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Research Paper

Supply of codeine combination analgesics from Australian pharmacies in the context of voluntary real-time recording and regulatory change: A simulated patient study

Jack C. Collins[1], Joel M. Hillman[1], Carl R. Schneider, Rebekah J. Moles*

Sydney Pharmacy School, Faculty of Medicine and Health, The University of Sydney, Sydney, Australia

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ABSTRACT

Background: In recent years there have been growing concerns regarding non-prescription codeine use in Australia. Efforts to mitigate risks associated with non-prescription codeine, such as addiction and toxicity, have been primarily through two initiatives; regulatory changes restricting their availability, and voluntary live-recording supply of non-prescription codeine combination analgesics (CCAs). This study sought to explore the supply of CCAs in the climate of regulatory change.

Methods: Eighty University of Sydney pharmacy students mystery-shopped 34 community pharmacies across metropolitan Sydney, Australia from August 2016 to November 2017, with scripted symptom-based (SBR) or direct product requests (DPR) for a CCA. Questions asked, staff involvement, regulatory compliance, voluntary recording, and product(s) supplied were recorded.

Results: Of 158 total visits, a non-prescription CCA was supplied in 101 instances. Sixty-one (60%) of these supplies complied with the legislative requirement for a pharmacist to supply the medicine. Voluntary recording was surmised to have been utilised 13 times (13% CCA supplies). CCAs were supplied less frequently in 2017 DPR scenarios compared to 2016 DPR scenarios (64% vs 86%; $p = 0.024$), and a greater proportion of 2017 DPR supplies were compliant with the legislative requirement of pharmacist supply (72% vs 46%; $p = 0.041$). No difference in proportion of sales surmised to have been voluntarily recorded was observed between the years. Interactions involving pharmacists resulted in less frequent supply of codeine than those without (58% vs 82%; $p = 0.012$).

Conclusion: Mandatory legislative regulation of pharmacist supply of non-prescription codeine was more likely to be complied with than voluntary recording. Compliance with pharmacist supply for DPRs appeared to improve following the announcement of regulatory change to prescription-only, whereas voluntary recording of supply did not appear to change.

Background

There is international concern about an 'opioid epidemic'. Data from the USA shows large increases in opioid-related deaths and per capita consumption over recent decades (Hedegaard, Warner & Minino, 2017; Scholl, Seth, Kariisa, Wilson & Baldwin, 2018; Seth, Scholl, Rudd & Bacon, 2018). Overdoses due to clandestine and illicit opioids, in particular, fentanyl, are the current leading cause of opioid-related deaths, exceeding those due to nonmedical use of prescription opioids. Although deaths due to nonmedical use of prescription opioids have stabilised in recent years, likely due to increasing awareness of the opioid crisis and the influence of policy on prescribing patterns, concerns remain regarding appropriate use of prescription opioids (Compton, Jones, Stein & Wargo, 2019; Hedegaard et al., 2017).

Similarly, opioid-use issues are being observed in Australia (Gisev et al., 2018) where deaths from opioid overdose vastly outweigh all other overdose deaths (Penington, 2017), and further, the use of, and overdose from, marketed opioids outweigh that of illicit opioids (Blanch, Pearson & Haber, 2014). In the period of 2011–2015, more than twice as many Australians died from opioid analgesics than heroin (Australian Commission on Safety and Quality in Health Care, 2018). In contrast to the USA, the Australian market up until recently had the availability of opioids without a prescription in the form of codeine combination analgesics (CCAs). These non-prescription preparations

* Corresponding author.
E-mail address: rebekah.moles@sydney.edu.au (R.J. Moles).
[1] These authors made equal contributions to this work

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contained up to 15 mg of codeine phosphate per dosage unit combined with either paracetamol (acetaminophen), ibuprofen, or paracetamol and doxylamine. In 2013 codeine was the most commonly supplied opioid by both pack count and weight, accounting for almost two-thirds of all opioids by pack count used in Australia, of which 55.8% was non-prescription CCAs (Gisev et al., 2016). Prior to the upscheduling of CCAs to prescription-only, concerns were raised surrounding the addictive potential of non-prescription codeine, with a considerable number of people presenting for both opioid-substitution and non-opioid substitution therapy where codeine was the primary opioid of use (Nielsen, Murnion et al., 2015; Nielsen, Roxburgh et al., 2015). In addition to codeine addiction, concerns were also presented regarding toxicity from the non-opioid components of CCAs (ibuprofen, paracetamol [acetaminophen]), as reports of toxicity from supratherapeutic doses of these components emerged (Frei, Nielsen, Dobbin & Tobin, 2010; Larson et al., 2005).

One approach to address the problem of opioid overuse is to implement drug monitoring programs (DMPs), though there is conflicting evidence of their efficacy in altering patterns of use (Finley et al., 2017). Research from the USA, where prescription DMPs of varying design are now active across all states, has suggested that monitoring is resulting in inconsistent effects on opioid prescribing and supply, and may not be effective in reducing problematic prescribing, especially when voluntary (Brady et al., 2014; Finley et al., 2017; Nam, Shea, Shi & Moran, 2017; Sun et al., 2018). Australia has seen two approaches attempting to mitigate risks posed by non-prescription codeine combination analgesics (CCAs). The first is legislative, whereby the national drug regulating body, the Australian Therapeutic Goods Administration, has twice ordered increasing restriction of supply to the public in 'upscheduling' (i.e. switching from a lower regulatory schedule to a higher schedule): restricting to supply by pharmacist-only (Schedule 3, see Table 1) in 2010, and then again in 2018 to prescription-only (Therapeutic Goods Administration, 2017). The second approach was a professional policy initiative of the Pharmacy Guild of Australia to institute a national, voluntary, real-time monitoring program for all non-prescription CCAs, called MedsASSIST which was introduced in the second quarter of 2016 (Pharmacy Guild of Australia, 2016). This tool allowed pharmacists to record supply of non-prescription CCAs against the purchaser's photographic identification, theoretically allowing pharmacists to track frequency of use, and identify potential overuse or misuse for referral to physicians or pain and addiction services.

