BMJ Open

Pharmacist's time spent: Space for Pharmacy-based Interventions and Consultation TimE (SPICE)—an observational time and motion study

Ajay Karia ,[1] Richard Norman,[1,2] Suzanne Robinson ,[1,2] Elin Lehnbom ,[3,4] Tracey-Lea Laba,[5] Iva Durakovic,[6] Christine Balane,[7] Rohina Joshi ,[7,8] Ruth Webster [5,7]

To cite: Karia A, Norman R, Robinson S, *et al*. Pharmacist's time spent: Space for Pharmacy-based Interventions and Consultation TimE (SPICE)—an observational time and motion study. *BMJ Open* 2022;**12**:e055597. doi:10.1136/bmjopen-2021-055597

► Prepublication history and additional supplemental material for this paper are available online. To view these files, please visit the journal online (http://dx.doi.org/10.1136/bmjopen-2021-055597).

Received 19 July 2021
Accepted 31 January 2022

For numbered affiliations see end of article.

Correspondence to
Ajay Karia;
ajay.karia@curtin.edu.au

ABSTRACT

Objective To describe the pharmacists' workflow, including tasks and time spent, to better understand their work capacity.

Design Cross-sectional, observational, time and motion study.

Setting Community pharmacies in Western Australia and New South Wales, Australia.

Participants Currently registered and practising pharmacists were approached using snowball sampling and selected using purposive techniques to obtain balance representation of metropolitan and rural pharmacies, as well as high and low script volumes where possible.

Results Twenty-four pharmacists across 15 pharmacies participated during the 135 sessions totalling over 274 hours of observation. Dispensing (30%), indirect patient services (17%), counselling (15%) and professional management activities (15%) were the top four duties pharmacists performed, while only 2% of time was spent on professional services such as pain clinics and influenza vaccinations. Tasks were frequently interrupted and often performed simultaneously. Breaks and consumer-contact times were limited. More time was spent on professional service activities in non-metropolitan pharmacies, in pharmacies with greater daily prescription volumes and those with one or more support pharmacists.

Conclusions This is the first study to quantify the pharmacists' tasks in Australian community pharmacies. Much time is being spent on dispensing, supply and management activities with little time for providing additional professional services. An extra supporting pharmacist is likely necessary to increase professional services. These findings could support future research around barriers and enablers of conducive workflows and of extended professional services.

Strengths and limitations of this study

- This is the first large-scale, time and motion study quantifying the pharmacist's work patterns in Australian community pharmacies.
- The study captures over 274 hours of direct observation.
- Recruitment of participants from both metropolitan and rural pharmacies and across two states increases data generalisability.
- Direct observational approach may change the behaviour of pharmacists being observed.

BACKGROUND/INTRODUCTION

Community pharmacists predominately dispense medicines and advise on medication matters.[1] However, funding pressures, growing and ageing population and health workforce shortages have led to calls for community pharmacists to provide a wider range of consumer-centred, clinically orientated professional services (PS) such as medication reviews and chronic disease management.[2 3] The resultant services aim to complement general practitioner (GP) and allied health service offerings and help reduce public demand for services in overloaded emergency departments and medical clinics.[4] There are many definitions for these health services within the pharmacy sector and they are differentiated from dispensing and related professional activities by terms including 'cognitive', 'extended', 'enhanced', 'newer', 'patient-centred', 'professional' and 'clinical' pharmacy services.[3–5] In this paper, such non-dispensing-related activities and non-over-the-counter medicine sales services, and those identified by the Australian Seventh Community Pharmacy Agreement (7CPA) as patient-centred services will be referred to as 'professional services'.[5]

In Australian community pharmacies, PS such as vaccinations, Diabetes MedsCheck, Quality Use of Medicines Maximised for Aboriginal & Torres Strait Islander people and health check programmes are already offered.[3 5] Globally, PS have shown to identify and resolve medication-related problems

and improve health outcomes, yet a number of barriers have affected their adoption and implementation in Australia.[6 7] Recent community pharmacy–government agreements have looked to address concerns around remuneration models being more product-orientated (fees for dispensing each item) rather than for patient-centred services that possibly need extra time and staffing.[8–10] Every 5 years, the Commonwealth government negotiates community pharmacy funding with the Pharmacy Guild of Australia and the Pharmaceutical Society of Australia.[5] The latest 7CPA has specified remuneration of $1.2 billion to support professional programmes and services (in addition to $14 billion for dispensing and over $1 billion for wholesalers) from July 2020.[5] While this is likely to increase provision of PS, a number of additional barriers have been recognised, suggesting that the uptake of pharmacy services may be more complex than simple financial remuneration. For example, appropriately trained staff and consultation rooms are required to incorporate new services into the pharmacy workflow.[11] Fragmented GP–pharmacist relationships, differing consumer perceptions on whether pharmacists should/could offer other services, consumer demand, pharmacist knowledge, confidence and attitudes, increasing workloads and challenging work areas (busy, limited space, noisy) are other potential determinants.[2 9 12–14]

One important challenge consistently voiced by pharmacists[15] is the perceived lack of time and inadequate support staff numbers that hinder the more time-consuming pharmacist-led PS.[16 17] Current Australian literature[18 19] is limited to just providing an overview of the daily duties of community pharmacists, and there is limited quantitative evidence that supports these concerns. No study has measured the time spent on specific tasks, nor the overall capacity within the pharmacists' workday to find time for additional services.[10] Documenting time pressures across a range of community pharmacist's workdays is critical to better understand whether pharmacists have the capacity to extend roles within their current practice and business model.

