

## Short communication

## Prescribing diamorphine in the United States: Insights from a nationally representative survey

Beau Kilmer<sup>a,\*</sup>, Rosanna Smart<sup>a</sup>, Jirka Taylor<sup>a</sup>, Jonathan P. Caulkins<sup>b</sup><sup>a</sup> Drug Policy Research Center, RAND Corporation, 1776 Main St., Santa Monica, CA 90407, United States<sup>b</sup> Carnegie Mellon University Heinz College, 5000 Forbes Ave., Pittsburgh PA 1521, United States

## ARTICLE INFO

## Keywords:

Opioid use disorder  
Opioid policy  
Diamorphine  
Heroin-assisted treatment  
Scheduling

## ABSTRACT

**Background:** Some countries allow physicians to prescribe pharmaceutical-grade diamorphine to dependent users who have previously undergone treatment but are still using street-sourced heroin; this is not allowed in the US. This study provides the first nationally representative US data concerning public support for prescribing diamorphine to dependent users. We also test the hypothesis that calling it “diamorphine” instead of “heroin” increases support for this approach.

**Methods:** The RAND American Life Panel is a nationally representative, probability-based survey of US adults. Of the 3345 panel members invited to take the survey, 2530 (75.6%) provided a valid response to our question module. Respondents were randomly assigned to have the question refer to the prescribed drug as either “heroin” or “diamorphine.” The groups did not significantly differ on sex, age, race/ethnicity, or education. We compare the distribution of responses for the two groups and conduct Pearson’s chi-squared test with the Rao–Scott correction.

**Results:** For those asked whether the US should try prescribing pharmaceutical-grade “heroin,” the share answering “Yes” (20.8%) was 15 percentage points lower than those responding “No” (35.8%). When the question asked about “diamorphine,” the results were nearly reversed: the share answering “Yes” (30.6%) was almost 12 percentage points higher than those responding “No” (18.9%). The distributions of responses were significantly different ( $p < 0.001$ ).

**Conclusions:** Support for prescribing diamorphine to dependent users is low in the US. While the results are consistent with the hypothesis that referring to heroin as diamorphine may reduce stigma associated with the substance and increase support for prescribing it, opinions may change as individuals learn they are different names for the same substance.

## 1. Introduction

Provisional US statistics indicate that approximately 49,000 individuals died from an opioid-involved overdose in 2017—more than a four-fold increase since 2002 (Ahmad et al., 2018; National Institute on Drug Abuse, 2018)—and the true estimate is likely be 20% to 35% larger (Ruhm, 2018). The inclusion of synthetic opioids like fentanyl in heroin and counterfeit pills has fueled recent increases in opioid-related mortality, the burden of which continues to have far-reaching costs (Centers for Disease Control and Prevention, 2018; Gomes et al., 2018; Rubin, 2017). Results from a new poll show one in eight American adults had a family member or close friend die from opioids (AP-NORC, 2018).

Expert panels have made a series of recommendations about how to

reduce opioid-related harms in the US, and there is near-universal support for increasing access to FDA-approved medications such as methadone and buprenorphine (e.g., National Academies of Science, Engineering, and Medicine, 2017; President’s Commission on Combating Drug Addiction and the Opioid Crisis, 2017). However, in some jurisdictions outside the US, physicians can also prescribe pharmaceutical-grade diamorphine (heroin) to those who have previously undergone substance use treatment but are still using heroin. The main goals of diamorphine prescription are to stabilize patients’ lives and reduce their use of illicit heroin.

Randomized trials in Europe and Canada suggest diamorphine prescription may be a clinically effective treatment for some patients with opioid use disorder (OUD) who have not responded to conventional treatments. Two recent systematic reviews found that for those

\* Corresponding author.

E-mail address: [kilmer@rand.org](mailto:kilmer@rand.org) (B. Kilmer).

treatment-refractory patients, relative to oral methadone maintenance treatment alone, supervised injectable diamorphine plus flexible doses of methadone showed positive effects for retaining patients in treatment, limiting illicit drug use, and reducing criminal activities (Ferri et al., 2011; Strang et al., 2015). However, the use of diamorphine in treatment of OUD carries significant regulatory and political barriers (Farrell and Hall, 2015).

Prescribing maintenance doses of diamorphine to dependent users used to be legal in the United States, but the practice fell out of favor after the passage of the Harrison Act of 1914 and subsequent Supreme Court decisions (Musto, 1999). The federal Controlled Substances Act (CSA) places heroin in Schedule I, meaning it can be researched, but not prescribed. Drugs can be rescheduled through an Act of Congress or an administrative decision of the Drug Enforcement Administration in conjunction with the Department of Health and Human Services. If the opioid crisis persists, we expect debate about diamorphine prescription and rescheduling to intensify.

