Prevalence of diversion and injection of methadone and buprenorphine among clients receiving opioid treatment at community pharmacies in New South Wales, Australia

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Abstract

Background: This study aimed to investigate the prevalence of diversion and injection of methadone and buprenorphine among clients receiving opioid pharmacotherapy treatment at community pharmacies in New South Wales (NSW), Australia.

Methods: A multi-site cross-sectional survey design was utilised using a self-complete questionnaire. Participants were 508 clients receiving supervised methadone (n = 442) and buprenorphine (n = 66) at 50 community pharmacies. Participants were surveyed about whether they had diverted their currently prescribed pharmacotherapy, whether they had injected methadone or buprenorphine, the frequency, desirability and duration of action of injecting, and the ease of availability of street-purchased pharmacotherapies.

Results: The prevalence of recent diversion was more than 10 times higher among those receiving buprenorphine compared to methadone, with 23.8% of buprenorphine-maintained participants reporting diverting their dose in the preceding 12 months. Seventeen percent of methadone clients had injected methadone in the preceding 12 months compared with 9.1% of buprenorphine clients over the same time period.

Conclusion: The higher prevalence of buprenorphine diversion compared to methadone diversion is likely to be due to its sublingual tablet formulation and difficulty associated with supervising its consumption compared to that of an oral liquid. Methadone diversion is also less prevalent likely due to the high levels of methadone takeaway provision, which also helps to explain the higher levels of recent methadone injecting compared to buprenorphine injecting. A clearer understanding of the motivations for diversion and injection of opioid pharmacotherapies, and the relationship between them is required.

Keywords: Buprenorphine; Methadone; Diversion; Injection; Pharmacy

Introduction

The diversion and injection of methadone and buprenorphine is a problem for individuals, communities and treatment providers, and has been widely reported in Australia (Darke, Ross, & Hall, 1996; Humeniuk, Ali, McGregor, & Darke, 2003; Jenkinson, Clark, Fry, & Dobbin, 2005) and internationally (Best et al., 1998; Cicero, Inciardi, & Munoz, 2005; Fountain, Strang, Gossop, Farrel, & Griffiths, 2000; Guichard et al., 2003; Lauzon et al., 1994; Robinson, Kemp, Lee, & Cranston, 2000; Vidal-Trecan, Varescon, Nabet, & Boissonnas, 2003). Diversion is usually defined as diversion of medication to the illicit market, but importantly also includes diversion of supervised medication for personal use outside the supervised treatment site and may be for the purposes of injecting (Cole, 2001; Fountain et al., 2000; Ritter & Di Natale, 2005). The injection of buprenorphine and methadone is associated with adverse outcomes including high levels of local injecting site complications (Darke et al., 1996; Darke, Topp, & Ross, 2002; Jenkinson et al., 2005) and fatal overdose (Caplehorn & Drummer, 2002; Kintz, 2001, 2002; Perret, Deglon, Kreek, Ho, & La Harpe, 2000; Pirnay et al., 2004; Schifano et al., 2005; Shah, Lathrop, & Landen, 2005; Zador & Sunjic, 2000), particularly in the case of methadone.
Despite several apparent advantages of buprenorphine over methadone, including safety in overdose and the possibility of less than daily dosing (Eissenberg et al., 1997; Walsh, Preston, Bigelow, & Stitzer, 1995; Walsh, Preston, Stitzer, Cone, & Bigelow, 1994), buprenorphine may be more susceptible to diversion from supervised dosing sites than oral liquid methadone due to its sublingual tablet formulation (McCormick, 2006).