Compared with previous studies using work sampling techniques[20] and qualitative interviews and focus groups,[21] quantitative, time and motion methodology has been suggested as the more appropriate approach to obtain data on work patterns. It has been used to describe pharmacist work in hospital settings,[22 23] and non-Australian hospital and community pharmacies.[12 21 23 24] However, to our knowledge, time and motion methodology in Australian community pharmacy has only been used in one pilot study by Cavaye *et al*.[10]

This study is part of a larger project designed to extend Cavaye and colleagues' work[10] by increasing the number of participating pharmacies and covering both urban and rural areas. The objective of this paper is to describe the work of community pharmacists including key tasks performed by pharmacists, and how their time is spent during the workday, with the goal of understanding the potential capacity for pharmacists to include PS in their daily practice.

Figure 1 Screenshot of Work Observation Method By Activity Timing (WOMBAT) data collection software tool. P Comm, professional communication; P Edu, professional education; P Mgmt, professional management; P Service, professional service.

STUDY DESIGN

The detailed study protocol has been published previously.[2] The Space for Pharmacy-based Interventions and Consultation Time study was a quantitative, cross-sectional, community pharmacy-based observational study that used the Work Observation Method By Activity Timing (WOMBAT) tool[25 26] (figure 1) to collect time and motion data on pharmacist workload allocation across time, during routine workdays.

Patient and public involvement

Community pharmacists were the target population for the study. As a result, patients or the public were not involved in this research. However, outcomes may benefit the general public by gaining an understanding of the pharmacists' duties and their role within the primary healthcare system. The results of this study will be disseminated through various means including published papers and presentations.

Recruitment

Community pharmacists from across regional and metropolitan areas of Western Australia (WA) and New South Wales (NSW) were invited to take part in the study over a 15-month period between October 2018 and December 2019. Pharmacies were classified geographically as per the Modified Monash (MM) model on a scale of MM1 (major city) to MM7 (very remote).[27] Pharmacies were purposively approached to obtain representation from a balance of metropolitan and rural pharmacies as well as high and low script volumes to maximise the generalisability of the results. A snowball technique[28] was used to identify potential candidates from our own networks and knowledge of local areas and then asking them to suggest other community pharmacists. Pharmacy owners allowing observations in their pharmacy and each volunteering participant pharmacist provided written informed consent. Participating pharmacies nominated one or more consenting pharmacists to complete the planned three 6-hour days of observations. Each participant was an active, registered, practising pharmacist (ie, not just undertaking managerial duties, and not an intern/student pharmacist). Observed pharmacists were given a $50 voucher as reimbursement.

Data collection

Six observers, four from WA and two in NSW, were trained in the use of the WOMBAT software and task definitions (table 1). The multidimensional WOMBAT tool has been used to capture health professional communication and work patterns in previous studies and it allowed researchers the flexibility to create and tailor the necessary observational variables in this study (figure 1).[23 26] Each observer started data collection when an inter-rater reliability score of above 85% had been obtained[29] with another data collector who simultaneously, but independently, observed the same pharmacist.

Observations were purposefully scheduled across a variety of weekday shifts, between the hours of 08:00 and 18:00 to maximise data variability and capture the full pharmacy workday. An observer equipped with the WOMBAT software[26] loaded on an Android tablet shadowed the pharmacist participant in 2-hour blocks, limited to three sessions per day, each separated by a short break to minimise participant and observer fatigue. Observation timings were thereafter changed to acquire work patterns during all business hours. Time data were collected across four categories, including: what task, with whom, where and mode (summarised in table 1 and figure 2), that were defined using descriptions formulated in an earlier study.[2 10] The tool also captured whether the pharmacist was interrupted or multitasking.[26 30]

The observer was stationed in close proximity to the pharmacist, yet far enough away to avoid interruptions to pharmacist's duties and maintain privacy during conversations. Consumers were informed of the study through posters positioned around the pharmacy and if requested, in person by the pharmacy team. Observers avoided interactions with consumers unless requested by the pharmacy, and no consumer or identifying data were collected. The observer did not record any conversation or information inadvertently witnessed or not related to the study.

Data analysis

WOMBAT data were downloaded and analysed in MS Excel 2016 and STATA MP V.16.0 (Statistics/Data Analysis; Texas, USA, www.stata.com) as per WOMBAT analysis guide V.2.2.[25] Work patterns were identified through calculations of the time spent on work tasks and multitasking, and the rate of interruptions. Time spent was reported as a proportion of the total observation time, or total task-specific time (ie, total time spent of the task noted) or of the total variable-specific time (eg, 'whom' variables such as alone and with consumer; and 'how/mode' variables such as face to face and on a computer). Other descriptive statistics including the frequency, median and IQR of different tasks and common task combinations were also calculated. Additionally, the relationships between the PS task occurrence and pharmacy and pharmacist type, number and type of supporting staff and prescription items to sales ratio were cross-tabulated to describe how these impact PS provision.

RESULTS

Demographic details

Fifteen community pharmacies accepted the invitation to participate from a total of 18 approached. All 15 were included and provided data for the final analysis (online supplemental appendix 1). Challenges, in particular the time taken for pharmacies to respond to invitations and/or sign paperwork, and consequent impact on timelines and budget, prevented recruitment of the originally planned 20 pharmacies.

