

# When less is more: A web-based study of user beliefs about buprenorphine dosing in self-treatment of opioid withdrawal symptoms

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## Abstract

**Aims:** There is growing evidence of an alarming increase in the illicit use of buprenorphine in the U.S., but our understanding of its use remains limited. This study aims to explore web-based data on illicit buprenorphine use, focusing on user beliefs about the appropriate dosing in self-treatment of opioid withdrawal.

**Methods:** PREDOSE, a novel Semantic Web platform, was used to extract relevant posts from a web-forum that allows free discussions on illicit drugs use. The web-forum content is accessible for public viewing. Using The PREDOSE platform we identified 1,217 posts containing discussions about buprenorphine and opioid withdrawal, covering a time period between January, 2005 and September, 2013. A random sample of 404 (33%) posts was selected and content analyzed using NVivo.

**Results:** The number of buprenorphine-related posts increased over time, peaking in 2011. The majority of posts endorsed use of significantly lower amounts of buprenorphine (2 mg and lower) than typical doses used in standard treatment (16-24 mg/day). Such posts expressed a belief that lower doses of buprenorphine are more effective in the self-treatment of opioid dependence, while the physician-prescribed dosage is too high. Thus, prescribed doses can be “conserved” or shared with others.

**Conclusions:** Social web data suggest that the “less is more” approach to buprenorphine dosing may be fairly prevalent among illicit opioid users and may be one of the contributing factors to the increasing availability of diverted buprenorphine. Our findings highlight the importance of web-based data in drug abuse epidemiology research.

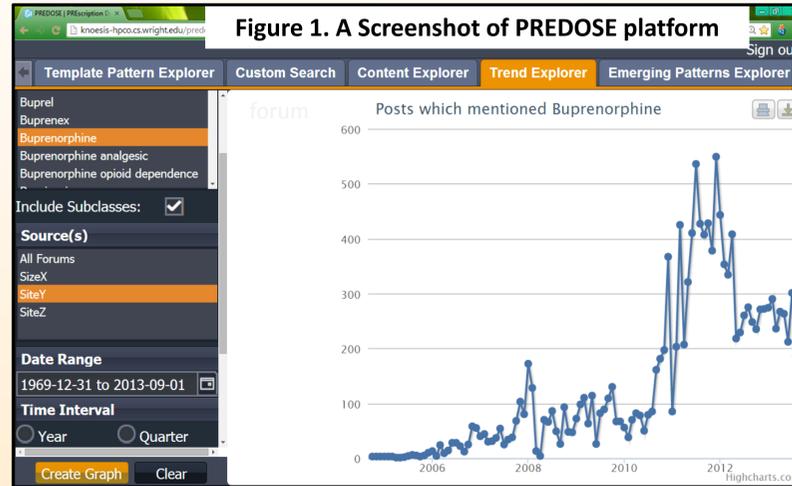
## Introduction

Buprenorphine’s use in substance abuse treatment in the U.S. has expanded substantially since its approval in 2002. Simultaneously, U.S.-based reports about its illicit use have also increased.<sup>1</sup> Some studies have suggested that in the U.S., diverted buprenorphine is more commonly used to self-treat opioid withdrawal symptoms than to get high.<sup>1</sup> More research is needed to provide a better understanding of lay attitudes and beliefs related to illicit buprenorphine use.

There is a growing recognition that the web provides unprecedented opportunities for drug abuse research. A growing number of users rely on web-based resources not only to seek information, but also to share their experiences and opinions about different drugs. Such user-generated content can therefore be a rich source of data about lay knowledge, attitudes and behaviors related to illicit drugs.<sup>2</sup> The key goal of the study is to analyze web-forum discussions about the illicit use of buprenorphine, focusing on the user attitudes and beliefs about the appropriate dosing in self-treatment of opioid withdrawal. The study builds on technical capabilities of PREDOSE (PREscription Drug abuse Online Surveillance and Epidemiology) platform, a novel semantic web tool, that was developed by our interdisciplinary team for semi-automated extraction and processing of web-forum data<sup>3,4</sup> (Figure 1).

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## Methods

A website that allows for free discussion of illicit drugs and is accessible for public viewing was selected for the study. Because postings on the website are made anonymously and intended for public viewing, the University’s Institutional Review Board determined the study to be exempt from human subjects review. Nevertheless, to safeguard anonymity, pseudonyms used by forum contributors were anonymized during the data collection; the actual name of the website has been omitted to assure confidentiality. The data extraction and analysis proceeded in the following stages:

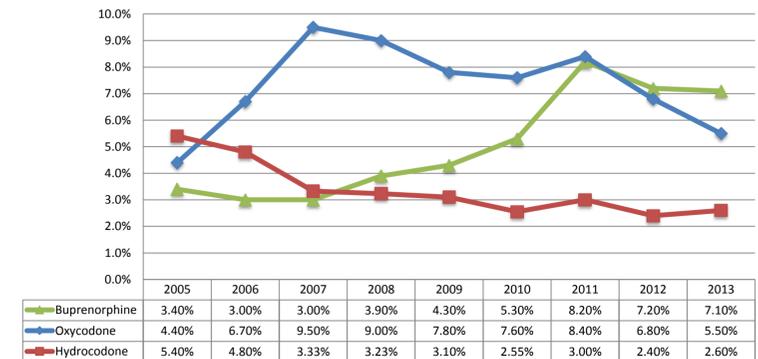
1) The PREDOSE Trend Explorer was used to extract data on the frequency of web-based posts that contain any mentions of buprenorphine (Figure 1). For comparative purposes, data on the frequency of oxycodone and hydrocodone mentions were also extracted.