In New South Wales (NSW), Australia, there are more than 16,000 clients receiving methadone (84%) and buprenorphine (16%) for the management of opioid dependence. In NSW, methadone and buprenorphine treatment is delivered in a supervised setting such as a public clinic (providing treatment to 25% of those in treatment), community pharmacies (43% of those in treatment) and private clinics (19% of those in treatment) (NSW Department of Health, personal communication, 2006). Public clinics provide methadone and buprenorphine free of charge and the majority do not provide takeaway doses. Treatment received at community pharmacies and private clinics incurs a dispensing fee, and takeaway doses of methadone are typically provided. The NSW Opioid Treatment Program Clinical Guidelines for Methadone and Buprenorphine Treatment of Opioid Dependence recommend that a maximum four takeaway methadone doses be provided each week with no more than two consecutive takeaway methadone doses being dispensed at one time with a supervised dose required at least once every 3 days (NSW Department of Health, 2006). While the daily supervision of medication, especially in the early stages of treatment, allows both close monitoring of clients and minimises diversion (NSW Department of Health, 2006) the requirement for daily attendance is not acceptable to many clients and has been associated with poorer retention in treatment (Pani, Pirastu, Ricci, & Gessa, 1996; Rhoades, Creson, Elk, Schmitz, & Grabowski, 1998; Treloar, Fraser, & Valentine, 2007).

Although current NSW guidelines support the selection of clients considered appropriately stable to receive takeaway doses (NSW Department of Health, 2006), this is not enforceable and in many cases takeaways are provided to clients who do not comply with the prescribers key expectation that the medication will be taken as directed by the person to whom it was prescribed (Hailstone, Indig, Lawrence, Gill, & Anns, 2004). Given that the majority of “street” methadone in NSW is sourced from diverted takeaway methadone doses (Darke et al., 1996; Sunjic & Howard, 1996) a key response to reducing the diversion of methadone has been through limiting the availability of takeaways and increasing the amount of supervised dispensing. That the availability of methadone takeaways is an important determinant in the availability of street methadone is consistent with findings that Australian states with more restrictive takeaway policies generally report a lower prevalence of methadone injecting (Ritter & Di Natale, 2005). The supervised consumption of methadone when accompanied by simple compliance checks such as having a brief conversation with the client after administration to ensure the dose has been swallowed permits the almost certain ingestion of methadone by the intended recipient (Pharmaceutical Services Branch, 2004). When buprenorphine was introduced in Australia in 2000 it was considered that the supervision of buprenorphine would be as an effective approach to reducing diversion as it had been for methadone. In addition, takeaway doses of buprenorphine were not routinely permitted in NSW until the most recent NSW guidelines were released in November 2006 (NSW Department of Health, 2006; NSW Health Department, 2001).

The current study aimed to explore the prevalence of self-reported diversion of supervised methadone and supervised buprenorphine and the prevalence of self-reported injection of methadone and buprenorphine among a sample of clients receiving opioid pharmacotherapy treatment at community pharmacies in NSW.

Method

Sample

Community pharmacies were alternately selected from an alphabetical list of all community pharmacies (n = 103) dispensing methadone and/or buprenorphine for opioid dependence in nine local government areas, representing a cross-section of metropolitan, regional and rural NSW. During 2005, selected pharmacies were contacted initially by mail and subsequently by telephone inviting them to participate in the study. Community pharmacies that agreed to participate were visited in person by a researcher to deliver materials and explain the study protocol. The Pharmacy Guild of Australia (NSW Branch) offered community pharmacies 1 Quality Care Pharmacy Program (QCI) credit point and 2 Continuing Professional Education (CPE) points for participating in the study.

Of 65 community pharmacies approached, 50 agreed to participate. The total number of clients registered in methadone or buprenorphine treatment at the participating pharmacies ranged from 1 to 62 (mean = 18.60; S.D. = 16.12; median = 13.00). Sixty percent (n = 30) of the pharmacies dispensed both methadone and buprenorphine. One community pharmacy (2%) dispensed buprenorphine only.

Participants were methadone and buprenorphine clients recruited from these 50 community pharmacies.

Measures

Participants were surveyed with a self-complete questionnaire designed by the researchers. The development of the questionnaire was a collaborative effort with contributions from treatment providers at public clinics and community pharmacies, researchers and drug user advocacy groups. The questionnaire was piloted on 10 pharmacy clients who were remunerated AUS 10 cash. Several items were revised follow-
ing suggestions from pilot participants to address ambiguities in question meaning.