Nine pharmacies were recruited in WA: five metropolitan (classified as MM1: major cities accounting for 70% of Australia's population) and four non-metropolitan (two classified as MM2: regional with over 50 000 residents, and two MM3: rural with between 15 000 and 50 000 residents).[27] The remaining six were in metropolitan areas of NSW (MM1: major cities).[27] Metropolitan sites were a mixture of five single/co-owned independents, two franchisees and four large commercial chain pharmacies. Non-metropolitan sites consisted of one pharmacy chain and three franchisees. Prescription volumes, as estimated by pharmacy owners, ranged from 300 to 2680 prescriptions per week, with nine pharmacies (all from metropolitan areas) estimating volumes below the Australian average of 1035 prescription items per week.[31] Staffing per pharmacy ranged from having 0 to 4 additional pharmacists (ie, not including the observed pharmacist, median=0, IQR: 0, 1), 0 to 16 other pharmacy staff (trained in the supply of medicines under pharmacist supervision, median=2, IQR: 1, 7) and up to 11 non-pharmacy (ie, sales, median=0, IQR: 0, 1) staff. Generally,

Table 1 Summary of tasks and definitions[2 10]

Variables	Definitions/descriptions
Category: what task	
Sales	Any act of selling a product or operating the cash register.
Counselling	Recommending and/or counselling a consumer specifically about a medication or symptom. Excludes social interactions.
Professional service	An action directly delivered by the pharmacist to assess and advise on improving health. Includes providing services such as MedsCheck programme, blood pressure monitoring and advice, administration of vaccinations, screening programmes and research. Excludes counselling on a symptom or a product that a consumer buys over the counter, for example, contraceptive pill, complementary medicines (vitamin, herbal, aromatherapy, homeopathic products).
Dispensing	Handling medications and prescriptions during the process of furnishing a prescription. Includes supply of dose administration aids (blister packs). Excludes counselling consumers and communication with prescribers.
Indirect patient services	Pharmacy services for a consumer that are not face to face. Includes ordering or organising medication supply and delivery. Excludes act of ordering general stock.
Compounding	Combining, altering or mixing ingredients/medications to suit the needs of consumer.
Professional communication	Communication with pharmacy staff or other health professionals/prescribers. Clarifying a prescription for example.
Professional education	Professional development and education, research, self-study or teaching.
Professional management	Pharmacy management activities. Includes administration, rosters, handling deliveries, general maintenance.
Waiting	Waiting for more than 10 s for consumers to approach the counter.
Break	A break from any of the above tasks. Includes food and toilet breaks, and social interactions.
Category: interacting with whom	
Alone	Pharmacists performing task by themselves. This is recorded when NONE of the other variables in this category are selected.
Patient	Any customer/consumer of the pharmacy.
Pharmacy staff	Pharmacy employees (eg, pharmacists, technicians, sales staff, students).
Other	Any other person not described above (eg, delivery staff, doctor).
Category: location of task completion (also see figure 2)	
Back office	Away from consumers or outside of pharmacy (eg, staff room).
Behind desk	Dispensary.
Desk	At or behind pharmacy medicine counter (ie, over the counter (OTC)).
Shop roam	Anywhere on open-shop area (ie, front of the OTC counter).
Consult booth/room	Dedicated consultation area/booth with wall partitions to preserve privacy.
Category: mode of task completion	
Face to face	Face to face.
Phone	Mobile or fixed telephone.
Script	With a prescription—paper or online.
Computer	On a computer (eg, dispensary or cash register operated on a personal computer).
Mobile device	Electronic tablet (including use of mobile phone for anything but phone calls).
Fax	Fax machine.
Other	Anything other than the above—opening letters, referring to rosters, etc.
Multitasking	Performing two or more tasks simultaneously.
Interruptions	One task paused/ceased by another.

Adapted from Karia *et al*[2] and Cavaye *et al*.[10]

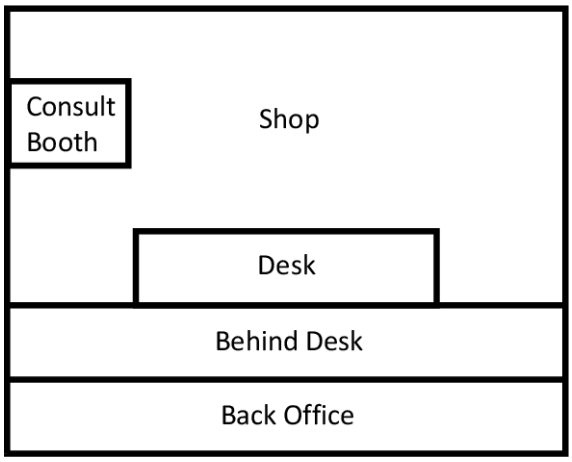

Figure 2 Diagram of pharmacy layout used during data collection to indicate locations of task completion detailed in table 1.

staffing levels were in line with or sometimes better than those recommended by the Australian dispensing practice guidelines[32] of having at least one trained dispensary assistant for dispensing workloads between 150 and 200 items per day, and additional pharmacists or dispensary assistants if dispensing levels exceed 200 items per day.

A total of 12 male and 12 female pharmacists participated: 1 locum, 10 pharmacist owners/managers and 13 pharmacists (online supplemental appendix 1). One metropolitan-based pharmacist was specifically employed as a PS manager in charge of conducting clinical services. Nearly 70% (n=16) were below the age of 40 years and a similar proportion (n=16) had been qualified for up to 15 years. The majority (88%) were Australian citizens (18 in the metropolitan area and three in non-metropolitan pharmacies), and 75% (n=18) also attained their pharmacy qualification in Australia. All but three pharmacists worked on a full-time basis (n=21, 88%). More than one pharmacist was required in eight of the participating sites (four WA, four NSW) to fully complete the 18 hours of observations.