Medicines for human use are divided into primary regulatory classes in Australia, with increasing restrictions on supply and use (Table 1). There is increasing movement between these classifications based on changing perceptions of risk. Whilst many medicines are 'down-scheduled' to increase accessibility, codeine is an example where up-scheduling occurred in an attempt to mitigate risks (McCoy, Bruno & Nielsen, 2017). The announcement of the proposal to upschedule was made in 2016, allowing time for public comment before coming into effect February 1st, 2018 (Therapeutic Goods Administration, 2017).

In the context of regulatory change in the supply of CCAs (pre- and post-rescheduling announcement), the primary objective of this study was to examine compliance with the legislative requirement of personal supply by a pharmacist when supplying non-prescription CCAs through the use of simulated patients. Secondary objectives were to measure the utilisation of voluntary live-recording software, identify factors influencing legislative compliance and voluntary live-recording utilisation, and finally to characterise pharmacy practice around the supply of non-prescription CCAs.

Methods

Ethics

The study was approved by the Human Research Ethics Committee of the University of Sydney (Reference 2014/186).

Mystery shopping

In order to meet the study objectives, mystery shopping was employed. This technique involves the use of simulated patients (mystery shoppers, pseudopatients) who enter the pharmacy with a scripted request for a product, or assistance with management of symptoms. These simulated patients may be students, actors, or members of a research team, but should be indistinguishable from regular patrons of the business. This technique is employed in numerous fields and is considered to be a useful measure of pharmacy practice when executed correctly (Watson, Norris & Granas, 2010). This technique is advantageous as it enables measurement of "true" practice, rather than self-reported or simulated practice.

Participants and setting

The research team contacted community pharmacies across metropolitan Sydney to recruit a variety of pharmacy sizes and formats through convenience sampling. Pharmacies expressing interest were provided consent forms for review and return. Each individual staff member provided consent to be included and for audio-recording of interactions. Pharmacies with students on placement were excluded. Each pharmacy was presented with cases of the same type at the rate of

Table 1
Summary of New South Wales medicine schedules, adapted from the Standard for the Uniform Scheduling of Medicines and Poisons and New South Wales Poisons and Therapeutic Goods Regulation (New South Wales Government, 2018; Therapeutic Goods Administration, 2019).

Schedule (increasing restriction with schedule number)	Restrictions and storage	Examples
Unscheduled medicines	No restrictions, may be sold anywhere	Small pack sizes of simple medicines such as ibuprofen and paracetamol (acetaminophen)
Schedule 2 – Pharmacy Medicines	Available only on pharmacy premises with pharmacist present	Large pack sizes of simple medicines Antihelminthics such as mebendazole Cough suppressants such as pholcodine
Schedule 3 – Pharmacist Only Medicines	Available only by direct personal supply from a registered pharmacist Must be stored out of public access	*Lower-dose (12 mg codeine per unit) codeine combination analgesics (until February 2018)* Pseudoephedrine in small pack sizes Bronchodilators such as salbutamol (albuterol)
Schedule 4 – Prescription Only Medicines	Available from a pharmacy, and only with a prescription Must be stored out of public access	*Higher-dose (30 mg codeine per unit) codeine combination analgesics (pre-February 2018); all codeine combination analgesics from February 2018* Antibiotics such as amoxicillin Blood pressure medicines such as perindopril
Schedule 8 – Controlled Drugs	Available from a pharmacy, and only with a prescription meeting specific requirements Must be stored in a secured drug safe	Opioids such as *codeine single-ingredient preparations*, morphine, and oxycodone Stimulants such as dexamfetamine

Table 2
Example scenario particulars.

Scenario	Scripted request	Who the product is for	How long they have had the symptoms	What the actual symptoms are	Other treatments for this or another condition	Other relevant information
2016 Direct product request	"Can I get some Panafen Plus® [ibuprofen and codeine phosphate]?"	Self	Long-term	Frequent migraines	Nil	Long-term, frequent use and symptoms warrant review
2016 Symptom-based request	"Can I get something for period pain?"	Friend	Since yesterday	Moderate menstrual cramps	Ibuprofen	If asked, has used Nurofen Plus® (ibuprofen and codeine phosphate) previously
2017 Direct prouct request	"Can I get some Panadeine® [paracetamol (acetaminophen) and codeine phosphate]?"	Self	Since this morning	Headache, both sides of head, no changes in vision, poor sleep last night	Nil	Have used in the past

one case per week for five weeks. Visits were completed between August 2016 and November 2017 in two cohorts.

Mystery shopping visits and data collection

In 2016 the research team, who are all registered pharmacists, composed an approximately parallel series of five symptom-based requests (SBR) for pain such as "Can I have something for tooth pain?", and five direct product requests (DPR) such as "Can I have some Nurofen Plus® [ibuprofen and codeine phosphate]?", where, if questioned, the presenting complaint was a case of dental pain. Cases were designed to assess the ability of staff to elicit required background information and identify a central problem, such as extended use or contraindication, then provide counselling on the use of any products supplied and/or referral to a physician. In 2017, the research team composed five DPR scenarios similar to those presented in 2016. Examples of cases are shown in Table 2. SBR scenarios were included in 2016 for comparison to performance in DPR scenarios. DPR scenarios were the preferred design to compare practice between 2016 and 2017 as these have been shown to be managed poorly compared to SBR scenarios (Watson, Bond, Grimshaw & Johnston, 2006).

Data collection through mystery shopping visits was completed by Bachelor of Pharmacy students at The University of Sydney. The participating students were provided with: (1) a training session familiarising them with the task, (2) in-class opportunity to role-play cases with researcher feedback, (3) ample opportunity to review written case summaries and talking points, and (4) extracurricular opportunity to practice with or ask questions of the research team.