Questions were asked about diversion of the pharmacotheraphy clients were currently prescribed (Have you diverted [sneaked] or tried to divert [sneak] your dose? [ever; past 12 months]), while questions exploring pharmacotherapy injection asked about both methadone and buprenorphine (ever injected; injected in past 12 months; injected in past month). “Sneak” is a term used by consumers and refers to an attempt at removing a supervised dose from the dosing site (Australian Injecting and Illicit Drug Users’ League (AIVL), personal communication, 2005). Participants who had ever injected methadone or buprenorphine were asked to provide information regarding their most recent injection episode (source; amount injected; duration of effect), and to report the number of times they had ever injected methadone or buprenorphine, their preferred route (injecting; oral/sublingual), and whether they would inject the pharmacotherapy again. All participants were asked about ease of availability and cost of street-purchased methadone and buprenorphine. Participants were not asked about their recent use of other drugs or why they had diverted and/or injected their medication when such behaviour was reported.

Procedure

Pharmacists were asked to distribute a flier and questionnaire to every client when they attended the pharmacy for dosing. The flier informed clients about the study aims, that participation was voluntary and anonymous, and that individual responses would not be seen by pharmacy staff or others involved in their treatment. Every client attending participating pharmacies for dosing was offered a questionnaire and secure response envelope and requested to complete and return it to the pharmacy within 1 week. Completed questionnaires returned to the pharmacy were placed into a sealed cardboard box. Clients were remunerated AUS 10 cash for their participation, which was provided to the pharmacies by the researchers. Each pharmacy kept a record of which clients had returned a questionnaire to ensure that nobody returned more than one questionnaire. This document was not provided to the researchers.

After 2 weeks, pharmacies were contacted by the researchers to arrange time to collect completed questionnaires. Some pharmacies requested more time and an additional 2–4 weeks was negotiated in these cases.

This study was approved by the Human Research Ethics Committee of Sydney South West Area Health Service.

Statistical analyses

Frequency statistics are presented for the prevalence of diversion and injection, and characteristics of injecting behaviour. Backward stepwise logistic regressions were performed to determine variables associated with buprenorphine and methadone diversion. All analyses were conducted using SPSS 14.0 for Windows.

Results

Sample

Of 931 clients receiving treatment at the participating pharmacies, 508 completed a questionnaire (54.6%). Eighty-seven percent (n = 442) were on methadone treatment and 13.0% (n = 66) were on buprenorphine treatment. The mean age was 38.8 years (S.D. = 9.04) and 38.9% were female. The mean daily methadone dose was 82.5 mg (S.D. = 46.07). Ninety-five percent (n = 414) were prescribed methadone syrup with the remainder (5.5%; n = 24) prescribed the water-based Biodone Forte (the concentration of all methadone preparations dispensed in NSW is 5 mg/ml). The majority of those on methadone treatment (95%; n = 418) reported that they were in current receipt of methadone takeaway doses, with a median four takeaway doses received each week (mean = 3.7; S.D. = 0.97; range = 1–6). The mean administered buprenorphine dose was 11.5 mg (S.D. = 8.11) for those on daily dosing (70%), and 20.0 mg (S.D. = 8.70) for those dosed less than daily (30%). Despite takeaway doses of buprenorphine not being routinely permitted at the time the study was conducted, 19.7% (n = 13) of those on buprenorphine reported they were currently receiving them.

Nine percent of participants (n = 44) had been in their current treatment episode for less than 12 months, 42% (n = 215) for between 1 and 5 years and 49% (n = 247) for more than 5 years.

For 62% (n = 41) of those on buprenorphine, this was their first episode of buprenorphine treatment. Twenty-seven percent (n = 18) had been on buprenorphine twice and 11% (n = 7) three times or more. Fifty-three percent (n = 33) had been prescribed methadone previously. For 39% (n = 172) of participants on methadone, this was their first episode of methadone treatment. Thirty-three percent (n = 144) had been on methadone twice and 28% (n = 121) three times or more. Eleven percent (n = 47) had prior experience of buprenorphine treatment. For more information on sample characteristics, see Winstock, Lea, Madden, and Bath (in press).