Work patterns

Data collection took place over a total of 135 sessions and 274 hours:40 min:40 s of observations ('total observation time'), with a mean time of 18 hours:18 min:43 s per pharmacy. A total of 7028 tasks summing to 293 hours:52 min:5 s ('total all-tasks time') were recorded (online supplemental appendix 1). The 'total all-tasks time' is greater than the actual 'total observation time' because it includes overlapped, multitasking times (when two or more tasks were conducted concurrently). Consequently, proportions of total observation time (predominately used in this study) do not add to 100%.

Tasks

Dispensing, indirect patient services (non-face-to-face activities for consumers, including ordering or organising of medication supply and delivery), counselling and professional management activities occupied over

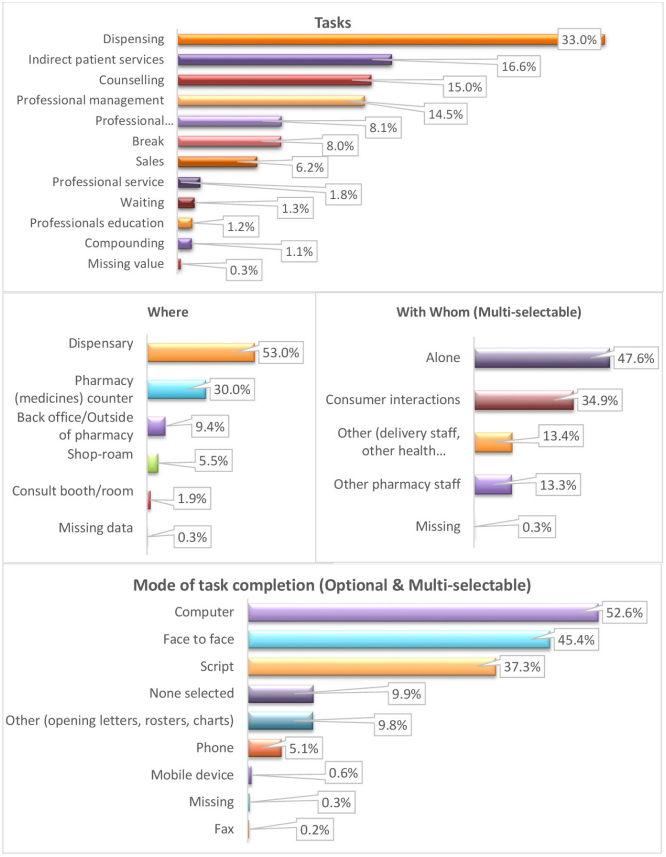

Figure 3 Tasks observed, where performed, with whom and mode of task completion as a percentage of total observation time (n=274 hours:40 min:40 s).

80% of the total observed time (33.0%, 16.6%, 15.0% and 14.5%, respectively, figure 3). PS were only observed on 31 occasions, summing to 1.8% of the total observation time. Table 2 includes the time spent on each task and their quartile ranges. The median time per task for any task performed was 1 min and 22 s (IQR: 39 s, 2 min:47 s). Lengthier times per task were logged during compounding (median=4 min:24 s per task, IQR: 1 min:59 s, 9 min:51 s) and PS tasks (4 min:7 s, IQR: 2 min:32 s, 10 min:22 s), and the least amount of time on communication activities with pharmacy staff and/or other health professionals/prescribers ('professional communication' 41 s, IQR: 19 s, 1 min:38 s).

Location and interactions

Pharmacists spent the greatest proportion of their time at locations where consumer interactions were limited. Over 53% of time was recorded in the dispensary and 9% in the back office or outside of the pharmacy compared with almost 38% of time at the pharmacy counter, on the shop floor or in the consult room (figure 3). The dispensary was the primary location for dispensing, compounding, indirect patient services, waiting, and professional communication, education and management activities. General counselling and sales tasks were chiefly performed at the pharmacy medicines counter. Online supplemental

Table 2 Distribution of task time, multitasking and interruptions

					Multitasking				Interruptions	
Task	Tasks (n)	Total task time (hour:min:s) (A)	Percentage (%) of total observation time* (n=274 hours:40 min:40 s)	Median time per task (IQR)	n	Total time (hour:min:s)	Proportion (%) of respective total task time (A)	Median time per task (IQR)	Interruptions (n)	Rate of interruptions: number of minutes per interruption
Dispensing	1777	90:42:08	33.0	2 min (1–3 min:59 s)	253	08:30:35	9.4	1 min:25 s (39 s–2 min:29 s)	386	14
Indirect patient services	744	45:31:34	16.6	1 min:49 s (50 s–3 min:50 s)	93	04:22:07	9.6	1 min:33 s (46 s–3 min:17 s)	194	14
Counselling	1314	41:12:20	15.0	1 min:14 s (37 s–2 min:16 s)	83	02:31:14	6.1	1 min:1 s (36 s–1 min:58 s)	26	95
Professional management	765	39:47:58	14.5	1 min:40 s (51 s–3 min:35 s)	49	02:22:24	6.0	57 s (37 s–2 min:1 s)	144	17
Professional communication	1012	22:07:27	8.1	41 s (19 s–1 min:38 s)	33	00:52:31	4.0	52 s (31 s–1 min:45 s)	24	55
Break	307	21:59:36	8.0	2 min:8 s (57 s–4 min:50 s)	15	00:24:21	1.9	49 s (35 s–2 min:4 s)	26	51
Sales	838	16:54:26	6.2	52 s (30 s–1 min:31 s)	48	01:02:57	6.2	54 s (27 s–1 min:46 s)	17	60
Professional service	31	04:54:01	1.8	4 min:7 s (2 min:32 s –10 min:22 s)	4	00:06:42	2.3	1 min:14 s (47 s–2 min:8 s)	2	147
Waiting	133	03:38:20	1.3	55 s (35 s–1 min:59 s)	5	00:04:38	2.1	58 s (24 s–1 min:5 s)	1	218
Professional education	78	03:11:16	1.2	58 s (32 s–1 min:52 s)	5	00:12:59	6.8	2 min:35 s (31 s–2 min:45 s)	22	9
Compounding	19	03:06:31	1.1	4 min:24 s (1 min:59 s–9 min:51 s)	3	00:06:58	3.7	2 min:17 s (2 min:16 s–2 min:21 s)	3	62
Missing value	10	00:46:28	0.3	3 min:38 s (2 min:32 s–5 min:1 s)						
Totals	**7028**	**293:52:05**		**1 min:22 s (39 s–2 min:47 s)**	**591**	**20:37:26**		**1 min:7 s (35 s–2 min:11 s)**	**845**	**1 interruption every 19 min**