These discussions could be influenced by the terminology used. “Heroin” is the brand name given to diamorphine by Bayer in the nineteenth century, and it is the commonly-used term in policy discussions. Even the CSA refers to the substance as heroin (diamorphine and diacetylmorphine are listed as “Other names”). With its links to crime and disease, the word “heroin” can carry a lot of stigma (e.g., Furst and Evans, 2014; National Academies of Science, Engineering, and Medicine, 2017). Thus, there may be more opposition to prescribing pharmaceutical-grade “heroin” rather than “diamorphine,” even though they are the same substance.

This brief report makes two contributions. First, it provides the first nationally-representative U.S. data concerning support for prescribing pharmaceutical grade heroin to dependent users. Second, it tests the hypothesis that referring to the treatment as “diamorphine” instead of “heroin” increases support for this approach.

## 2. Methods

Our questions were fielded as part of a RAND American Life Panel (ALP) Omnibus survey from February 21, 2018 to March 14, 2018. Respondents participated online, either using their own devices or via RAND-provided internet access. ALP survey weights, which were developed utilizing a raking method to match population distributions retrieved from the Current Population Survey Annual Social and Economic Supplement, were constructed for the respondent sample to generate nationally representative estimates. For further information about the survey, see Pollard and Baird (2017).

For the Omnibus survey, 3345 ALP members aged 21 and older were invited to participate, with the goal to obtain at least 2500 responses. Invited participants were randomly selected from English-speaking, probability-based active members (defined as those who completed a non-demographic survey within the past year). Over the three-week period when the survey question was fielded, 2653 respondents started the survey, 2530 of whom provided a response to the study question of interest, yielding a completion rate of 75.6%.

Participants were specifically asked to respond Yes, Don't Know/Not Sure, or No to the following question: “In some European cities, heroin users who fail treatment (e.g., methadone) multiple times can be prescribed pharmaceutical-grade \_\_\_\_ as a substitute for illicit heroin in order to help stabilize their lives. Should we try this approach in the US?” Participants were randomized to one of the two wording conditions (“heroin” or “diamorphine”) upon reaching the experimental question. Randomization (1:1) was not dependent on survey- or respondent-level factors. All study procedures were approved by the RAND Human Subjects Protection Committee.

We used Pearson's chi-squared test with the Rao–Scott correction to determine whether the “heroin” and “diamorphine” groups significantly differed in terms of their sociodemographic characteristics and in their agreement with undertaking the proposed treatment

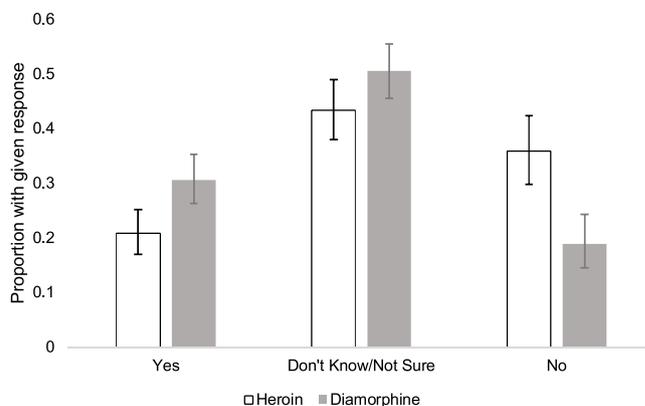


Fig. 1. Support for prescribing diamorphine to dependent users in the US is stronger when it is called “diamorphine” instead of “heroin”.

Notes. Respondents were asked “In some European cities, heroin users who fail treatment (e.g., methadone) multiple times can be prescribed pharmaceutical-grade \_\_\_\_ as a substitute for illicit heroin in order to help stabilize their lives. Should we try this approach in the US?”, and randomly assigned whether the blank was filled in with “heroin” or “diamorphine.” Error bars indicate 95% confidence intervals for survey responses. The distributions of responses are significantly different ( $p < 0.001$ ).

approach in the United States. Comparisons were considered statistically significant based on a two-sided  $p$ -value  $< 0.05$ . All analyses were conducted in Stata/MP version 15.1.

## 3. Results

About half the weighted sample was female (51.4%), approximately two-thirds were Non-Hispanic White (65.1%), and the average age was 48.3 years. Nearly 40% had completed up to a high school or equivalent educational degree, and the majority (58.9%) reported currently being married or co-habiting with a partner. The diamorphine and heroin groups did not significantly differ on any covariate dimension (sex, age, race/ethnicity, and education;  $p$ -values ranged from 0.29 to 0.88).