Pharmacotherapy diversion

Among those on buprenorphine treatment, 32.3% (n = 20) reported having ever diverted or tried to divert (sneak) a buprenorphine dose and 23.8% (n = 15) had diverted or tried to divert (sneak) their buprenorphine dose in the preceding 12 months (data missing on four cases). Seventeen percent (n = 11) reported having tried buprenorphine prior to commencing treatment. Logistic regression was performed to determine predictors of ever diversion of buprenorphine with the following variables entered into the equation: gen-
der, age, treatment duration, ever injected buprenorphine and tried buprenorphine prior to commencing treatment. Participants who had ever injected buprenorphine were 10 times more likely than those who had not to have ever diverted or attempted to divert (sneak) their buprenorphine (OR = 9.74; 95% CI = 1.53–62.04; \(p = 0.016\)). Characteristics of buprenorphine diversion are presented in Table 1.

Among those on methadone, 12.6% (\(n = 52\)) reported having ever diverted or tried to divert (sneak) a methadone dose, and 2.2% (\(n = 9\)) had diverted or tried to divert their methadone dose in the preceding 12 months (data missing on 28 cases). Forty-two percent (\(n = 184\)) had tried methadone prior to commencing treatment. Logistic regression was performed to determine predictors of ever diversion of methadone with the following variables included in the equation: gender, age, treatment duration, methadone injection (ever, preceding 12 months) and tried methadone prior to commencing treatment. Those who had ever injected methadone were 10 times more likely to have diverted or attempted to divert (sneak) their methadone dose than those who had never injected it (OR = 9.74; 95% CI = 1.53–62.04; \(p = 0.016\)). There was no significant relationship between diverting or attempts at diverting (sneaking) a methadone dose in the preceding 12 months and the number of takeaway methadone doses received each week (Mann–Whitney \(U = 210.0; \ p = 0.23\)). Characteristics of methadone diversion are presented in Table 2.

**Buprenorphine injecting**

Fifteen percent (\(n = 10\)) of participants currently on buprenorphine treatment had ever injected buprenorphine, and 9.1% (\(n = 6\)) had injected it in the preceding 12 months. One participant reported injecting buprenorphine in the preceding month. Forty-nine percent (\(n = 32\)) knew somebody who had injected buprenorphine. Characteristics of buprenorphine injecting are presented in Table 1.

Of the participants currently on buprenorphine treatment who had ever injected buprenorphine, the majority (70%; \(n = 7\)) had injected buprenorphine 5 times or less, and the remaining three participants had injected buprenorphine between 10 and 20 times. Participants who reported injecting buprenorphine were asked to compare the desirability of injecting buprenorphine and taking it sublingually. One-half reported that they preferred to take buprenorphine sublingually (\(n = 5\)), and only one participant reported that they would inject buprenorphine again. Referring to the most recent time they had injected buprenorphine, 90% (\(n = 9\)) reported injecting their own prescription medication and one participant reported injecting street-purchased buprenorphine. The median amount injected was 6 mg (mean = 5.8; S.D. = 3.1; range = 2–10 mg) and the effects lasted for a median 24 h (range = 6–36 h). Gender effects could not be analysed as only one female on buprenorphine treatment reported ever injecting buprenorphine.

Among those on methadone treatment few reported having ever injected buprenorphine (3%; \(n = 14\)). Four participants on methadone reported injecting buprenorphine in the preceding 12 months. None reported injecting buprenorphine in the preceding month.

