisdictions including St Vincent's Hospital Melbourne (SVHM) Human Research Ethics Committee (HREC), Victoria (HREC/17/SVHM/280), James Cook University HREC (mutual recognition of SVHM HREC, approval HREC/H7348), Menzies School of Health Research (HREC/2018-3072) and the Central Australian HREC (HREC/CA-18-3085).

Results

Registered pharmacists were integrated within the primary healthcare teams of 18 ACCHSs for up to 15-months from 2nd August 2018 to 31st October 2019. Initially, twenty ACCHSs commenced delivering the pharmacist intervention, but one ACCHS withdrew due to the unexpected workload placed on other staff due to the pharmacist's recommendations and activities, in an already busy period where staff shortages were ongoing. Another ACCHS chose to discontinue with the intervention after 6 months of activity, when their pharmacist resigned for personal reasons; there were insufficient patient numbers at the ACCHS to warrant re-recruitment of a pharmacist for the remaining project duration. Eighteen ACCHSs completed the intervention and were well distributed across urban, regional and remote settings (Table 1).

Table 1. Distribution of ACCHSs by setting and jurisdiction.

	Urban	Regional	Remote	**Total**
Northern Territory	0	1	4	5
Queensland	3	2	2	7
Victoria	2	4	0	6
Total	**5**	**7**	**6**	**18**

A total of 26 (equivalent to 12.3 full time equivalent) pharmacists were involved in delivering integrated services in participating ACCHSs (Table 2).

Table 2. Number of ACCHSs and pharmacists via employment method throughout the implementation phase, by jurisdiction.

States	**Final number of ACCHSs involved**	**FTE Allocated**	**Pharmacists**	**PSA employed**	**Community pharmacy subcontracted pharmacists**
Northern Territory	5	4.6	8	3	5
Queensland	7	5.1	9	7	2
Victoria	6	2.6	9	9	0
Total	**18**	**12.3**	**26**	**19**	**7**

A total of 1,733 patients were consented for the project, of which 1,456 had pre and post data that was included for analysis of participant outcomes. An overview of all pharmacist activity is presented in Table 3.

Table 3. Overview of pharmacist activity included in analysis from 02/08/2018 to 31/10/2019.

Pharmacist Core Role	Number of activities
Self-reported medication adherence survey	2,759
Medication Appropriateness Index (MAI) Audits / Assessments of Underutilisation (AoU)	789
Home Medicines Reviews (HMRs)	639
Non-HMRs	757
Follow-up to a HMR or Non-HMR	1,548
Team Based Collaboration (1,082 related directly to IPAC participants)	3,165
Medicines Information	1,715
Education and Training	358
Drug Utilisation Reviews	26
Stakeholder Liaison Plans	47
Stakeholder Liaison – Community Pharmacy Contact	3,233
Transitional Care	1,901

Clinical endpoints

Integrated pharmacists embedded into usual care in ACCHSs provided clinically and statistically significant improvements in the control of cardiovascular disease (CVD) risk factors, glycaemic control in participants with T2DM, and reduced absolute CVD risk in Aboriginal and Torres Strait islander adults with chronic disease.[13] Analysis of the 1,456 participants found:

- Mean age of participants within clinical endpoint groups, defined by the availability of outcome measures for each endpoint, ranged from (Redacted) years, most (Redacted) were Aboriginal and/or Torres Strait Islander, (Redacted) attended health services located in inner and outer regional locations, (Redacted) had T2DM, and (Redacted) had co-morbidity.
- Statistically significant improvement in HbA1c results in participants with T2DM, with a (Redacted) or (Redacted) reduction (Redacted)
- Reductions in diastolic blood pressure (Redacted) total cholesterol (Redacted) (LDL-C (Redacted) and triglyceride levels (Redacted) were significant for all participants.
- Mean calculated absolute 5-year CVD risk was significantly reduced by (Redacted)
- Mean annual estimated glomerular filtration rate (eGFR) significantly improved with an increase of) (Redacted) from baseline, which is a significant slowing of eGFR decline. When participants with less than 6-months of follow-up were excluded, the mean annual eGFR decline was (Redacted) significantly slower than the predicted and expected annual decline of (Redacted) in the Aboriginal and Torres Strait Islander population.

