“Doctor shopping and pharmacy hopping”: practice innovations relating to codeine

Marie Claire Van Hout

Dr Marie Claire Van Hout is a Coordinator, based at School of Health Sciences, Waterford Institute of Technology, Waterford, Ireland.

Abstract
Purpose – The misuse of pharmaceutical opioid analgesics is identified as a global public health concern. Codeine represents an interesting quandary in terms of its regulated status, with individuals varying in their metabolism of codeine, estimation of safe dosages, risk of adverse health consequences and abuse potential. Efforts to quantify and address hidden non-compliant medical codeine use, overuse and intentional misuse is compromised by availability to the public in prescribed and over the counter forms. The paper aims to discuss these issues.

Design/methodology/approach – A review of literature on codeine use, misuse and dependence, and associated innovative medical and pharmacy interventions is presented, and was conducted as part of a larger scoping review on codeine.

Findings – The review highlights the complexities associated with monitoring public health awareness of codeine’s abuse potential, and customer/patients trends in non-compliant codeine use for therapeutic and recreational purposes. Aberrant codeine behaviours centre on visiting multiple doctors for prescriptions, repeated lost or stolen prescriptions, forging prescriptions and use of multiple pharmacies. Innovations to monitor misuse of codeine include national prescription databases and recent developments in real-time monitoring of dispensing activity.

Practical implications – Further development of real-time monitoring processes with process evaluation is advised.

Originality/value – This viewpoint is intended to demonstrate how efforts to quantify and address codeine use are compromised by its availability. It intends to encourage further policy and practitioner dialogue on how to monitor, support and intervene with consumers misusing codeine.

Keywords Medicines, Codeine, Doctor shopping, Pharmacovigilance, Pharmacy, Realtime monitoring

Paper type Viewpoint

Introduction
Misuse of pharmaceutical opioid analgesics is increasingly identified as a global public health and drug monitoring concern (UNODC, 2011, 2013). Opioids are a class of psychoactive substances derived from the poppy plant “Papaver somniferum varalbun” (opium, morphine and codeine), and can also occur in semi-synthetic (heroin) and synthetic compounds (methadone, buprenorphine). They are commonly used treat pain, as cough suppressants and as substitution treatment for opiate dependence (Manchikanti and Singh, 2008; Trescot et al., 2008). Pharmacological effects include analgesia, sedation, euphoria and respiratory depression. Efforts to quantify and address the misuse of opioid analgesics are compromised by availability to the public as prescribed by medical practitioners and dispensed over the counter in pharmacies, which fuels the hidden nature of non-compliant medical use, overuse and intentional misuse for euphoric effects (Williams and Kokotailo, 2006; Manchikanti and Singh, 2008; Benyamin et al., 2008; Lessenger and Feinberg, 2008; UNODC, 2011; Lawson, 2011; Wightman et al., 2012). Further confounding issues is the lack of consensus around defining what misuse of opioid analgesics constitutes and how this form of drug misuse contrasts to other forms of illicit drug use (Barrett et al., 2008). For the purposes of this review, the umbrella term “misuse” will be used to
describe problematic consumption where risks and adverse consequences outweigh the benefits, use of the drug with or without prescription, outside of acceptable medical practice or medical guidelines, for recreational reasons and when self-medicating at higher doses and for longer than is advisable (Casati et al., 2012).

Misuse of prescribed and over the counter opioid medications is driven by a myriad of individual, environmental and geographic factors which include lack of medical consultation, public misconceptions around safety, over the counter availability and self-selection of opioid analgesics, self-medication of emotional and physical pain, recreational popularity, inappropriate and increased prescribing, doctor shopping, access to illicit sourcing, pharmaceutical marketing tactics and governmental responses (Boyd and McCabe, 2008; McCabe et al., 2009; Maxwell, 2011; Nosyk et al., 2012; Lankenau et al., 2012; Nordmann et al., 2013). Opioid misuse occurs via oral and non-oral routes (along with potential administration of other substances) and appears clustered within a range of cohorts including middle aged females, students, elderly, criminal offenders, pain patients, individuals with pre-existing alcohol or drug dependence, and healthcare professionals (Simoni-Wastila et al., 2004; Teter et al., 2006; Boyd et al., 2006; Compton et al., 2006a,b; McCabe and Teter, 2007; Morasco and Dobscha, 2008; Merlo, 2008; Edlunds et al., 2010). Indicators of aberrant opioid behaviours include requesting certain prescribed and/or over the counter opioids, multiple unsanctioned dose escalations, repeated lost or stolen prescriptions, use of multiple doctors and pharmacies, hoarding of medications, forging prescriptions, stealing prescription opioids from other patients, selling prescription opioids, concurrent abuse of other licit and illicit drugs, and injecting opioid formulations (Chou et al., 2009; UNODC, 2011).