**Methadone injecting**

Forty-three percent (\(n = 186\)) of participants currently on methadone treatment reported ever injecting methadone (data missing on nine cases). Seventeen percent (\(n = 74\))

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**Table 1**

Characteristics of self-reported buprenorphine diversion and injection among those on buprenorphine treatment

<table>
<thead>
<tr>
<th></th>
<th>Ever diverted buprenorphine ((n = 20))</th>
<th>Never diverted buprenorphine ((n = 42))</th>
<th>Ever injected buprenorphine ((n = 10))</th>
<th>Never injected buprenorphine ((n = 56))</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (mean)</td>
<td>34.8</td>
<td>33.8</td>
<td>33.7</td>
<td>34.1</td>
</tr>
<tr>
<td>Gender (male)</td>
<td>55% (11)</td>
<td>73% (30)</td>
<td>89% (8)</td>
<td>63% (35)</td>
</tr>
<tr>
<td>Current treatment duration</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 12 months</td>
<td>30% (6)</td>
<td>31% (13)</td>
<td>40% (4)</td>
<td>30% (17)</td>
</tr>
<tr>
<td>1–5 years</td>
<td>55% (11)</td>
<td>57% (24)</td>
<td>50% (5)</td>
<td>57% (32)</td>
</tr>
<tr>
<td>More than 5 years</td>
<td>15% (3)</td>
<td>12% (5)</td>
<td>10% (1)</td>
<td>13% (7)</td>
</tr>
<tr>
<td>Buprenorphine dose (mean) (mg)</td>
<td>15.3</td>
<td>13.5</td>
<td>13.0</td>
<td>14.2</td>
</tr>
<tr>
<td>Buprenorphine dosing schedule (daily)</td>
<td>65% (13)</td>
<td>71% (30)</td>
<td>80.0% (8)</td>
<td>68% (38)</td>
</tr>
<tr>
<td>Buprenorphine preparation</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Crushed to a powder</td>
<td>25% (4)</td>
<td>15% (5)</td>
<td>57% (4)</td>
<td>87% (39)</td>
</tr>
<tr>
<td>Whole tablets/broken into pieces</td>
<td>75% (12)</td>
<td>85% (28)</td>
<td>43% (3)</td>
<td>13% (6)</td>
</tr>
<tr>
<td>Tried buprenorphine prior to treatment</td>
<td>30% (6)</td>
<td>12% (5)</td>
<td>44% (4)</td>
<td>13% (7)</td>
</tr>
<tr>
<td>Buprenorphine injection</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ever</td>
<td>30% (6)</td>
<td>7% (3)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Past 12 months</td>
<td>20% (4)</td>
<td>2% (1)</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Ever injected methadone</td>
<td>20% (4)</td>
<td>32% (13)</td>
<td>60% (6)</td>
<td>24% (13)</td>
</tr>
</tbody>
</table>
reported injecting methadone in the preceding 12 months, and 8.5% \((n=37)\) in the preceding month (data missing on 14 cases). There was no significant relationship between the number of takeaway methadone doses received each week and methadone injecting in the preceding 12 months (Mann–Whitney \(U\) = 10421.0; \(p = 0.20\)), or the preceding month (Mann–Whitney \(U\) = 5360.5; \(p = 0.19\)). The majority of respondents (83.3%; \(n = 364\)) knew somebody who had injected methadone. Characteristics of methadone injecting are presented in Table 2.

Of those on methadone treatment who had ever injected methadone, 45.5% \((n=71)\) had injected methadone 10 times or less, 29.5% \((n=46)\) between 11 and 100 times, and the remainder (25.0%; \(n=39\)) more than 100 times. Participants on methadone treatment who had injected methadone were asked to compare the desirability of injecting methadone and taking it orally. Thirty-nine percent \((n=67)\) reported that they preferred the effects of taking methadone orally. Sixty-three percent \((n=115)\) reported that they would not inject methadone again, 15% \((n=28)\) would inject methadone again and 22% \((n=41)\) were undecided. Referring to the most recent time they had injected methadone, 55% \((n=99)\) had injected their own prescribed methadone, 23% \((n=42)\) had injected street-purchased methadone and 22% \((n=40)\) had injected a mixture of their own prescription methadone and street-purchased methadone. The median amount injected was reported as being 60 mg (mean = 71.9; S.D. = 43.4; range = 5–200 mg), although these amounts are estimates only due to the uncertainty of the amount of methadone contained in methadone on the illicit market. The effects of injected methadone lasted for a median 13 h (range = 0.5–60 h). There were no significant gender differences in methadone injecting behaviours.