IQR (25%, 75%).
*Percentages do not sum to 100% as data also include times when tasks were performed simultaneously with another.

appendix 2 details the most common combinations by task type of location, persons interacting with and mode.

The multiselectable 'with whom' category logged pharmacists working alone for nearly 48% of their time and interacting with pharmacy and non-pharmacy workers/professionals for 13% of time each. Pharmacist–consumer interactions were witnessed for 35% of the total observation time: 10% in the dispensary or back office combined and the remaining 25% at the pharmacy counter, shop floor and consult room combined. Consumer communications were predominately around general counselling (42.0% of total consumer-contact time), dispensing (32.6% of total consumer-contact time) and sales tasks.

Multitasking

Pharmacists performed two or more tasks simultaneously during 7.5% (over 20 hours) of their observed time (table 2). They were more likely to multitask during indirect patient services (9.6% of total task time) and dispensing activities (9.4%), followed by professional education, sales and counselling tasks (6.8%, 6.2% and 6.1% of respective total task times). Indirect patient services were mostly multitasked with professional communication tasks, and dispensing events with counselling.

Interruptions

As detailed in table 2, pharmacists were interrupted on 845 occasions at a rate of three interruptions per hour or had one interruption every 19 min on average. Professional education activities were interrupted the most (one per 9 min), in comparison to dispensing and indirect patient service activities that were both interrupted once per 14 min and professional management tasks that were interrupted once per 17 min. Interruptions typically occurred to undertake professional communication duties, and less frequently to undertake counselling and dispensing jobs.

Professional services

PS observations such as blood pressure measurement, blood glucose checks, pain clinics and influenza vaccinations were minimal. Only 31 observations and 4 hours:54 min (1.8% of the total observation time) were recorded (table 2). However, the median time per observation of 4 min:7 s (IQR: 2 min:32 s, 10 min:22 s) was greater than the other tasks. Nine out of 15 pharmacies performed at least one PS task, with half (50.5%, 2 hours:28 min:26 s) of all observations being registered at just three non-metropolitan sites and the remaining spread across six metropolitan pharmacies (four in NSW and two in WA). These tasks were predominately conducted face to face in available consult rooms (for 73.8% of total PS task time).

Pharmacies with greater PS times (median=2 hours:22 min, IQR: 1 hour:13 min, 3 hours:40 min) tended to have larger prescription volumes (median=164 prescriptions per day, IQR: 114, 292) and more medicine dispensing transactions than the total number of sales transactions (86% of total task time, 4 hours:12 min). Male pharmacists registered greater times spent on PS tasks compared to females (70% of total task time, 3 hours:25 min), as did pharmacies with at least one other supporting pharmacist (77% of total task time, 3 hours:48 min). However, it was noted that these were all based on a small number of PS observations. Pharmacists performing these tasks were less likely to be interrupted (one per 147 min) or have activities multitasked.

DISCUSSION

This is the first large-scale direct observational time and motion study documenting work patterns in Australian community pharmacies. Pharmacists were busy, undertaking 25 tasks per hour on average with a median of 1 min:22 s (IQR: 39 s, 2 min:47 s) per task, interspaced with infrequent or minimal breaks (1 per hour, median=41 s (IQR: 19 s, 1 min:38 s)) and repeated interruptions (one every 19 min). Pharmacists spent 80% of their time on dispensing, counselling duties, management tasks such as organising of staffing rosters and indirect patient services (activities related to the supply of prescription medicines: clarifying orders and sourcing medicines). While such product-focused tasks are necessary and essential to the pharmacy business, this leaves little time for more consumer-focused, advanced PS. All participating pharmacies listed a selection of additional PS on offer; however, only a handful were observed to actually provide them during this study, accounting for less than 2% of the observed time.