This viewpoint paper seeks to demonstrate how efforts to quantify and address misuse of codeine as weak opioid commonly prescribed and consumed over the counter, is compromised by its availability to the general public. Information forming the basis of this viewpoint was partly extracted from a large-scale scoping review on codeine (Arksey and O’Malley’s, 2005; six stage framework) conducted by a team of researchers from academic and pharmacy practice backgrounds. A series of databases were searched in January 2014 (PubMed, EBSCO Host, Science Direct, EMBASE, PsycINFO, Cochrane library and Medline) with the data set restricted to 1994-2014. Follow up hand search strategies using reference lists and exploring pharmaceutical, health, medical and drug-related web sites were included. Initial screening identified a total of 3,105 articles, of which 475 met the inclusion criteria relating to prevalence of codeine use, misuse, abuse, diversion, dependent and treatment, at risk groups, codeine-specific treatment and pharmacy-based interventions, codeine’s effectiveness in pain therapy, codeine sales, consumption and manufacture trends, and policy relating to the scheduling of codeine. Further to this, extant literature on the real-time monitoring of non-compliant use and misuse of pharmaceuticals was included and intended to form the basis of arguments to include monitoring of the dispensing of codeine and empowerment of pharmacists to support, treat and refer individuals dependent on codeine preparations.

Codeine

Codeine or 3-methylmorphine is widely used for its analgesic, antitussive and anti-diarrheal properties (MacDonald and MacLeod, 2010; Tremlett et al., 2010; Derry et al., 2010; Derry et al., 2013). The name “codeine” is derived from the Greek word kōdeia (κόδεια) for “poppy head”. It is a short acting, weak to mid-range acting opiate, and is an alkaloid found in raw opium (at concentrations of 0.2-0.8 per cent) (Tremlett et al., 2010). Codeine has high oral/parenteral potency ratio with peak plasma concentrations occurring at 60 minutes, and with a plasma half-life of 3-3.5 hours in adults (Band et al., 1994; Arora and Herbert, 2001). Intramuscular and rectal routes of administration have similar speed of absorption (McEwan et al., 2000). The analgesic effect is attributed to metabolism to active compounds 4-morphine and morphine-6-glucuronide, with between 5 and 10 per cent converted to morphine (Derry et al., 2013). The endogenous enzymes (human cytochrome P450 2D6) convert to morphine resulting in “opioid analgesia” which alters perception and emotional responses to pain and incurs a stimulatory effect by blocking neurotransmitters (Williams et al., 2002; Kelly and Madadi, 2012).
Patient responses to codeine vary, and require monitoring with the usual oral dose for adults of 30-60 mg every four hours, and to a maximum of 240 mg per day (Derry et al., 2013). Genetic variations in activity of human cytochrome exist, with 5 per cent of the population identified as not having the enzyme to convert to morphine, with codeine-based medicines ineffective in pain relief and little risk of potential dependence over time (Chew et al., 2001; Cascarbi, 2003; Zhou, 2009). Individuals who have a slow metabolism of CYP2D6 are, however, at risk of adverse effects if codeine dosage is increased or if combination products (ibuprofen, aspirin, acetaminophen, phenacetin, caffeine, doxylamine) are used. Those with fast or extensive CYP2D6 metabolism are at risk of opioid toxicity syndrome in the form of respiratory depression, coma and death (Ingelman-Sundberg et al., 2007; Dobbin and Tobin, 2008; Madadi et al., 2011; Derry et al., 2013). Risks are exacerbated in the case of poly pharmacy, whereby certain medicines enhance its effect (phenytoin, rifampicin and dexamethasone) and others compromise its effect (fluoxetine, paroxetine, sertraline and citalopram) (ledema, 2011; Derry et al., 2013).