- SBP significantly improved for younger participants (Redacted).

Medication Appropriateness Index (MAI)

Prescribing quality improved significantly for participants following the integrated pharmacist intervention within ACCHSs. Key results included:

- 357 participants with paired MAI data (baseline and end of study) included for analysis (median follow-up of 270 days).
- MAI analysis included a total of 2,804 and 2,963 medications at baseline and at the end of the study respectively.
- The intervention significantly reduced mean MAI scores per participant (Redacted); the mean MAI score per individual medication (Redacted); the proportion of participants receiving medications rated as inappropriate (Redacted); and the proportion of medications with the following prescribing risks: incorrect dosage, impractical directions, unacceptable therapy duration, drug-disease interactions; and unnecessary medications due to absent clinical indications, or lack of clinical effectiveness (redacted).

Assessment of medication underutilisation (AoU)

Potential Prescribing Omissions (PPOs) were common in the IPAC cohort. Improvements in prescribing quality arising from pharmacists integrated within ACCHSs significantly averted PPOs to high-value pharmacotherapies. Key results were:

- 353 participants (from the MAI subset) had paired AoU data and were included in analysis (median follow-up of 266 days).
- At baseline, [Redacted] of participants had at least one PPO from explicit and implicit criteria, totalling [Redacted] PPOs per participant.
- At follow-up (mean 267 days post-baseline), there was a significant (Redacted) reduction in the number of participants with potential prescription-based medication underutilisation, and a significant relative reduction in the mean number of PPOs per participant (Redacted) .
- The PPOs that were averted were for pneumococcal vaccination, BP and/or lipid lowering medication in those clinically at high primary CVD risk, antihypertensives for participants with T2DM and albuminuria, and metformin for those with T2DM.

Self-assessed medication adherence and health status

By the end of the study, integrated pharmacists significantly increased the number of participants adherent to their medications from baseline. There were significant improvements in participant self-assessed health status during the same period.

- There were 1,103 participants with paired medication adherence assessments (baseline to end of study) and 975 participants with paired self-assessed health status data.

- Based on adherence cut-scores for two separate self-assessed adherence measures, 70.8% (781/1103) and 73.3% (808/1103) of participants were adherent at baseline respectively, and 18% (175/975) had 'excellent to very good' health status.
- There was a (Redacted) net absolute increase in the number of participants adherent to medications at the end of the study compared with baseline ($p<0.001$) using both measures.

  There was a (Redacted) net absolute increase in the number of participants with improved self-assessed health status (redacted).

Medication Management Reviews

The intervention significantly increased access to medication management reviews and follow-up to these reviews for participants. Participants had a [Redacted] significant increase in HMR access (based on MBS claims) compared with usual care whilst the total number of HMRs (MBS claims) increased [Redacted] at end of study compared with baseline.

Economic analysis

The cost-consequence analysis identified a mean incremental cost of (Redacted) per participant estimated from net changes in medication use. The incremental cost of medication utilization was derived by minimizing the cost of medications that were stopped and maximizing the cost of new medications that were started, per participant. The incremental cost was associated with statistically significant improvements in clinical endpoints pre and post-intervention: glycated haemoglobin (HbA1c) for participants with a clinical diagnosis of T2DM, diastolic blood pressure (DBP), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), triglycerides (TG), cardiovascular risk 5-year risk (CVD 5-year risk) and estimated glomerular filtration rate (eGFR) (Table 4).

Table 4. Statistically significant improvements in clinical endpoints for cost-consequence analysis.