This study had similar findings to previous studies conducted in the UK,[33] Portugal,[12] the USA[24] and in an Australian feasibility study,[10] suggesting some uniformity across countries. All found that high levels of product-focused workloads, being constrained to the dispensary, frequent multitasking (averaging two episodes every hour in this study) and short breaks (of around 4 min/hour in this study), may limit pharmacists' choice of work.[10 12 24 33] A literature review by Lea *et al*[33] explored this concept further and reported that such work pressures and lack of opportunity to extend to more consumer-centred roles increased stress levels and reduced job satisfaction. Additionally, Tucker *et al*[34] and Davies *et al*[35] suggest that rest breaks of less than around 10 min/hour during prolonged continuous work may increase the chance of making errors. Therefore, in Australian pharmacies, a change in organisational processes aimed at having a more streamlined work pattern and frequent breaks may improve work fulfilment and preserve patient safety.[33–35]

Our work supports common perceptions of suboptimal work conditions and limited work capacity of Australian community pharmacists to expand roles.[3 9 15 33 36] Barriers to adoption and implementation listed in previous studies of lack of time, generally high workloads and tasks dominated by dispensing and medicine supply are consistent with our data.[9 33] Findings in this research of PS tasks (registering 1.8% of total observed time) being among the least documented align with Davies and colleagues'

pharmacists' time utilisation study using work sampling methodology, showing that such tasks occupied just 3.2% of the pharmacists' time.[35] A study by Hattingh *et al* and a narrative review by Buss *et al* concluded that having access to private areas within pharmacies, and sufficient and skilled staff could help facilitate community pharmacy services.[8 11] However, our study documented private consultation areas in almost 75% of the participating sites and pharmacy staffing numbers as recommended in professional guidelines,[32] yet we observed relatively few PS tasks. A shift to exploring other important factors driving uptake of such services is required.

This study also found that the pharmacies with at least one additional support pharmacist, greater prescription volumes and non-metropolitan pharmacies provided more PS. However, as the proportions of pharmacies conducting PS were too small in this study, these findings cannot be generalised. Further time and motion research, possibly using a purposive sample of pharmacies who engage in regular PS, is recommended to provide additional clarification on specific influential factors. Time constraints are a commonly cited barrier to PS delivery.[4 16 37] Other literature infers that non-metropolitan pharmacies provide more patient-orientated services due to having lighter workloads and, hence, more time; or such areas being underserved and, hence, placing greater emphasis on these pharmacists to extend their roles.[37 38] Yet, a narrative review by Howarth *et al* challenges the validity of these results suggesting limitations in study design and inadequate control of potential confounding variables.[39] Consequently, future qualitative research using pharmacist interviews and/or focus groups could supplement our quantitative findings and further elicit and explain work patterns in those providing PS, and between metropolitan and non-metropolitan community pharmacy practices.

While there is ample evidence of benefits from pharmacist-led PS, results presented here, though limited in sample size, suggest that practical implementation lags behind this evidence.[3 5 9 12 35] Lack of adequate funding has been noted as a common barrier.[40] The current Australian, volume-based, fee-for-service model only provides payments for each prescription dispensed or when a selected service is delivered.[40] Time away for alternative roles could possibly be financially counterproductive. Jackson and Urick recommended a performance-based payment model that has been used by GPs, other allied health professionals and in other countries.[40] In this model, payments could be incentivised according to patient health outcome targets such as medication compliance. Additionally, Chan *et al* detail the importance of including costs for training, participation in accreditation processes and documentation time in the remuneration package to ensure the viability of professional pharmacy services.[41]

However, finance may not be the only factor influencing the uptake of additional pharmacy services. As pharmacies differ in their organisation, geography and settings, the issue of identifying determinants is possibly more complex and multifactorial, and approaches require further and ongoing investigation.[33 41 42] Solutions such as using other trained non-professional staff to undertake some medicine supply-related tasks; negating competing priorities by, for example, allowing more time for direct patient care rather than for documentation; addressing pharmacist training needs; and improving GP–pharmacist collaboration have been suggested.[9 15 21 24 41 43] Gregório and colleagues also propose using internet-based pharmaceutical services to reduce unnecessary pharmacy visits and following examples of nursing practices that reorganised their work to accommodate similar services.[12] This all warrants further exploration. It is also important to examine how the findings in this study are perceived by pharmacists, pharmacy staff, primary care teams and consumers to better understand the views of what the pharmacists' role is, should be and how it could be better managed.[33]

Strengths and limitations

The strengths of this study included the length of observed time as well as the diverse nature of the pharmacies enrolled. There are, however, limitations to our data. First, there was the possibility of purposeful behaviour changes by participants (Hawthorne effect) knowing they were being observed.[44] However, this was minimised with the observer sitting a distance away and as unobtrusively as possible, while maintaining long-sustained observational periods as recommended in other time and motion studies.[12 35 45] Second, there was the possibility of interobserver variance in recording activities and observer bias. For example, three sites recorded only few or no multitasking and interruption observations relative to others that had around three times more. However, extensive training and regular conversations on data collection techniques between observers and study investigators, as well as formal inter-rater reliability measures to ensure consistency prior to commencing data collection were undertaken to mitigate variabilities. Finally, pharmacy recruitment challenges limited our ability to recruit the broadest range of pharmacy range of pharmacy types as planned and thus the generalisability of our findings to all pharmacy models is uncertain.

CONCLUSION

The evidence presented here is the first quantitative data set detailing work of community pharmacists in Australia. Pharmacists' work choices are limited by time pressures, frequent interruptions and multitasking. Dispensing, general counselling and management activities seem to dominate daily duties while PS are among the least performed. If pharmacists are to expand their role in line with the 7CPA, a review of practice guidelines and organisational processes is required by policymakers and pharmacy owners. In light of these findings, more research into remuneration models, staffing structures, consumer

preferences and primary healthcare professional perceptions of community pharmacist roles are the likely next steps.