Students presented to a pre-allocated pharmacy with one of the aforementioned scenarios. Students interacted with the first staff member encountered and used a structured script to respond to questioning or counselling. Students then used the audio-recording of the interaction to score the staff member on a datasheet. Individual students visited a pharmacy only once to minimise the risk of detection.

Data recording sheets

Datasheets used in this study (see supplementary file for example) were based on the Pharmaceutical Society of Australia's WHAT-STOP-GO protocol (Pharmaceutical Society of Australia, 2006), designed to assist pharmacy staff (particularly non-pharmacist staff) in the provision of non-prescription medicines. This *aide-mémoire* includes the questions *W*ho the medicine is for, *H*ow long they have had symptoms, what the *A*ctual symptoms are, and if there are any other *T*reatments taken for the presenting or other conditions. In addition to the questions asked, other data recorded included any products supplied and counselling on the use of these products, rapport, appropriateness of outcome, quality of the information provided, if referral was made, details of when the visit occurred, who attended to the student, and if any CCA supply was surmised to have been recorded in MedsASSIST or another means of recording (determined by simulated patients being asked for photographic identification).

Data collation and analysis

All data were checked for completeness by researchers before being entered into Microsoft Excel 2013 for Windows (Microsoft, Redmond, USA). Data fidelity was ensured by randomly auditing 10% of recordings, a portion based on existing literature (Werner & Benrimoj, 2008).

Data were entered into IBM SPSS Statistics V24.0 (IBM Corp., Armonk, USA), descriptively analysed, and tested for normality using the Kolmogorov-Smirnov test. Pearson's χ^2 analyses with Yates' Continuity Correction were performed to determine any differences in proportion of visits resulting in the supply of CCAs between request types and between 2016 and 2017 DPR cohorts and 2016 DPR and SBR cohorts, and if there were any differences in proportion of visits

complying with legislative requirements surrounding the supply of these products, the surmised use of MedsASSIST or other means of recording, and whether the staff member's designation predicted supply of CCAs.

Results

Of the pharmacies approached, 25 consented to participate in the 2016 study, with one pharmacy withdrawing during the study, leaving 24 pharmacies in the pre-up-scheduling announcement (2016) cohort. In 2017, 10 pharmacies consented to participate with five pharmacies participating in both years, giving 29 unique community pharmacies across the study. Eighty undergraduate pharmacy students completed 170 mystery shopping visits to the 29 community pharmacies in the metropolitan region of Sydney, Australia between August 2016 and November 2017. Of 170 completed visits, 158 (93%) were eligible for analysis – 57 from 2016 SBR visits, 56 from 2016 DPR visits, and 45 from 2017 DPR visits. Three visits were excluded from the 2016 (pre-announcement) DPR scenarios due to student error, one was excluded due to the student being recognised, and three visits were excluded from the 2016 SBR scenarios due to missing data. Five visits were excluded from the 2017 (post-announcement) DPR visits due to missing data. The audit of 10% of cases identified no discrepancies between the student-reported data and the researcher-reported data for the outcomes of interest in this study.

CCA supply, legality of supply, and voluntary recording of supply

Of the 158 visits eligible for analysis, a CCA was supplied in 101 instances (64% of visits). A significantly greater proportion of 2016 DPR visits resulted in the supply of a CCA compared to 2017 DPR visits (86% vs 64%; $\chi_2 = 5.11$, $p = 0.024$, $\varphi = 0.25$). When comparing 2016 DPR and SBR scenarios, CCAs were supplied more often when the simulated patient presented with a request for a product, rather than describing symptoms (86% vs 42%; $\chi_2 = 21.39$, $p < 0.001$, $\varphi = 0.45$).

According to the State legislation where the study was conducted, one of the factors for a CCA (a *Pharmacist Only Medicine*) to be legally supplied is that the pharmacist must personally provide the product to the patient. Intern (graduate) pharmacists are considered pharmacists for this purpose provided they are under the supervision of a registered pharmacist (New South Wales Government, 2018). Of the 101 instances where a CCA was supplied, a total of 61 (60%) were supplied in accordance with this requirement (Table 3). Greater adherence to this requirement was observed in the 2017 DPR requests than the 2016 counterpart (72% vs 46%; $\chi_2 = 4.16$, $p = 0.041$, $\varphi = 0.26$). Similarly, greater regulatory adherence occurred in 2016 SBR requests compared to DPR scenarios in the same year (75% vs 46%; $\chi_2 = 4.40$, $p = 0.036$, $\varphi = 0.28$).

In addition to adherence to legislative requirements, surmised use of the CCA voluntary real-time recording software MedsASSIST (or other means of recording) was also documented (Table 3). Sales were surmised to have been recorded in four (8%) of the 2016 DPR supplies, five (17%) of the 2017 DPR supplies, and four (17%) of the 2016 SBR supplies; resulting in a total of 13 uses (13% of all CCA supplies) across all instances where a CCA was supplied. No significant difference in proportion of recording of supplied was found between 2016 and 2017 DPR supplies (8% vs 17%; $\chi_2 = 0.70$, $p = 0.402$, $\varphi = 0.14$).

Pharmacy staff and supply outcomes

Pharmacists (either intern or registered) were the first staff member encountered in approximately half of the recorded visits ($n = 82$). In the remaining 76 visits a non-pharmacist staff member was encountered first. Of these, the simulated patient was referred to the pharmacist in 26 cases, and the non-pharmacist staff member sought advice from the pharmacist in 11 cases. The remaining 39 cases were handled completely without a pharmacist. CCAs were significantly less likely to be supplied if a pharmacist was involved in the interaction, with 58% ($n = 69$) of interactions where a pharmacist was involved resulting in CCA supply versus 82% ($n = 32$) of interactions where non-pharmacist staff handled the interaction alone ($\chi_2 = 6.37$, $p = 0.012$, $\varphi = 0.22$).