Among those on buprenorphine treatment, 29.2% \((n=19)\) had ever injected methadone, and four participants had injected methadone in the preceding 12 months.

### Street availability of buprenorphine and methadone

Twenty-six percent \((n=127)\) of participants reported that it was easier to obtain street-purchased methadone than buprenorphine while only 1% \((n=7)\) reported that it was easier to obtain street-purchased buprenorphine than methadone. Nine percent \((n=43)\) indicated that both methadone and buprenorphine were equally available, while the majority of the sample (64%; \(n = 317\)) did not know which pharmacotherapy was easier to purchase on the street.

### Discussion

This paper reports on the prevalence of self-reported opioid pharmacotherapy diversion and injection among a large sample of clients receiving methadone or buprenorphine treatment at 50 community pharmacies in NSW. The prevalence of buprenorphine diversion was considerably higher than methadone diversion with one-third of buprenorphine clients having ever diverted or attempted to divert their buprenorphine compared with 13% of methadone clients having ever diverted or attempted to divert a methadone dose. Differences between methadone and buprenorphine diversion in the preceding 12 months were even more striking, with just 2.2% of methadone clients having diverted or attempted to divert their medication compared with one-quarter of buprenorphine clients reporting this behaviour. Conversely, three times as many methadone clients reporting having injected methadone than buprenorphine clients had injected buprenorphine.
Although the higher rates of buprenorphine diversion reported may be explained by the relative ease of diverting a sublingual tablet as opposed to an oral liquid, it may also be explained by the fact that the majority of those on methadone were in receipt of regular takeaway doses implicitly reducing the number of opportunities to divert a supervised methadone dose compared to buprenorphine and perhaps reducing the necessity to divert a supervised methadone dose.

The higher rates of ever and recent injection of methadone may not only reflect the greater availability of methadone but also a preference for a full agonist as opposed to a partial agonist with a ceiling on and blockade of intoxicating opioid effects (Walsh et al., 1995, 1994). Previously reported reasons for injecting methadone have included to speed up the onset of drug effect, greater euphoria, needle fixation and inability to tolerate oral methadone (Robinson et al., 2000; Sunjic & Howard, 1996). That one-quarter of those who had ever injected methadone in the current study reported doing so 100 times or more may suggest that there is a subpopulation of injecting drug users who have a strong preference for the greater euphoria afforded by injecting. It is likely that some are regular methadone injectors while others only inject episodically, as a “treat”. In any case, this behaviour remains a risk for both injecting-related complications and overdose. Given that there is a subgroup in treatment who continue to inject their methadone, consideration should be given to the introduction of injectable methadone programmes in Australia. A clinical trial has shown injectable methadone to be of similar efficacy to oral methadone in terms of treatment retention and reducing heroin use (Strang et al., 2000).

In the current study, 17% of people in methadone treatment reported injecting methadone in the preceding 12 months, with 8.5% reporting injection in the preceding month. These figures are considerably lower than those reported 10 years ago by Darke et al. (1996) who reported a 6 months prevalence of methadone injection among those in treatment of 34%. The decline in methadone injecting has been noted elsewhere in NSW and throughout Australia in the Illicit Drug Reporting System (IDRS), an annual survey of injecting drug users (IDU) exploring patterns of drug use. In Sydney between 1997 and 2000 the proportion of IDU who reported injecting methadone dropped from 31 to 13% (Darke et al., 2002). More recently, 2005 national data reported 30% of IDU having ever injected their prescribed methadone (12% in the preceding 6 months), and 35% ever injecting non-prescribed methadone (16% in the preceding 6 months) (Stafford et al., 2005). Possible explanations for reported reductions in methadone injecting include changes in takeaway provision, changes in access to treatment, the removal of large barrel injecting equipment from Needle and Syringe Programs (NSP) in NSW in 1999 (Hopwood et al., 2003), as well as user education initiatives that have taken place over the last decade. The majority of people in methadone treatment appear aware of some of the risks associated with methadone including its use by opiate naïve people and risks associated with using methadone concomitantly with other central nervous system depressants (Winstock et al., in press).