Author affiliations
[1]School of Population Health, Curtin University, Perth, Western Australia, Australia
[2]Faculty of Health Sciences, Curtin enAble Institute, Curtin University, Perth, Western Australia, Australia
[3]Department of Pharmacy, Faculty of Health Sciences, University of Tromsø–The Arctic University of Norway, Tromsø, Norway
[4]Department of Health and Caring Sciences, Faculty of Health and Life Sciences, Linnaeus University, Kalmar, Sweden
[5]Centre for Health Economics Research and Evaluation, University of Technology Sydney, Sydney, New South Wales, Australia
[6]Interior Architecture, Faculty of Built Environment, UNSW, Sydney, New South Wales, Australia
[7]The George Institute for Global Health, Newtown, New South Wales, Australia
[8]The George Institute for Global Health India, New Delhi, India

Twitter Suzanne Robinson @Robinsonsuz

Acknowledgements We wish to thank the contributions of all employed observers and participating pharmacists as well as the pharmacy owners who consented and allowed us to collect data in their pharmacies.

Contributors AK, RW, RN, SR, EL, T-LL, ID, CB and RJ contributed to the conception and design of the study. AK, RW, SR, RN and CB are involved in implementation of the study. AK coordinated the project and data collection, and drafted the manuscript. EL, ID, CB, T-LL and RJ critically reviewed the manuscript for important intellectual content. AK, RN, SR and RW revised and finalised the manuscript. All authors read and approved the final manuscript. All authors state that they had complete access to the study data that support the publication. AK is responsible for the overall content as the guarantor.

Funding This study is supported by a National Health and Medical Research Council (NHMRC) Project grant (ID1084657). AK is supported by the Australian Government Research Training Program Scholarship. T-LL is supported by the NHMRC Early Career Fellowship (APP1110230). RJ is supported by the National Heart Foundation Future Leader Fellowship (ID100484) and by a UNSW Scientia Fellowship. EL is supported by the Swedish Research Council for Health, Working Life, and Welfare (Forte), Junior Research Grant (2016-00148). RW is supported by an NHMRC Early Career Fellowship (APP1125044).

Competing interests None declared.

Patient consent for publication Not applicable.

Ethics approval This study involves human participants and was approved by the University of New South Wales and Curtin University Human Research Ethics Committees (HREC number HRE2018-0635). Participants gave informed consent to participate in the study before taking part.

Provenance and peer review Not commissioned; externally peer reviewed.

Data availability statement Data are available upon reasonable request. Deidentified participant data are available from the corresponding author on reasonable request.

ORCID iDs
Ajay Karia http://orcid.org/0000-0001-5300-4062
Suzanne Robinson http://orcid.org/0000-0001-5703-6475
Elin Lehnbom http://orcid.org/0000-0003-1428-5476
Rohina Joshi http://orcid.org/0000-0002-3374-401X
Ruth Webster http://orcid.org/0000-0002-7444-3037

REFERENCES

1 Dineen-Griffin S, Benrimoj SI, Garcia-Cardenas V. Primary health care policy and vision for community pharmacy and pharmacists in Australia. *Pharm Pract* 2020;18:1967–67.
2 Karia AM, Balane C, Norman R, *et al*. Community pharmacist workflow: space for Pharmacy-based interventions and consultation time study protocol. *Int J Pharm Pract* 2020;28:441–8.
3 Mossialos E, Courtin E, Naci H, *et al*. From "retailers" to health care providers: Transforming the role of community pharmacists in chronic disease management. *Health Policy* 2015;119:628–39.
4 Yong FR, Hor S-Y, Bajorek BV. Considerations of Australian community pharmacists in the provision and implementation of cognitive pharmacy services: a qualitative study. *BMC Health Serv Res* 2021;21:1–906.
5 Australian Government Department of Health, Pharmacy Guild of Australia, Pharmaceutical Society of Australia. *Seventh community pharmacy agreement*, 2020.
6 Ellitt GR, Engblom E, Aslani P, *et al*. Drug related problems after discharge from an Australian teaching hospital. *Pharm World Sci* 2010;32:622–30.
7 Nishtala PS, McLachlan AJ, Bell JS, *et al*. A retrospective study of drug-related problems in Australian aged care homes: medication reviews involving pharmacists and general practitioners. *J Eval Clin Pract* 2011;17:97–103.
8 Buss VH, Shield A, Kosari S, *et al*. The impact of clinical services provided by community pharmacies on the Australian healthcare system: a review of the literature. *J Pharm Policy Pract* 2018;11:22.10.1186/s40545-018-0149-7
9 Berbatis CG, Sunderland VB, Joyce A, *et al*. Enhanced pharmacy services, barriers and facilitators in Australia's community pharmacies: Australia's National Pharmacy Database Project. *International Journal of Pharmacy Practice* 2010;15:185–91.
10 Cavaye D, Lehnbom EC, Laba T-L, *et al*. Considering pharmacy workflow in the context of Australian community pharmacy: a pilot time and motion study. *Res Social Adm Pharm* 2018;14:1157–62.
11 Hattingh HL, Emmerton L, Ng Cheong Tin P, *et al*. Utilization of community pharmacy space to enhance privacy: a qualitative study. *Health Expect* 2016;19:1098–110.
12 Gregório J, Cavaco AM, Lapão LV. How to best manage time interaction with patients? community pharmacist workload and service provision analysis. *Res Social Adm Pharm* 2017;13:133–47.
13 Roberts AS, Benrimoj S I (Charlie), Chen TF, *et al*. Implementing cognitive services in community pharmacy: a review of facilitators used in practice change. *Int J Pharm Pract* 2010;14:163–70.
14 Roberts AS, Benrimoj SI, Chen TF, *et al*. Practice change in community pharmacy: quantification of facilitators. *Ann Pharmacother* 2008;42:861–8.
15 Minard LV, Deal H, Harrison ME, *et al*. Pharmacists' perceptions of the barriers and facilitators to the implementation of clinical pharmacy key performance indicators. *PLoS One* 2016;11:e0152903.
16 Nissen LM, Tett S. Community pharmacists improving health outcomes in rural and remote Queensland. *Australian pharmacist* 2002;21:874.
17 Benrimoj SI, Frommer M, Rychetnik L. *The value of pharmacist professional services in the community setting: a systematic review of the literature October 2002 – March 2005*: 2005.
18 Hoti K, Hughes J, Sunderland B. Expanded prescribing: a comparison of the views of Australian hospital and community pharmacists. *Int J Clin Pharm* 2013;35:469–75.
19 Counsell AB, Nguyen AD, Baysari MT, *et al*. Exploring current and potential roles of Australian community pharmacists in gout management: a qualitative study. *BMC Fam Pract* 2018;19:54.
20 Finkler SA, Knickman JR, Hendrickson G, *et al*. A comparison of work-sampling and time-and-motion techniques for studies in health services research. *Health Serv Res* 1993;28:577–97.
21 Fisher AM, Ding MQ, Hochheiser H, *et al*. Measuring time utilization of pharmacists in the Birmingham free clinic dispensary. *BMC Health Serv Res* 2016;16:529.
22 de Clifford J-M, Blewitt P, Lam SS, *et al*. How do clinical pharmacists spend their working day? A Time-and-Motion study. *Journal of Pharmacy Practice and Research* 2012;42:134–9.