Variable	Mean difference in clinical endpoints mean (SD, 95% CI)	p-value
HbA1c mmol/mol *[% units]* (n=539 in T2DM)	(Redacted)	(Redacted)
DBP, mmHg (n=1045)	(Redacted)	(Redacted)
TC, mmol/L (n=660)	(Redacted)	(Redacted)
LDL-C mmol/L (n=575)	(Redacted)	(Redacted)
TG mmol/L (n=730)	(Redacted)	(Redacted)
CVD 5-year risk % units (n=38)	(Redacted)	(Redacted)
eGFR (no minimum follow-up time) ml/min/1.73m^2 (n=895)	(Redacted)	(Redacted)
eGFR (6-month follow-up time) ml/min/1.73m^2 (n=895)	(Redacted)	(Redacted)

1. Data pertains to biomedical indices with mean difference that was statistically significant at the 0.05 level, as sourced from clinical endpoint report (Appendix 9) and MSAC Assessment Report.
CVD= cardiovascular disease.
DBP= diastolic blood pressure
eGFR= estimated glomerular filtration rate

HbA1C= glycated haemoglobin
LDL-C= low density lipoprotein cholesterol
TC= total cholesterol
TG= triglycerides
T2DM= type 2 diabetes mellitus

For participants with a clinical diagnosis of T2DM, and with pre and post-measures of HbA1c, costs and outcomes for the IPAC intervention compared with no IPAC intervention (the comparator) found the incremental cost effectiveness ratio (ICER) of the IPAC intervention, versus no IPAC intervention was (Redacted) per participant with a clinically meaningful reduction in HbA1c of at least 0.5%. For the sample of participants assessed for the underutilisation of medications, the ICER of the IPAC intervention versus usual care was $(Redacted) per reduction in the number of participants with a potential prescribing omission. The incremental cost of the IPAC intervention of (Redacted) for participants (n=539) with a clinical diagnosis of T2DM and with pre and post-measures of HbA1c, suggested an ICER of (Redacted) per QALY, assuming no lifetime costs additional to usual care are required to maintain the reduction in HbA1c.

Qualitative Evaluation

The qualitative evaluation demonstrated overwhelming stakeholder support for integrated pharmacists within participating IPAC sites and in ACCHSs more broadly. Participants reported *'feeling better',* being more involved in decisions about their care, and felt empowered to better manage their health. Upon hearing the integrated pharmacist trial was concluding one patient stated: *"you get a program and it works and bugger me dead if they don't pull the plug on it."*

For health services staff, the main benefit with having a pharmacist integrated in their team was access to an *'in-house medicines expert'* who provided support and advice informally through *'corridor conversations'* as well as formally through team-based collaboration and medication management reviews. Recommendations made following medication reviews were perceived to be of high quality and prescriber up-take was reported to be high.

Benefits from the pharmacists' perspective were the opportunity "*to sit down with the patient"* and *"spend a bit more time"* with them, and being available to see patients opportunistically. Integrated pharmacists developed meaningful relationships with participants and empowered them by developing their health literacy and knowledge about their medicines.

Integrated pharmacists worked together with community pharmacists to problem solve, access discharge summaries, confirm the patient's medication history, undertake medication reconciliation by correcting errors and creating current medication lists, and facilitate provision of dose administration aids for health service patients. Community pharmacists reported that the integrated pharmacist role was very helpful and useful to them and facilitated communication between the community pharmacy and GPs within the ACCHS.

Discussion

The IPAC trial used data from 1,456 participants making it one of the largest interventional studies involving individually consented Aboriginal and Torres Strait Islander adults with chronic disease ever conducted in Australia. The trial was a pragmatic, non-randomized, prospective, pre and post quasi-experimental study that was community-based, participatory, and evaluated real-life outcomes within ACCHS settings arising from the intervention (integrated pharmacists within ACCHSs).