Discussion

There was a significantly greater compliance with legislative requirement relating to involvement of the pharmacist when supplying CCAs from community pharmacies in the 2017 cohort compared to the 2016 cohort. A reason for this may be increased awareness of harms of codeine misuse and abuse and the announcement from the Australian Therapeutic Goods Administration to up-schedule CCAs to prescription-only and the subsequent scrutiny on pharmacy practice as a result of the discourse surrounding the rescheduling. However, the announcement of up-scheduling to Schedule 4 appeared to have no influence on voluntary recording of sales through the utilisation of the MedsASSIST tool or otherwise, and this study observed very limited potential use of this voluntary system across the two years.

Legislation in New South Wales requires a pharmacist to physically hand a Schedule 3 medicine to the consumer (New South Wales Government, 2018). We saw mediocre compliance with this legal requirement at 60%, highlighting the need for improvement. Similarly, a study in Victoria (conducted prior to the establishment of MedsASSIST) found 23% of CCAs were supplied without supervision of a pharmacist (the corresponding legislative requirement in that state) (Byrne, Wood & Spark, 2018). This is only one aspect of legal supply of Schedule 3 medicines, and other legal requirements such as storage were not captured in this study. This may have resulted in inflation of the number of legal supplies reported and would be worth investigating in future work. The Australian community pharmacy workforce is broadly divided into two groups: pharmacists and non-pharmacist staff, of which both are permitted to be involved in the supply of non-prescription medicines. Pharmacists are tertiary-educated registered practitioners (with either provisional or general registration), and non-pharmacist staff may have no specific training requirements, meaning they may or may not have undergone formalised training. Training of non-pharmacist staff is strongly recommended however is not mandated, with the exception of pharmacies enrolled in a voluntary accreditation program (of which approximately 90% of Australian pharmacies are accredited), the Quality Care Pharmacy Program (QCPP), which requires staff to undertake (and maintain) basic training on the

Table 3
Supply of codeine combination analgesic (CCA) by pharmacists and recording of supply.

Scenario (times CCA supplied)	Pharmacist supplied CCA	CCA supply recorded[a]
2016 Direct product request ($n = 48$)	22 (46%)	4 (8%)
2016 Symptom-based request ($n = 24$)	18 (75%)	4 (17%)
2017 Direct product request ($n = 29$)	21 (72%)	5 (17%)
Overall ($n = 101$)	61 (60%)	13 (13%)

[a] Determined by request for photographic identification in order for CCA to be supplied.

provision of non-prescription medicines (Pharmacy Guild of Australia, 2019). The Pharmacy Industry Award states that higher level pharmacy assistants and technicians should be remunerated at a higher rate if they have completed accredited training programs from technical colleges or equivalent (Fair Work Ombudsman, 2019). This is contrasted with other countries, such as the United Kingdom, where there are mandated requirements for non-pharmacist pharmacy staff to hold certifications or accredited qualifications (General Pharmaceutical Council of Great Britain, 2011). Our results match existing literature in the field, which reports that non-pharmacist staff provide sub-optimal care and are less adherent to guidelines and legislation than pharmacists (Alte, Weitschies & Ritter, 2007; Collins et al., 2017; Watson et al., 2006). Future work should investigate the adequacy of training delivered to non-pharmacist staff, and if there should be legally mandated requirements for training. We observed that non-pharmacist staff referred the simulated patient to the pharmacist in less than 50% of cases, and hence CCAs were supplied without the legal requirement of pharmacist supply. This lack of internal referral at the pharmacy (organisational) level highlights that current staff structure and practice in Australian pharmacies may be a barrier to compliance with system-level regulatory requirements surrounding the supply of Schedule 3 medicines.

A recent survey of opinions in the field of pharmacy and drug misuse suggested academic support for DMPs as an approach to CCAs in Australia (Gibbins, Wood & Spark, 2017). In contrast to legislative approaches to controlling CCA supply, MedsASSIST was introduced nationally in April 2016 as a decision-support and live-recording tool for pharmacists in response to growing concerns about the inappropriate use and abuse of CCAs. The tool was reported to have been registered in more than 70% of pharmacies across Australia, and in late 2017 was recording approximately 100,000 supplies per week nationally, with 2% of requests resulting in non-supply; however, the system design was such that denial of CCA supply before review in the software is not recorded, so the actual figure may be higher (Pharmacy Guild of Australia, 2017). This study however only saw a maximum of 13% of visits where it is surmised that the system was utilised. As this was determined by a request for the purchaser's photographic identification, actual utilisation of this system may have been lower if the sale was in fact recorded elsewhere or not at all. Australia has other drug monitoring programs, such as Project STOP (Pharmacy Guild of Australia, 2007), which mandatorily monitors the supply of pseudoephedrine, aiming to reduce diversion for the manufacture of methamphetamine. Much like MedsASSIST, Project STOP, which was initially introduced as a voluntary platform, records the sale of pseudoephedrine-containing products against the purchaser's photographic identification, including a record of their name and residential address. As a compulsory recording program with punitive incentive for use, Project STOP has been reported to have a greater success in reducing diversion, as well as more complete compliance (Hattingh, Varsani, Kachouei & Parsons, 2016). Such low potential utilisation of the voluntary DMP seen in this study is in line with the international experience with DMPs, whereby voluntary decision-support has been reported as either not fully utilised, or not utilised effectively (Deyo et al., 2018; Gugelmann & Perrone, 2011). Anecdotal evidence suggests that use of MedsASSIST declined after the announcement to up-schedule CCAs, however no difference in proportion of recorded sales between 2016 and 2017 DPRs was observed in this study. It is interesting to note that a simulated patient study conducted in Australia prior to the introduction of MedsASSIST saw pharmacists voluntarily recording the sales of CCAs in Project STOP (an unapproved use of this system) or their pharmacy dispensing software (Byrne et al., 2018). This is supported by other literature reporting that some pharmacists felt the need to monitor the sale of these products even before formalised systems were introduced (Hamer, Spark, Wood & Roberts, 2014).