23 Lehnbom EC, Li L, Prgomet M. Little things matter: a time and motion study of pharmacists' activities in a paediatric Hospital. *Stud Health Technol Inform* 2016;227:80–6.
24 Negaard BJ, Lyons KP, Nichol CL, *et al*. What does a pharmacist do? a time and motion study. *Res Social Adm Pharm* 2020;16:1314–7.
25 Walter SR, Ling L, Westbrook JI. *A guide to the analysis of data from the work observation method by activity timing (WOMBAT) system*. Sydney: Australian Institute of Health Innovation, Macquarie University, 2018.
26 Westbrook JI, Ampt A. Design, application and testing of the work observation method by activity timing (WOMBAT) to measure clinicians' patterns of work and communication. *Int J Med Inform* 2009;78 Suppl 1:S25–33.
27 Australian Government Department of Health. Modified Monash model, 2019. Available: https://www.health.gov.au/health-workforce/health-workforce-classifications/modified-monash-model [Accessed 16th Jan 2021].
28 Naderifar M, Goli H, Ghaljaie F. Snowball sampling: a purposeful method of sampling in qualitative research. *Strides in Development of Medical Education*. In Press 2017;14.
29 Gwet KL. *Handbook of inter-rater reliability: the definitive guide to measuring the extent of agreement among multiple raters*. 4th ed. Gaithersburg: Advanced Analytics, LLC, 2014.
30 Westbrook JI, Li L, Georgiou A, *et al*. Impact of an electronic medication management system on hospital doctors' and nurses' work: a controlled pre-post, time and motion study. *J Am Med Inform Assoc* 2013;20:1150–8.
31 Pharmaceutical Benefits Scheme. *Pbs expenditure and prescriptions report 1 July 2018 to 30 June 2019*, 2019.
32 Pharmacy Board of Australia. *Guidelines for dispensing of medicines*, 2015.
33 Lea VM, Corlett SA, Rodgers RM. Workload and its impact on community pharmacists' job satisfaction and stress: a review of the literature. *Int J Pharm Pract* 2012;20:259–71.
34 Tucker P, Folkard S, Macdonald I. Rest breaks and accident risk. *Lancet* 2003;361:680.
35 Davies JE, Barber N, Taylor D. What do community pharmacists do?: results from a work sampling study in London. *Int J Pharm Pract* 2014;22:309–18.
36 Tsao NW, Lynd LD, Gastonguay L, *et al*. Factors associated with pharmacists' perceptions of their working conditions and safety and effectiveness of patient care. *Can Pharm J* 2016;149:18–27.
37 Scott DM, Strand M, Undem T, *et al*. Assessment of pharmacists' delivery of public health services in rural and urban areas in Iowa and North Dakota. *Pharm Pract* 2016;14:1.
38 Hays CA, Taylor SM, Glass BD. The rural pharmacy practice landscape: challenges and motivators. *J Multidiscip Healthc* 2020;13:227–34.
39 Howarth HD, Peterson GM, Jackson SL. Does rural and urban community pharmacy practice differ? A narrative systematic review. *Int J Pharm Pract* 2020;28:3–12.
40 Jackson J, Urick B. Performance-Based pharmacy payment models: the case for change. *Aust Health Rev* 2019;43:502–7.
41 Chan P, Grindrod KA, Bougher D, *et al*. A systematic review of remuneration systems for clinical pharmacy care services. *Canadian Pharmacists Journal* 2008;141:102–12.
42 Saini B, Krass I, Smith L, *et al*. Role of community pharmacists in asthma - Australian research highlighting pathways for future primary care models. *Australas Med J* 2011;4:190–200.
43 Inoue Y, Takikawa M, Morita Y, *et al*. A comparison of pharmacists' role functions across various nations: the importance of screening. *Res Social Adm Pharm* 2016;12:347–54.
44 Paradis E, Sutkin G. Beyond a good story: from Hawthorne effect to reactivity in health professions education research. *Med Educ* 2017;51:31–9.
45 Svensberg K, Kalleberg BG, Mathiesen L, *et al*. The observer effect in a hospital setting - Experiences from the observed and the observers. *Res Social Adm Pharm* 2021;17:2136–44.