2) The PREDOSE Custom Search identified 1,217 posts containing mentions of buprenorphine and opioid withdrawal, covering a time period between January 2005 and September 2013. The Custom Search function in PREDOSE provides a capability to set up search parameters that include selection of at least two concepts, distance (number of words) between them, and a time period. Identification of “buprenorphine” and “withdrawal” included relevant brand and slang terms.

3) The posts were uploaded to an NVivo data base. A random sample of 404 (33%) posts was manually coded and analyzed using a framework that combines qualitative and quantitative methods commonly employed in content analysis studies of media communications.

4) A sample of 50 text segments was selected to assess coding reliability in relation to buprenorphine’s dosing. The reliability sample was then independently coded by two coders. SPSS was used to calculate Cohen’s kappa. Generally, kappa scores of 0.40-0.75 indicate acceptable, and above 0.75, indicate excellent agreement.<sup>5</sup>

**Figure 2. Percentage of buprenorphine, oxycodone, and hydrocodone-related posts on a web-forum discussing illicit drug use**



**Table 1. Mention of buprenorphine dose to self-treat opioid withdrawal (N=82)**

Amount of Buprenorphine:	Number	Percentage
2mg or less	58	71%
More than 2mg but less than 8mg	23	28%
More than 8mg	8	10%

## Results

The overall number of buprenorphine-related posts increased over time (Figure 1). Initially, buprenorphine was less commonly discussed than hydrocodone or oxycodone. However, the frequency of buprenorphine-related posts increased substantially over time, and it became more common than hydrocodone or oxycodone-related mentions (Figure 2).

Out of 404 coded posts, about 20% contained information about the specific amounts of the daily dose of buprenorphine used in self-treatment. The majority of the coded posts advocated use of very low doses—2 mg and lower per day—when self-treating opioid withdrawal symptoms (Table 1). The coder reliability assessment indicated excellent agreement between coders in identifying reports of dosing at or below 2 mg/day (kappa of 0.75) and above 2 mg per day (kappa of 0.79).

In web-forum discussions about “low dosing,” users expressed a belief that buprenorphine is a “counterintuitive” drug that may be more effective at lower doses than at higher doses (Table 2). Many of the dose-related discussions endorsed a view that physician-prescribed doses, typically averaging 16-24 mg per day, are too high, and thus, they can be “conserved” or shared with others (Table 2). In addition, some web forum participants advocated use of a *low* amount of buprenorphine *in conjunction* with an opioid agonist to make the transitions from a full agonist to buprenorphine easier and less painful. Such recommendations were especially relevant for those who tended to switch back and forth between buprenorphine and their opioid of choice.

**Table 2. Lay beliefs about buprenorphine dosing in self-treatment**

### Buprenorphine is “more effective” at very low doses:

“Normally, I would try 6 mg+ of bupe for an attempt at relief of withdrawal, but since I heard less is more, I decided to start low and add more if I needed it. Lucky me! 2 mg put me to sleep the first night, and it only got progressively better each day.”

“I cut the Sub strip into about 24 tiny pieces, which is 1/12 of 1 mg each dose. I used one piece about every 4 to 6 hours, and it kept me well for almost a week. I was amazed!”

### Physician-prescribed doses are “too high”:

“You can conserve your Suboxone by taking 1 pill or even half a pill. I do not know why doctors insist on prescribing 16 mg, even 32 mg per day of bupe...”

“Most Sub doctors script at least 16mg a day... That is enough to dose BOTH of you comfortably; probably with some even left over! Subs can be a life-safer...if u have to function during the time of withdrawal.”

## Conclusions

Web-forum participants endorsed use of significantly lower amounts of buprenorphine than conventional doses averaging between 16 and 24 mg per day. Lay attitudes that buprenorphine is more effective in lower doses contradict medical treatment protocols and prior research findings. Such conflicting beliefs about buprenorphine dosing may undermine effective treatment and contribute to the increasing use of diverted buprenorphine.

Buprenorphine-related discussions increased over time, peaking in 2011 and overtaking oxycodone-related posts in 2012. These changes coincided with the release of tamper-resistant formulation of OxyContin in late 2010. We recognize that our study population is selective, and the findings cannot be generalized. Furthermore, at this time, we lack the ability to provide demographic and geographic indicators. Nevertheless, the findings may help inform prevention and policy measures and demonstrate the need for further research with community-recruited samples to understand patterns of illicit buprenorphine use over time.

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