It should be noted that DMPs are not without problems, and are only one mechanism aiming to curb opioid prescribing and use. Recent systematic reviews on literature examining the efficacy of prescription DMPs have cited mixed, weak-level evidence for outcomes relating to prescription numbers, misuse, diversion, and overdose/fatality (Fink et al., 2018; Finley et al., 2017). Problems cited include lack of guidance on interpretation, what information is recorded, the agency controlling the system, clinician uptake and satisfaction, breadth of medicines included in surveillance, as well as external factors such as media scrutiny, and clinical awareness of opioid use (Cobaugh et al., 2014; Deyo et al., 2018; Rutkow et al., 2017). These variations in manifestation and environment have led to some DMPs showing decreases in opioid trends, while others actually show increases (Brady et al., 2014). Despite the potential benefits of DMPs, some concern has been raised that DMPs may shift prescribing focus on the legality of prescribing, rather than the clinical appropriateness of prescribing or health outcomes (Kovitwanichkanont & Day, 2018). Another shortcoming of DMPs, particularly at the supply stage, is that despite success in cutting off one avenue of supply, other avenues may be exploited resulting in no net decrease in use, manufacture or improved outcomes. This was the case as seen in an evaluation of Project STOP, whereby despite the success of this DMP in reducing purchase of pseudoephedrine-containing products for the purpose of methamphetamine synthesis, the overall amount of methamphetamine manufacture and clandestine laboratories did not decrease most likely due to a shift to alternative sources of precursors (Ferris, Devaney, Mazerolle & Sparkes-Carroll, 2016). This is reflected in the case of opioids where shifting patterns towards increases in use of (and resulting death from) synthetic opioids has been seen in recent years (Scholl et al., 2018; Seth et al., 2018). Therefore it is essential that policymakers consider these (unintended) consequences when developing policy to restrict access to substances of abuse.

After the upscheduling of codeine to prescription-only following the completion of this study, prescribers are now the only source of opioid analgesics in Australia. Since the upscheduling of CCAs, the MedsASSIST platform has been decommissioned and a national real time monitoring platform remains under development. The states of Victoria and Tasmania have initiated their own state-based prescription monitoring platforms (Hunt, 2017; Pharmacy Guild of Australia, 2018; Tasmanian Government, 2019; Victoria State Government, 2019).

The current opioid epidemic seen in developed nations may be due in part to social acquiescence exhibited by healthcare professionals when presented with a direct request for an opioid. Pharmacy staff in this study were observed to supply CCAs more frequently when the product was named, and pharmacy literature has highlighted that pharmacists feel less comfortable in asking questions and exhibit poorer adherence to best-practice guidelines when presented with a direct request for a specific product (Seubert et al., 2017; Watson et al., 2006). Acquiescence has also been well-demonstrated in physicians, who have been shown to supply prescriptions for drugs against the best interests of the patient after a direct request, even after the physician identifies such a contradiction (Arney, Street & Naik, 2014; Becker & Midoun, 2016; Kaul, Kirchhoff, Morden, Vogeli & Campbell, 2015; McKinlay, Trachtenberg, Marceau, Katz & Fischer, 2014).

These points emphasise that DMPs alone may be insufficient. Perhaps providing an avenue of external review or justification at the time of prescribing may also be warranted, alongside training for health professionals and their support staff in assertive communication to reduce the risk of acquiescent supply. With evidence for self-monitoring by physicians lacking, infrastructure for pharmacist intervention should be built into the imminent DMPs planned in Australia (Hennessy, 2017; Hunt, 2017), as well as into the expectations of the public around such a system. This research supports this idea, where the outcomes of a case were improved by increased pharmacist involvement.

Approaching cases of misuse of non-prescription drugs has been identified as an area of difficulty for pharmacists. Reports indicate that while pharmacists are able to identify misuse, they struggle to guide individuals to appropriate care pathways (Gibbins et al., 2017;

Hamer et al., 2014; McBride, Pates, Ramadan & McGowan, 2003). It is likely that this difficulty in referring, managing, or even talking to people about misuse is at least a contributing factor in the lack of success observed with the MedsASSIST program (Gibbins et al., 2017). Factors such as supratherapeutic doses, frequent supply, use for inappropriate indications or outside of approved parameters, or suspected recreational use are among the many reasons a pharmacist may wish to engage a patient in a discussion about their non-prescription medication use, though data in this area are limited (Gibbins et al., 2017; Hamer et al., 2014; Nielsen, MacDonald & Johnson, 2018). In the wake of the increase in nonmedical opioid use, there is the potential for increased involvement of the community pharmacist in many ways, including screening, identification of potential misuse, education and counselling about use, storage and disposal of opioid medicines, referral to medical practitioners or addiction services, and supply of opioid substitution therapy (Pringle, Cochran & Aruru, 2019). It is necessary to ensure pharmacists are equipped to deliver these services appropriately and effectively.