It is perhaps interventions in the area of patient selection that will have the greatest impact upon reducing the diversion (and potential injection) of methadone takeaways. It will however remain the responsibility of each prescriber to ensure that clients who receive takeaway doses of methadone are carefully selected on the basis that they are stable and present a low risk of diversion (Winstock & Bell, 2006). Other than reducing the availability of doses for diversion, approaches to reducing the injection of methadone have also included the dilution of methadone takeaways, though evidence for the efficacy of this practice in isolation of other factors is uncertain (Lintzeris, Lenne, & Ritter, 1999; Ritter & Di Natale, 2005).

The injection of sublingual buprenorphine has been implicated in a number of fatalities (Kintz, 2001, 2002; Pirnay et al., 2004; Schifano et al., 2005) and is associated with local injecting-related complications (Cazorla et al., 2005; Feeney & Fairweather, 2003; Jenkinson et al., 2005). Only a minority of participants in the current study reported that they had ever injected buprenorphine (15% of those on buprenorphine and 3% of those on methadone). These figures are similar to those reported in the 2005 IDRS where 20% of IDU had ever injected prescribed buprenorphine (11% in preceding 6 months) and 21% had ever injected non-prescribed buprenorphine (14% in preceding 6 months) (Stafford et al., 2005). While ever injecting buprenorphine was a significant predictor of buprenorphine diversion in the current study, twice as many people in buprenorphine treatment had ever diverted their buprenorphine than had ever injected buprenorphine. This suggests that the relationship between buprenorphine diversion and injection is not straightforward, and that not all of those who divert buprenorphine do so with the intention of injecting it. This supports data from the IDRS where almost one-quarter of those who had obtained diverted buprenorphine took it exclusively via the sublingual route (Jenkinson et al., 2005). This preference for the sublingual route over the intravenous route among some users of buprenorphine is consistent with the findings from this study where the majority who had ever reported injecting buprenorphine preferred taking it sublingually. The fact that the majority of those who ever reported injecting buprenorphine had done so on five or less occasions may suggest that for some, injecting medication is no more than an experiment driven by curiosity. Whether or not the addition of naloxone to buprenorphine will reduce the desirability of injecting diverted buprenorphine remains to be seen.

Buprenorphine-naloxone was introduced into Australia in April 2006 and is recommended as the preparation to be provided to those stable on buprenorphine and considered suitable for the routine provision of takeaways (Winstock & Bell, 2006). It may be argued that the wider availabil-
ity of buprenorphine that has not been removed from a person’s mouth and that is provided on an unsupervised basis may increase the availability of black market buprenorphine (as takeaway doses have done for methadone). Clinical judgement and prescriber selection will remain the most important safeguards against diversion and medication misuse.

For community pharmacists, there are implications for practice. The ease with which buprenorphine clients appear to be able to divert their supervised doses and the time required to supervise dosing is of significant concern for community pharmacists providing this treatment (Nielsen et al., 2007). In addition, variations in how buprenorphine is prepared for supervision (e.g., crushed tablets, whole tablets, tablets broken into pieces) may also influence the ease with which diversion may take place. However, the ability of pharmacists to better monitor this activity remains limited due to the public nature of the pharmacy environment and the potential inappropriateness of intrusive supervision of all clients when only a minority appear to divert. Responses to buprenorphine diversion in community pharmacies in Victoria, Australia, have included crushing all doses, increased supervision, discussing diversion with clients and requesting that clients sign a contract (Nielsen et al., 2007). Further research is required to determine the most effective responses by community pharmacies to minimise the risk of diversion.