Common side effects of codeine whilst less profound than morphine are dose dependent, and include visual disturbances, vertigo, euphoria, itching, nausea, vomiting, constipation, drowsiness, confusion, pupil constriction, bradycardia, tachycardia, reduced breathing rate, sweating, flushing, clammy skin, postural hypotension, sexual difficulties, tremors, irritation, depression, ureteric spasm, miosis, dry mouth, urinary retention, sleep disturbances, headache, urinary retention, urticaria, micturition and seizures (Romach et al., 1999; Agaba et al., 2004; Dobbin and Tobin, 2008; Robinson et al., 2010; McDonough, 2011). Repetitive daily consumption is known to result in a withdrawal-based headache called “Medication Overuse Headache” with the extent of self-medicating under reported and unknown (Linton-Dahløe et al., 2000; Diener and Katsarava, 2001; Williams, 2005; Ferrari et al., 2006; Katsarava and Jensen, 2007; Bendtsen et al., 2012; Roussin et al., 2013). In the case of misuse of codeine combination products, particularly those containing ibuprofen, serious chronic health consequences relate to gastrointestinal haemorrhage, nephro-toxicity, hypokalaemia, acute haemorrhagic necrotising pancreatitis and brain damage are reported (Hastier et al., 2000; Chetty et al., 2003; Dyer et al., 2004; Lambert and Close, 2005; Ford and Good, 2007; Dutch, 2008; Dobbin and Tobin, 2008; Evans and Geary, 2010; Frei et al., 2010; Ernest et al., 2010; McAvoy et al., 2011; Ng et al., 2011; Hou et al., 2011; Barreto et al., 2011; Tormey, 2013). Codeine can also be an iatrogenic cause of psychiatric disturbances (Manchia et al., 2013). Finally, codeine toxicity syndrome with risk of coma or death occurs at very high doses, after oral over dosage, in the event of poly pharmaceutical and substance use and on intravenous use (Heard et al., 2006; Paulozzi and Ryan, 2006; Dobbin and Tobin, 2008; Zamparutti et al., 2010; McAvoy et al., 2011).

**Codeine misuse and dependence**

Despite being classed as a weak opioid, abuse potential remains of concern, with tolerance and neuro-adaptation occurring on repeated administration of codeine in the absence of pain within a relatively short period of time (Derry et al., 2013; ledema, 2011). Increasing doses of codeine for therapeutic, non-medical or recreational purposes raise its abuse potential (Dobbin and Tobin, 2008; Nielson et al., 2010; Reed et al., 2011). Physical tolerance and withdrawal symptoms include cravings, preoccupation with seeking and taking codeine, lack of control of consumption patterns despite increasing negative physical outcomes (e.g. insomnia, restlessness, runny nose, stomach pains, diarrhoea and chills) (Vallejo et al., 2011; Cooper, 2013a). Nielson et al. (2010) observed how individuals with “iatrogenic” dependence following medical use of codeine for pain, anxiety or insomnia may frequently experience a “blurring” between therapeutic and problematic use over time. They identified three distinct types of codeine user, namely those dependent on codeine, aware of their dependence but continuing to use due to cravings and to avoid withdrawal symptoms; those unknowingly misusing codeine by using within the recommended limits but using frequently and on a regular basis to treat withdrawal associated headaches; and those conscientiously disobeying codeine product instructions so as to incur the euphoric effect. Other studies have identified a fourth cohort of individuals dependent on codeine in the form of problematic drug users and methadone maintenance patient who use codeine to manage withdrawals when unable to secure either
heroin or prescribed methadone (Heard et al., 2006; Reed et al., 2011). In terms of over the counter codeine, Cooper (2011) described three distinct types of user based on quantity of consumption, namely type I who never exceeded the maximum dose; type II who sometimes consumed slightly higher than recommended doses; and type III who consumed significantly higher doses than recommended.