Strengths and limitations

The strength of this study is the mystery shopping technique used, allowing the research team to observe actual practice of pharmacy staff when presented with a variety of direct product requests for CCAs or symptom-based pain scenarios. This is also the only known simulated patient study to capture the practice of pharmacists during the period of MedsASSIST being live and impending up-scheduling of CCAs. The approach to the simulated patient method employed in this study does come with limitations, notably that the staff must consent to participation before the study commences (without knowing the exact timing of visits) and the homogeneity of the demographic of the simulated patients (undergraduate pharmacy students from one university). The restricted demographic of simulated patients may not have captured how patients from different demographics, for example the elderly or those from different socioeconomic backgrounds, may have been managed if they presented with the same requests. The sample of pharmacies was relatively small, not paired between the pre- and post-announcement periods, and was a voluntary convenience sample. The lack of random sampling and prior knowledge of the study may have yielded results that overestimate compliance with supply regulation due to the volunteer and Hawthorne effects. Due to the involvement of some pharmacies in both the 2016 and 2017 cohorts, it is possible that some pharmacists may have participated in both years, thus violating the assumption of independence for χ^2 tests. Finally, the sample of the study was constrained to metropolitan Sydney, and hence the results may not be generalisable to wider practice in Australia during the timeframe of the study.

Conclusion

Our findings suggest that compliance with legislative requirements regarding involvement of the pharmacist in supply improved after the announcement that codeine was to be up-scheduled, but this announcement appeared to have no impact on the use of a voluntary real-time codeine monitoring program in this sample. Our findings also suggest that the decision-making capacity of pharmacists results in greater compliance with best practice compared to non-pharmacist staff. Regulatory changes, including a mandatory DMP, is likely one part of what should be a multimodal intervention aiming for opioid harm minimisation in the Australian setting.

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CRediT authorship contribution statement

Jack C. Collins: Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing - original draft, Writing - review & editing. **Joel M. Hillman:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing - original draft, Writing - review & editing. **Carl R. Schneider:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Supervision, Project administration, Writing - review & editing. **Rebekah J. Moles:** Conceptualization, Data curation, Formal analysis, Investigation, Methodology, Project administration, Writing - review & editing, Supervision.

Declaration of Competing Interest

None.

Supplementary materials

Supplementary material associated with this article can be found, in the online version, at doi:10.1016/j.drugpo.2019.10.010.

References

Alte, D., Weitschies, W., & Ritter, C. A. (2007). Evaluation of consultation in community pharmacies with mystery shoppers. *The Annals of Pharmacotherapy, 41*(6), 1023–1030. https://doi.org/10.1345/aph.1H565.

Arney, J., Street, R. L., Jr., & Naik, A. D. (2014). Factors shaping physicians' willingness to accommodate medication requests. *Evaluation & the Health Professions, 37*(3), 349–365. https://doi.org/10.1177/0163278712468756.

Australian Commission on Safety and Quality in Health Care. (2018). The third atlas of healthcare variation. Retrieved 11th December 2018 from https://www.safetyandquality.gov.au/atlas/the-third-australian-atlas-of-healthcare-variation-2018/.

Becker, S. J., & Midoun, M. M. (2016). Effects of direct-to-consumer advertising on patient prescription requests and physician prescribing: A systematic review of psychiatry relevant studies. *The Journal of Clinical Psychiatry, 77*(10), e1293–e1300. https://doi.org/10.4088/JCP.15r10325.

Blanch, B., Pearson, S., & Haber, P. S. (2014). An overview of the patterns of prescription opioid use, costs and related harms in Australia. *British Journal of Clinical Pharmacology, 78*(5), 1159–1166. https://doi.org/10.1111/bcp.12446.

Brady, J. E., Wunsch, H., DiMaggio, C., Lang, B. H., Giglio, J., & Li, G. (2014). Prescription drug monitoring and dispensing of prescription opioids. *Public Health Reports, 129*(2), 139–147. https://doi.org/10.1177/003335491412900207.

Byrne, G. A., Wood, P. J., & Spark, M. J. (2018). Non-prescription supply of combination analgesics containing codeine in community pharmacy: A simulated patient study. *Research in Social & Administrative Pharmacy: RSAP, 14*(1), 96–105. https://doi.org/10.1016/j.sapharm.2017.01.005.

Cobaugh, D. J., Gainor, C., Gaston, C. L., Kwong, T. C., Magnani, B., & McPherson, M. L. (2014). The opioid abuse and misuse epidemic: Implications for pharmacists in hospitals and health systems. *American Journal of Health-System Pharmacy (AJHP): Official Journal of the American Society of Health-System Pharmacists, 71*(18), 1539–1554. https://doi.org/10.2146/ajhp140157.

Collins, J. C., Schneider, C. R., Naughtin, C. L., Wilson, F., de Almeida Neto, A. C., & Moles, R. J. (2017). Mystery shopping and coaching as a form of audit and feedback to improve community pharmacy management of non-prescription medicine requests: An intervention study. *BMJ Open, 7*(12), e019462. https://doi.org/10.1136/bmjopen-2017-019462.

Compton, W. M., Jones, C. M., Stein, J. B., & Wargo, E. M. (2019). Promising roles for pharmacists in addressing the U.S. opioid crisis. *Research in Social and Administrative Pharmacy, 15*(8), 910–916. https://doi.org/10.1016/j.sapharm.2017.12.009.

Deyo, R. A., Hallvik, S. E., Hildebran, C., Marino, M., Springer, R., & Irvine, J. M. (2018). Association of prescription drug monitoring program use with opioid prescribing and health outcomes: A comparison of program users and nonusers. *The Journal of Pain: Official Journal of the American Pain Society, 19*(2), 166–177. https://doi.org/10.1016/j.jpain.2017.10.001.

Fair Work Ombudsman. (2019). Pharmacy Industry Award 2010. Retrieved 15th April 2019 fromhttp://awardviewer.fwo.gov.au/award/show/MA000012#P936_81431.

Ferris, J., Devaney, M., Mazerolle, L., & Sparkes-Carroll, M. (2016). *Assessing the utility of project stop in reducing pseudoephedrine diversion to clandestine laboratories. Trends & issues in crime and criminal justice no. 509.* Canberra: Australian Institute of Criminology. Retrieved 17th July 2019 from https://aic.gov.au/publications/tandi/tandi509.