Integrated pharmacists significantly improved a range of intermediate clinical outcomes for adult Aboriginal and Torres Strait Islander participants with chronic disease attending ACCHSs. Participants had significantly improved control of CVD risk factors, glycaemic control in participants with T2DM, reduced absolute CVD risk, and a significantly slowed decline in kidney function. The net absolute reduction in 5-year CVD risk of (Redacted) for participants without pre-existing CVD indicates the clinically significant potential for primary CVD prevention arising from the IPAC intervention.

A nearly (Redacted) fold increase in HMRs indicates that pharmacists integrated within ACCHSs have an exceptional capacity to increase access to medication management reviews to participants who experience substantial barriers in accessing HMRs under current program rules, especially for participants who would otherwise forgo a medication review. Prescribing quality improved significantly for participants following assessments of medication appropriateness and underutilisation. Self-assessment of medication adherence and health status improved significantly indicating that integrated pharmacists can help to overcome some of the many difficulties this population faces with taking medications.

The net biomedical improvements observed in the IPAC study most likely emanated from the observed targeted improvements to prescribing quality, participant medication adherence, and team-based care. Prescribing quality significantly improved following the IPAC intervention with reductions in inappropriate prescribing for BP lowering and diabetes medications, a significant reduction in underprescribing of BP-lowering medications for those with T2DM and albuminuria. Integrated pharmacists also delivered team-based care to optimise chronic disease management (such as case conferences) and attended patient group meetings to deliver preventive health messages such as advice on dietary and lifestyle improvements.

Economic analysis revealed that the total cost of implementing the IPAC intervention was (Redacted) per participant in order to achieve all outcomes for participants including statistically significant improvements in clinical endpoints mentioned above.

There was overwhelming support from stakeholders for the intervention including study participants , health

services staff, community pharmacists and integrated pharmacists, with recommendations to extend the intervention to Aboriginal primary health care settings more broadly. Moreover, whilst integrated pharmacists working in these settings have similarities to general practice pharmacist roles, IPAC pharmacists were trained and adapted to working in ways that are culturally appropriate and consistent with the holistic model of care within Aboriginal health settings in urban, regional and remote settings.

The acceptability and effectiveness of this model and the delivery of the key activities was supported empirically by extremely low patient attrition, low site attrition, positive findings in the qualitative evaluation, feedback provided to the PSA project coordinators, and feedback from the participating services through governance committees.

The proposed broader expansion of integrated pharmacists within ACCHSs has an existing policy context. In principle, the Pharmacy Guild of Australia (PGA) supports the non-dispensing role of pharmacists in general practice whilst also emphasizing that communication with community pharmacy is critical to the role. The relationship between community pharmacies and GPs, and that between patients, community pharmacies and GPs must be maintained and strengthened.[14] Evaluation findings from the IPAC trial support the PGA policy, having demonstrated that integrated pharmacist roles can drive a strengthened relationship between community pharmacies and ACCHSs. Integrated pharmacists were found to have interacted with community pharmacists on a daily basis with more occasions logged for such interactions than any other IPAC activity undertaken by integrated pharmacists.

The documented concerns that general practice pharmacists may reduce the supply of dispensing pharmacists in regional and remote areas[15] is inconsistent with IPAC trial experience. IPAC trial pharmacists were seeking alternate career pathways and willing to relocate to regional and remote locations for these positions. Such roles may enhance regional and remote area workforce opportunities and recruit more pharmacists rather than stretching existing services. Collaboration with community pharmacies may also foster the development of 'after hours' shared rostering as often occurs with medical professionals in these settings. Some of the integrated pharmacists who worked full time hours for the IPAC trial elected to work additional hours within nearby community pharmacies. In multiple locations, community pharmacies offered employment to supplement the integrated pharmacist's role. Where integrated pharmacists worked part-time in the IPAC trial, the remaining time could be used to support community pharmacy.