A wide ranging profile of individuals misusing codeine medicines is reported in the literature. They include the parental medication of children with codeine products (Allotey et al., 2004), the misuse of codeine cough mixtures among youth and drug users (Kitabayashi et al., 2000; Elwood, 2001; Banerji and Anderson, 2001; Miyatake et al., 2002; Agnich et al., 2013; Lam and Shek, 2006; Peters et al., 2003, 2007a, b, c; Shek and Lam, 2006, 2008; Ford, 2009; Wilson et al., 2010; Lao et al., 2010; Arndt et al., 2011; Chitrakarn et al., 2012; Tang et al., 2012; Hart et al., 2014), prescribed and over the counter codeine use among university students (Accocella, 2005; Steinman, 2006), adult male customers and treatment patients (Sweileh et al., 2004; Tetrault et al., 2007; Yang and Yuan, 2008; Albsoul-Younes et al., 2010), middle aged females accessing pharmacies (Akram, 2000), psychiatric patients (Agyapong et al., 2013) and in older adults (Roumie and Griffin, 2004; Agaba et al., 2004). Despite potential misuse and dependence on codeine as evidenced in the literature, prevalence and incidence of this “hidden” form of drug use, misuse and dependence remains scant, and rely on individuals presenting to seek help (Pates et al., 2002; Skurtviet et al., 2011; Roussin et al., 2013). Individuals dependent on codeine in Australia were found to differ from non-dependent users and other populations of individuals dependent on opioids (heroin, morphine), by consumption of well above the recommended dose of over the counter codeine and for longer periods of time, with a younger profile characterised by lower levels of employment and education, and with family history of problematic substance use (Nielsen et al., 2011). Sproule et al. (1999) reported that individuals dependent on codeine were more likely to report chronic pain, and likely to use codeine to reduce stress and for its pleasurable and relaxing effect. In this study, over half of the sample used over the counter codeine with average daily doses when dependent of 179 mg, and with 80 per cent using five or more days per week. Cooper (2013a) illustrated in his qualitative study on over the counter codeine dependence, that users despite recognising they were dependent on codeine reported regret on loss of control of their codeine use, and associated work and health problems. They also identified themselves as different to illicit drug users by virtue of their continued social and economic activity. Other studies support this rejection of “drug addict” identity, with user perspectives centring on the availability of codeine inferring safety and legality (Dobbin and Tobin, 2008). Given the wide variety of misusers of codeine, and the continuum of non-compliant medicinal use of codeine ranging towards abuse and dependence on codeine with associated health consequences, there is a public health imperative for ensuring responsible prescribing, monitoring of prescribed and over the counter codeine use and development of medical and pharmacy screening, support and treatment interventions.

Medical and pharmacy-based interventions and innovations

Pain management specialists generally observe low incidence of codeine misuse and dependence, with these risks outweighed by potential for improved functioning and quality of life (Cowan et al., 2002). When considerate of the extensive literature available on misuse of prescribed opioids much of which could be extrapolated to codeine given its availability to the public, responsible prescribing of opioid analgesics is advised to include risk assessments, prescribing agreements and treatment contracting without comprising legitimate access to opioids for analgesia, along with monitoring of vulnerable groups (patients with chronic non-malignant pain, patients with cancer pain and illicit drug users) and patient health and co-morbid conditions (Chetty et al., 2003; Kahan et al., 2006; Manchikanti and Singh, 2008; Edlund et al., 2010; Ernest et al., 2010; Frei et al., 2010; Maxwell, 2011; Ng et al., 2011; Ling et al., 2011; Roxburgh et al., 2011; Jones et al., 2012; Manchia et al., 2013). Frequent co-prescribing of benzodiazepines with opioid analgesics such as codeine is common, and further complicates patient outcomes (Backmund et al., 2006; Bachs et al., 2008; Maxwell, 2011). Indicators of dependence on prescribed opioid analgesics include repeated patient requests for specific and stronger forms of opioid-containing drugs, patient complaints of
consistent on-going, “unresolved” pain, stress and anxiety, feigning prescription loss, requesting for early refills of prescriptions, and different scripts presented to different pharmacists for the same or similar drug from different doctors (Kamien, 2004; Brands et al., 2004; Bailey et al., 2010; Cepeda et al., 2012a, b; Bateman, 2013; Nordmann et al., 2013). Prescribers aged 70-79 years, male and prescribing stronger opioids have been reported as having an increased likelihood of having opioid shoppers as patients (Cepeda et al., 2012a).

Management of patient aberrant opioid behaviours by medical practitioners are advised to include patient education, monitoring, testing, support, treatment of comorbid conditions, documentation of incidents, suggestion of alternative drugs and cessation of prescribing a particular drug, and with primary focus on treatment of dependence (Bailey et al., 2010; Sheridan et al., 2012). Cautiousness around abuse potential and under prescribing of opioid analgesics can create difficulties in sub management of pain and open the door to potential misuse of prescribed and over the counter analgesics (Brennan et al., 2007; Bell and Salmon, 2009). Emergence of patient dependence can compromise therapeutic relations because “pain exists whenever the patient says it does” (Modesto-Lowe et al., 2007). For individuals developing dependence on certain opioid analgesics (codeine included), the potential re-emergence of pain along with unmanaged pain compounds difficulties in successful addiction treatment completion and indicates the need for coexisting pain management supports (Fishbain et al., 2008; Dobbin and Tobin, 2008). Of concern and underscoring the need for tailored initiatives is that brief interventions for individuals dependent on codeine delivered in general hospitals incur poor long-term outcomes (Otto et al., 2009; Zahradnik et al., 2009).