Fink, D. S., Schleimer, J. P., Sarvet, A., Grover, K. K., Delcher, C., Castillo-Corniglia, A., et al. (2018). Association between prescription drug monitoring programs and nonfatal and fata drug overdoses: A systematic review. *Annals of Internal Medicine, 168*(11), 783–790. https://doi.org/10.7326/M17-3074.

Finley, E. P., Garcia, A., Rosen, K., McGeary, D., Pugh, M. J., & Potter, J. S. (2017).

Evaluating the impact of prescription drug monitoring program implementation: A scoping review. *BMC Health Services Research, 17*(1), 420. https://doi.org/10.1186/s12913-017-2354-5.

Frei, M. Y., Nielsen, S., Dobbin, M. D. H., & Tobin, C. (2010). Serious morbidity associated with misuse of over-the-counter codeine-ibuprofen analgesics: A series of 27 cases. *MJA, 193*(5), 294–296. https://doi.org/10.5694/j.1326-5377.2010.tb03911.x.

General Pharmaceutical Council of Great Britain. (2011). Policy on minimum training requirements for dispensing/pharmacy assistants and medicines counter assistants. Retrieved 10th December 2018 from https://www.pharmacyregulation.org/sites/default/files/minimum_training_requirements_da_mca_sep_2011.pdf.

Gibbins, A. K., Wood, P. J., & Spark, M. J. (2017). Managing inappropriate use of non-prescription combination analgesics containing codeine: A modified Delphi study. *Research in Social & Administrative Pharmacy: RSAP, 13*(2), 369–377. https://doi.org/10.1016/j.sapharm.2016.02.015.

Gisev, N., Campbell, G., Lalic, S., Larney, S., Peacock, A., Nielsen, S., et al. (2018). Current opioid access, use, and problems in Australasian juridstictions. *Current Addiction Reports, 5*(4), 464–472. https://doi.org/10.1007/s40429-018-0227-6.

Gisev, N., Nielsen, S., Cama, E., Larance, B., Bruno, R., & Degenhardt, L. (2016). An ecological study of the extent and factors associated with the use of prescription and over-the-counter codeine in Australia. *European Journal of Clinical Pharmacology, 72*(4), 469–494. https://doi.org/10.1007/s00228-015-1995-8.

Gugelmann, H. M., & Perrone, J. (2011). Can prescription drug monitoring programs help limit opioid abuse? *JAMA, 306*(20), 2258–2259. https://doi.org/10.1001/jama.2011.1712.

Hamer, A. M., Spark, M. J., Wood, P. J., & Roberts, E. (2014). The upscheduling of combination analgesics containing codeine: The impact on the practice of pharmacists. *Research in Social & Administrative Pharmacy: RSAP, 10*(4), 669–678. https://doi.org/10.1016/j.sapharm.2013.08.004.

Hattingh, H. L., Varsani, J., Kachouei, L. A., & Parsons, R. (2016). Evaluation of pseudoephedrine pharmacy sales before and after mandatory recording requirements in Western Australia: A case study. *Substance Abuse Treatment, Prevention, and Policy, 11*(1), 30. https://doi.org/10.1186/s13011-016-0075-0.

Hedegaard, H., Warner, M., & Minino, A.M. (.2017). Drug overdose deaths in the United States, 1999–2016. NCHS Data Brief (294), 1–8.

Hennessy, J. (2017). Life-saving real-time prescription monitoring laws pass Parliament [Press release]. Retrieved 10th December, 208 fromhttps://www.premier.vic.gov.au/life-saving-real-time-prescription-monitoring-laws-pass-parliament/.

Hunt, G. (2017). National approach to prescription drug misuse: The Australian government will invest over $16 million to deliver the national roll-out of real time prescription monitoring for medicines to directly address the needless loss of life from misuse of these drugs. [Press release]. Retrieved 10th December 2018 fromhttp://www.health.gov.au/internet/ministers/publishing.nsf/Content/health-mediarel-yr2017-hunt071.htm.

Kaul, S., Kirchhoff, A. C., Morden, N. E., Vogeli, C. S., & Campbell, E. G. (2015). Physician response to patient request for unnecessary care. *The American Journal of Managed Care, 21*(11), 823–832.

Kovitwanichkanont, T., & Day, C. A. (2018). Prescription opioid misuse and public health approach in Australia. *Substance Use & Misuse, 53*(2), 200–205. https://doi.org/10.1080/10826084.2017.1305415.

Larson, A. M., Polson, J., Fontana, R. J., Davern, T. J., Lalani, E., Hynan, L. S., et al. (2005). Acetaminophen-induced liver failure: Results of a United States multicenter, prospective study. *Heaptology, 42*(6), 1364–1372. https://doi.org/10.1002/hep.20948.

McBride, A. J., Pates, R., Ramadan, R., & McGowan, C. (2003). Delphi survey of experts' opinions on strategies used by community pharmacists to reduce over-the-counter drug misuse. *Addiction, 98*(4), 487–497. https://doi.org/10.1046/j.1360-0443.2003.00345.x.

McCoy, J., Bruno, R., & Nielsen, S. (2017). Attitudes in Australia on the upscheduling of over-the-counter codeine to a prescription-only medication. *Drug and Alcohol Review, 37*(2), 257–261. https://doi.org/10.1111/dar.12568.

McKinlay, J. B., Trachtenberg, F., Marceau, L. D., Katz, J. N., & Fischer, M. A. (2014). Effects of patient medication requests on physician prescribing behavior: Results of a factorial experiment. *Medical Care, 52*(4), 294–299. https://doi.org/10.1097/mlr.0000000000000096.

Nam, Y. H., Shea, D. G., Shi, Y., & Moran, J. R. (2017). State prescription drug monitoring programs and fatal drug overdoses. *The American Journal of Managed Care, 23*(5), 297–303.