Other ways in which part-time integrated pharmacist employment models could be adapted in remote locations is through rostering in blocks. This was undertaken in six ACCHSs in the IPAC trial. At one ACCHS, a pharmacist appointed to a 0.4 FTE position delivered a 2-week block of activity at regular intervals, rather than 2 days per week, while in another setting the pharmacist spent 2-week blocks at one of the clinics that

required charter flights to access. A broader roll-out of integrated pharmacists could incorporate blocks of activity to deliver services to smaller and more remote ACCHS.

Whilst eligible Aboriginal and Torres Strait Islanders living with or at risk of chronic disease can access free or low-cost medicines through the Section 100 Remote Area Aboriginal Health Services program and Closing the Gap PBS Co-payment measure,[16] support from an integrated pharmacist can complement such schemes and go further to address a multitude of barriers to the quality use of medicines experienced by Aboriginal peoples and Torres Strait Islanders.

Underpinning any program rules for the expansion of integrated pharmacists is the acknowledgement of the needs and preferences of individual ACCHSs and their representative bodies to guide the integration model. ACCHSs are founded on the principle of 'Aboriginal health in Aboriginal hands'.[17] Upholding the principle of self-determination is necessary to enable a culturally acceptable mode of delivering effective and sustainable primary health care services to Aboriginal peoples and Torres Strait Islanders. Having a pharmacist with the right *'organizational fit'* and personality was just as important as their skills and experience according to qualitative evaluation findings from the IPAC trial. ACCHS staff made the ultimate decision on pharmacist selection for their service and any future model must uphold that principle.

Evaluation findings support a nationwide program roll-out with funding for services to employ a pharmacist(s) integrated within the service setting, starting from a threshold employment level of 0.2 full-time equivalent (FTE), increasing proportionately according to service size, with additional remote loadings as appropriate. The study design and evidence generated supports the generalisability of outcomes if implementation of the integrated pharmacist core roles were to be supported more broadly. A model outlining anticipated costs for 140 ACCHSs across Australia based on the integrated model of care for pharmacists investigated in the IPAC Trial is presented in the MSAC Assessment Report – Section E. The program cost incorporates pharmacist training and salary, support for ACCHSs and pharmacists to ensure successful expansion of the intervention, and ongoing program monitoring and evaluation.

Conclusion and Recommendations

The IPAC trial provided evidence that integrating pharmacists within ACCHSs significantly improved quality of care and health outcomes for adult Aboriginal and Torres Strait Islander patients with chronic disease when compared to pre-intervention. The integration of pharmacists significantly improved patient outcomes such as the control of CVD risk factors, glycaemic control in participants with T2DM, and reduced absolute CVD risk. Prescribing quality improved significantly for participants following assessments of medication appropriateness and underutilisation, and there was a significant reduction in the number of participants

with potential prescription-based medication underutilisation. Patient self-assessed medication adherence and health status improved significantly indicating that the barriers Aboriginal and Torres Strait Islander patients face with taking medications can be reduced with pharmacist workforce support within the clinic setting.

Health service utilisation increased with a nearly (Redacted) fold increase in HMRs and significant uptake of the non-HMR model of care by both accredited and non-accredited pharmacists integrated within ACCHSs. Many of the improvements in the quality of care for Aboriginal and Torres Strait Islander patients may have been mediated by better access to medication reviews, given that this population experiences substantial barriers in accessing HMRs under current program rules, especially for participants who would otherwise forgo a medication review if not conducted opportunistically.

The trial evidence supports the generalizability of outcomes to the broader adult Aboriginal and Torres Strait Islander patient population with chronic disease if pharmacists were to be integrated within ACCHSs more broadly across urban, rural and remote geographical locations. Targeting patients with chronic disease, who are most at risk of developing medication related problems, is likely to deliver substantial improvements in health outcomes at a population level. Future roll-out should be supported using strategies similar to those adopted in the IPAC trial.

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