The World Health Organisation has placed codeine as a “step 2” on its pain ladder, and it is commonly used in the management of mild to moderate pain in adults (often dental or post-partum) and under strict monitoring in children (Campbell, 2006; Kelly and Madadi, 2012; European Medicines Agency (EMA), 2013; Cartabuke et al., 2013). However, recent discourse has suggested to skip “step 2” due to problems with codeine (and tramadol), with guidelines generally not recommending codeine for management of pain, due to limited evidence of effectiveness, variations in metabolism and availability of more predictable opioids. Cochrane reviews have underscored the lack of data to support low-dose codeine (>10 mg) and limited data to support medium dose (10-20 mg) codeine for analgesic efficiency, with combined ibuprofen (400 mg) and codeine (25.6-60 mg) incurring good analgesic efficiency (Derry et al., 2013). There is limited evidence for single dose oral ibuprofen plus codeine being more effective for post-operative pain than either drug in isolation (Baratta et al., 2013). A meta-analysis of opioids for osteoarthritis of the knee or hip reported that modest benefits of codeine were outweighed by adverse consequences (Nuesch et al., 2009). According to Murnion (2010), given the low-dose codeine used in non-prescription medicines, it may be the case that non-opioid analgesics perform better.

The debate around codeine, however centres on it is over the counter availability to the general public (Robinson et al., 2010; Cooper, 2013b). The deregulation of codeine from prescribed to pharmacy over the counter status in certain countries has evolved in order to reduce governmental drug budgets, general practitioner workload, encourage self-treatment and extend the screening, education, life-skills, harm reduction and referral roles of community pharmacists (Hughes et al., 1999; MacFadyen et al., 2001; McBride et al., 2003; Fleming et al., 2004; Wazafy et al., 2006; Pawaskar and Balkrishnan, 2007; Basak et al., 2009; Cooper, 2011; Hamer et al., 2013). Despite increased customer convenience, self-management of minor ailments and pharmacist empowerment in consumer health decision making (Francis et al., 2005; Albsoul-Younes et al., 2010), some studies report on increased misuse and associated harms (Bond and Hannaford, 2003; Eccles, 2006; Hughes et al., 2001; Hughes, 2003). Others reveal that increased access by deregulation has not increased irrational use by consumers (Almarsdóttir and Grimsson, 2000). Conversely the up-scheduling of pharmaceuticals carrying abuse potential (e.g. pseudoephedrine) can impact negatively on sales and creates potential burdening of public health systems (Le Roux, 2013). For the case of codeine, it is not clear that developing countries would be adversely affected by up-scheduling of codeine, as ibuprofen and paracetamol carry comparable effectiveness for mild pain, and are more affordable with lower associated harms.
Pharmacist reporting of concern around customer misuse and dependence on codeine products (with mixed views on safety) continues, despite public awareness around potential for harm (Hughes et al., 1999; MacFadyen et al., 2001; Matheson et al., 2002; Pates et al., 2002; Roumie and Griffin, 2004; Wazaify et al., 2005; Ferner and Beard, 2008; Albsoul-Younes et al., 2010; Reed et al., 2011). In terms of risk perceptions, a minority of customers appear willing to accept risks associated with increased access to the counter medications containing codeine and other active ingredients (Alexander et al., 2005). Over the counter analgesic users generally view these pharmaceuticals as necessary and report use at greater doses and frequencies (French and James, 2008). Björnsdóttir et al. (2009) observed the need for health and pharmacy professionals to be aware of public lay definitions around safety and use of prescribed and over the counter forms of medicine in order to avoid misunderstandings. Pharmacists, however remain a trusted source of information around the counter medications (Wawruch et al., 2013). Recent studies underscore that community pharmacies can solve or partly solve opioid drug-related problems without involvement of general practitioners (Frekjaer et al., 2012) and should involve a thorough assessment of the customer’s problem prior to counter prescribing (Fleming et al., 2004; Francis et al., 2005). Pharmacists observe opioid intoxication and aberrant opioid behaviours in their pharmacies, but report difficulties in the communication of concerns to doctors (Kahan et al., 2011).