New South Wales Government. (2018). Poisons and therapeutic goods regulation 2008. Retrieved 10th December 2018 fromhttps://www.legislation.nsw.gov.au/#/view/regulation/2008/392/full.

Nielsen, S., MacDonald, T., & Johnson, J. L. (2018). Identifying and treating codeine dependence: A systematic review. *MJA, 208*(10), 451–461. https://doi.org/10.5694/mja17.00749.

Nielsen, S., Murnion, B., Dunlop, A., Degenhardt, L., Demirkol, A., Muhleisen, P., et al. (2015a). Comparing treatment-seeking codeine users and strong opioid users: Findings from a novel case series. *Drug and Alcohol Review, 34*, 304–311. https://doi.org/10.1111/dar.12224.

Nielsen, S., Roxburgh, A., Bruno, R., Lintzeris, N., Jeffferson, A., & Degenhardt, L. (2015b). Changes in non-opioid substitution episodes for pharmaceutical episodes and heroin from 2002 to 2011. *Drug Alcohol Dependence, 149*, 212–219. https://doi.org/10.1016/j.drugalcdep.2015.02.004.

Penington. (2017). *Australia's annual overdose report 2017*. Retrieved 10th December 2018 fromhttp://www.penington.org.au/australias-annual-overdose-report-2017/.

Pharmaceutical Society of Australia. (2006). *Standards for the provision of pharmacy medicines and pharmacist only medicines in community pharmacy. Professional practice standards*. Canberra: Pharmaceutical Society of Australia.

Pharmacy Guild of Australia. (2007). Project STOP. Retrieved 10th December 2018 fromhttp://www.projectstop.com/.

Pharmacy Guild of Australia. (2016). MedsASSIST - Informing Medicine Decisions. Retrieved 8th Februrary, 2018 fromhttps://www.guild.org.au/programs/medsassist.

Pharmacy Guild of Australia (2017). Personal communication from the pharmacy guild of australia regarding the medsassist program.

Pharmacy Guild of Australia. (2018). MedsASSIST to be discontinued. Retrieved 10th December 2018 fromhttps://www.guild.org.au/news-events/news/2018/medsassist-to-be-discontinued.

Pharmacy Guild of Australia. (2019). S2/S3 Training. Retrieved 15th April 2019 fromhttps://www.guild.org.au/training/training-tiles/pharmacy-and-dispensary-assistant/s2s3-training.

Pringle, J. L., Cochran, J., & Aruru, M. (2019). Role of pharmacists in the Opioid Use Disorder (OUD) crisis. *Research in Social and Administrative Pharmacy, 15*(2), 228–229. https://doi.org/10.1016/j.sapharm.2018.11.005.

Rutkow, L., Smith, K. C., Lai, A. Y., Vernick, J. S., Davis, C. S., & Alexander, G. C. (2017). Prescription drug monitoring program design and function: A qualitative analysis. *Drug Alcohol Dependence, 180*, 395–400. https://doi.org/10.1016/j.drugalcdep.2017.08.040.

Scholl, S., Seth, P., Kariisa, M., Wilson, N., & Baldwin, G. (2018). Drug and opioid-involved overdose deaths – United States, 2013–2017. *Morbidity and Mortality Weekly Report, 67*(5152), 1419–1427. https://doi.org/10.15585/mmwr.mm675152e1.

Seth, P., Scholl, L., Rudd, R. A., & Bacon, S. (2018). Overdose deaths involving opioids, cocaine, and psychostimulants – United States, 2015–2016. *Morbidity and Mortality Weekly Report, 67*(12), 349–358. https://doi.org/10.15585/mmwr.mm6712a1.

Seubert, L., Whitelaw, K., Boeni, F., Hattingh, L., Watson, M., & Clifford, R. (2017). Barriers and facilitators for information exchange during over-the-counter consultations in community pharmacy: A focus group study. *Pharmacy, 5*(4), 65. https://doi.org/10.3390/pharmacy5040065.

Sun, B. C., Charlesworth, C. J., Lupulescu-Mann, N., Young, J. I., Kim, H., & Hartung, D. M. (2018). Effect of automated prescription drug monitoring program queries on emergency department opioid prescribing. *Annals of Emergency Medicine, 71*(3), 337–347. https://doi.org/10.1016/j.annemergmed.2017.10.023.

Tasmanian Government. (2019). DORA – Drugs and poisons information system online remote access. Retrieved 15th April 2019 from https://www.dhhs.tas.gov.au/psbtas/publications/general/dora.

Therapeutic Goods Administration. (2017). Scheduling delegate's final decision: Codeine, December 2016. Retrieved 15th April 2019 from https://www.tga.gov.au/book-page/summary-delegates-final-decisions-7.

Therapeutic Goods Administration. (2019). The poisons standard no. 23 (SUSMP). Canberra: Australian Government. Retrieved 15th April 2019 from https://www.tga.gov.au/publication/poisons-standard-susmp.

Victoria State Government. (2019). SafeScript. Retrieved 15th April 2019 fromhttps://www2.health.vic.gov.au/public-health/drugs-and-poisons/safescript.

Watson, M. C., Bond, C. M., Grimshaw, J., & Johnston, M. (2006). Factors predicting the guideline compliant supply (or non-supply) of non-prescription medicines in the community pharmacy setting. *Quality & Safety in Health Care, 15*(1), 53–57. https://doi.org/10.1136/qshc.2005.014720.

Watson, M. C., Norris, P., & Granas, A. G. (2010). A systematic review of siimulated patients and pharmacy practice research. *The International Journal of Pharmacy Practice, 14*(2), 83–93. https://doi.org/10.1211/ijpp.14.2.0002.

Werner, J. B., & Benrimoj, S. I. (2008). Audio taping simulated patient encounters in community pharmacy to enhance the reliability of assessments. *American Journal of Pharmaceutical Education, 72*(6), 136. https://doi.org/10.5688/aj7206136.