It is unlikely however that any policy change or adaptation of the treatment delivery system will completely remove either the demand for diverted medication or the potential for it to occur. Motivations for diverting a dose include stockpiling for later use, injecting, being encouraged by others to divert and selling the dose to others (Horyniak, Armstrong, Higgs, Wain, & Aitken, 2006; Nielsen et al., 2007). Other reasons for diversion may include ambivalence over treatment, concerns that the dose is too high, and the experience of adverse effects. In the case of buprenorphine, diversion may occur because of fear of precipitated withdrawal due to recent or planned other opioid use. Anecdotal reports from drug user organisations suggest that some clients may sell some of their dose to pay for pharmacy dispensing fees, which are typically in the range of $30–35 per week (Winstock, Lea, Madden, & Bath, 2006). That many clients in opioid treatment experience significant financial hardship is well documented (Gossop, Marsden, Stewart, & Kidd, 2003; Mattick et al., 2001; Ross et al., 2005). People both in and out of opioid treatment report purchasing diverted pharmacotherapies. Reasons include obtaining an emergency supply to avoid withdrawal, self-treatment (due to a lack of available treatment places, desire to inject and unwillingness to comply with treatment policies such as daily clinic attendance), desire for a higher dose, and that diverted methadone and buprenorphine is cheaper than heroin (Fountain et al., 2000; Fraser, 2006; Horyniak et al., 2006). Diverted methadone and buprenorphine may also be purchased when heroin is not obtainable. Pharmacists are often the first point of response to suspected diversion and should be guided as to the most appropriate course of action. Initial responses to diversion should be aimed at retaining the client in treatment while advising them of both the risks and the unacceptability of continued medication diversion.

There are several limitations to the current study. Firstly, the number of participants on buprenorphine was small, comprising just 13% of our sample. However, the proportion of participants on buprenorphine is similar to NSW state-wide data indicating 16% of people on opioid treatment in NSW are prescribed buprenorphine. Secondly, despite a large sample size representing 8% of all those receiving treatment at community pharmacies in NSW (NSW Department of Health, personal communication, 2006), with demographics consistent with those reported among three cohorts of people entering treatment in 1990, 1995 and 2000 (Bell, Burrell, Indig, & Gilmour, 2006), self-selection and recruitment bias may have led to a relatively non-representative sample. Thirdly, it is possible that some clients may have felt uncomfortable returning a self-report questionnaire in which sensitive information was elicited to the pharmacy where they receive treatment, despite attempts to ensure confidentiality by having a sealed box in which to place completed questionnaires. Finally, the illegality of some activities and fear of punitive response from treatment providers may have led to an underreporting of diversion and/or injection by study participants. However, there is evidence to suggest that self-report is associated with more truthful reporting of sensitive information than data gathered by an interviewer in drug and alcohol research (Aquilino, 1994; Gmel, 2000; Kraus & Augustin, 2001).

A final issue for consideration is clients’ interpretation of the terms “diversion” and “sneak”. The questions regarding diversion included the term “sneaking” the dose, and were intended to refer to supervised doses. The term “sneak” was included following suggestions from drug user organisations that people in treatment would understand that “sneaking” a dose refers to the diversion of a supervised dose and not a takeaway dose. It is possible, although unlikely, that diversion was interpreted by some clients to include diversion of takeaway doses.

This study reports on a large survey of clients receiving methadone and buprenorphine treatment for opioid dependence in community pharmacies. While buprenorphine has a better safety profile than methadone and the risks associated with the use of diverted buprenorphine are not as severe, the results of this study demonstrate a far higher prevalence of buprenorphine diversion compared to methadone diversion. Although there are a number of possible reasons, it seems likely that its sublingual formulation contributes at least in part to this.

Diversion represents one of a number of forms of non-compliance with treatment. The potential implications for client outcome and the health of the community are significant. Adaptations to dosing, supervision and changes in the
precise formulation and preparation of medication provided will form only part of an informed response to this issue. It is likely that only through a better understanding of the functional purpose of pharmacotherapy diversion and injection will policy makers and service providers be appropriately equipped to develop acceptable and effective strategies to reduce this problem.

Conflict of interest

The funding body had no input into the study aims and questionnaire design, and no prior knowledge of the content of this paper or claim over how the results would be disseminated.

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References