Conflicting information from retail, medical and pharmaceutical sources complicates the consumer decision making process (Banks et al., 2007). Hanna and Hughes (2010) described safety and patient demand for certain products influenced the pharmacist’s decision to supply, with evidence for clinical effectiveness of the requested product rarely part of the decision-making process. Pharmacy practice strategies to address codeine misuse includes the rejection of sale, supply of small amounts, removal of products from sight, claiming products are not in stock, brief intervention to raise customer awareness of harm and referral of the customer to a doctor (Matheson et al., 2002; Pates et al., 2002; Albsoul-Younes et al., 2010). Other mitigating actions relating to codeine include sale of smaller pack sizes and dispensing of lower dosages of medications (Bateman, 2013). Of interest in terms of customer demands for codeine, is that individuals dependent on codeine dependents in Australia have described how relative ease of access to codeine centres on better (i.e. more professional) customer appearance and presentation to the pharmacists (Nielsen et al., 2013). This study did, however find that the “hassle” of pharmacy shopping were important drivers for eventual treatment seeking.

When considering the widespread availability of codeine products on prescription, over the counter and via online pharmacies, broader public health and drug control tactics include monitoring of web sales for self-selecting codeine customers, raising visibility of warnings on products, restricting advertising and promoting rational and responsible use of codeine (Bessell et al., 2003; McBride et al., 2003). Harm reduction tactics warrant prescriber pharmacovigilance and patient screening, alongside consumer education. A multifaceted approach by all stakeholders to include manufacturers, prescribers, pharmacists, wholesalers, treatment, law enforcement and drug education specialists is required to avoid penalising patients who benefit from prescribed pharmaceuticals such as codeine (Wilsey and Prasad, 2012). Development of national online prescription systems can counteract patterns of pharmaceutical misuse (Roxburgh et al., 2011; Maxwell, 2011). Innovative developments based on national integrated prescriber and pharmacy monitoring of medicines using real-time reporting (RTR) analysis have emerged in the USA, Canada, South Africa and Australia (UNODC, 2011; Le Roux, 2013; Shand et al., 2013). Well-designed RTR systems aim to track and monitor levels of dispensing, reduce inappropriate prescribing, prescription shopping and unsanctioned use, prevent pharmacy hopping in the event of refusal of sale and reduce adverse events such as overdose (Wrobel, 2003; Chee and Schneberger, 2003; Bateman, 2013; Le Roux, 2013). However, these systems for the most part do not include codeine and require extensive evaluation and process monitoring, with potential unintended consequences including a shift towards overly cautious prescribing of higher schedule opioids, shift towards mid-range scheduled opioids to avoid scrutiny, displacement of consumer behaviour to include alcohol, other prescription drugs and illicit drugs, increases in pharmacy and warehouse theft, and problems in doctor responses to real-time information (Shand et al., 2013).
Ultimately, the need for continued support and empowerment of pharmacists as custodians of medicine, and health professionals involved in appropriate prescribing of codeine is warranted. Live reporting of customer consumption history at pharmacy point of sale in codeine-specific RTRs along with customer awareness of monthly thresholds for codeine dispensing presents a timely opportunity for the pharmacist to refuse sale, engage in a customer brief intervention, or provide support and treatment options (e.g. the option for pharmacy led treatment withdrawal) if required. The continued development of innovative health technologies within RTRs to provide customers with discrete access to personal purchasing history and product-related information via mobile phone apps are grounded in informed consumer decision-making and the promotion of rational responsible use of codeine amongst the public. RTR systems expanded to include codeine can also provide a unique mechanism to record national misuse of codeine trends by linking into national substance misuse databases. Further policy dialogue, research on public health impact and process evaluations of innovative RTRs to include codeine is advised.

References


MacDonald, N. and MacLeod, S.M. (2010), "Has the time come to phase out codeine?", *Canadian Medical Association Journal*, Vol. 182 No. 17, p. 1825.


Nielson, S., Cameron, J. and Pahoki, S. (2010), Over the Counter Codeine Dependence, Turning Point Drug and Alcohol Centre, Victoria.


Further reading


**About the author**

Dr Marie Claire Van Hout is a Coordinator of the ENCEPP registered Substance Abuse Research Centre at the Waterford Institute of Technology, and has consulted for EMCDDA. Her interests centre on cyber drug retailing, intoxication phenomena, abuse of medicines, human enhancement drugs and novel psychoactive substances. Dr Marie Claire Van Hout can be contacted at: mcvanhout@wit.ie

To purchase reprints of this article please e-mail: reprints@emeraldinsight.com
Or visit our web site for further details: www.emeraldinsight.com/reprints