Fig. 1 shows that among those asked about “heroin,” the share answering “Yes” (20.8%) was 15 percentage points lower than the share responding “No” (35.8%). For those asked about “diamorphine,” the share answering “Yes” (30.6%) was almost 12 percentage points higher than those responding “No” (18.9%). Across both scenarios, the most common response was “Don't Know/Not Sure,” with 43.4% and 50.5% selecting this response for heroin and diamorphine, respectively. The distributions of responses were significantly different ( $p < 0.001$ ) when the pharmaceutical maintenance treatment was described as “heroin” versus “diamorphine.”

Table 1 presents exploratory subgroup analyses, showing the aggregate pattern was replicated within each group. Every subgroup was more likely to support “diamorphine” prescribing than “heroin” prescribing, with the risk ratio ranging between 1.1 and 2.0. With respect to education, those who did not attend college were much less likely to respond “Yes” for both questions when compared to those who had more education.

In analyses not shown, the biggest difference in Yes versus No answers depending on the wording of the question was among those with a college degree or higher. The share of those with a college degree or higher reporting Yes and No was fairly similar when “heroin” was used (31.1% and 28.4%, respectively); however, there was a dramatic difference when “diamorphine” was used (40% and 8.8%, respectively). We also found that females were more likely to report “Don't Know/Not Sure” than males irrespective of whether the question referred to heroin or diamorphine.

**Table 1**  
Support for prescribing diamorphine versus heroin, by subgroup.

Subgroups	Respondents saying “Yes” to prescribing:		RR [95% CI]
	Diamorphine N (%)	Heroin N (%)	
<b>Sex</b>			
Female	182 (24.0)	116 (15.8)	1.5 [1.1, 2.1]
Male	202 (38.1)	171 (25.6)	1.5 [1.0, 2.1]
<b>Race/Ethnicity</b>			
White/Non-Hispanic	279 (31.2)	212 (17.7)	1.8 [1.3, 2.4]
Nonwhite/Hispanic	105 (29.3)	75 (26.2)	1.1 [0.7, 1.7]
<b>Education</b>			
HS or less	45 (22.6)	19 (11.1)	2.0 [1.0, 4.1]
Some college or BA	219 (34.3)	181 (27.0)	1.3 [1.0, 1.7]
More than BA	120 (40.0)	87 (28.4)	1.4 [1.0, 2.0]
<b>Age group</b>			
Age 21–60	217 (30.9)	158 (21.9)	1.4 [1.0, 1.9]
Age 61 +	167 (29.7)	129 (18.0)	1.7 [1.2, 2.2]

Notes: Values are expressed as unweighted frequency (N) and weighted percentage (%). Risk ratios (RR) and associated 95% confidence intervals also shown.

#### 4. Discussion

If heroin and fentanyl continue to cause tens of thousands of overdose deaths every year, discussions of less-traditional approaches to reducing illicit opioid use may become more common in the United States (e.g., Kilmer et al., 2018; Pardo and Reuter, 2018). This paper presents results from the first nationally-representative survey in the United States to ask about public support for prescribing diamorphine to those dependent on heroin. We find that support for this intervention is currently low; at 21% or 31% depending on whether it was referred to as heroin or diamorphine, respectively. For comparison, a 2017 poll found that public support for legalizing safe consumption sites and syringe services programs in respondents’ communities was 29% and 39%, respectively (McGinty et al., 2018).

The low proportion voicing support does not mean most are opposed; relatively few said “No” to prescribing diamorphine when referred to by that name (18.9%); opposition was higher with the term “heroin” (35.8%) but still not a majority. The most common response was “Don’t Know/No Sure,” particularly when the less familiar term diamorphine was used (50.5% vs. 43.4%), so the extent of public support may still be malleable not only to terminology—as investigated here—but perhaps also to public education as well.

Indeed, an important limitation of asking survey respondents about new ideas is that they have limited time to consider and respond to the question. The survey questions also typically must be brief, which constrains the amount of information respondents receive before answering. Focus groups or other mechanisms that allow further reflection may have elicited different answers (e.g., respondents may have been less likely to respond “Don’t Know/Not Sure” or seen less differences between “heroin” and “diamorphine”). Since the survey did not ask respondents about their level of familiarity with heroin-assisted treatment or services for people who are dependent on opioids more broadly, it is plausible that limited awareness contributed to the high share of “Don’t Know/Not Sure” responses.

Whether support for prescribing diamorphine grows over time could be shaped by many factors, possibly including the terminology used to describe this intervention. While the results of this paper are consistent with the hypothesis that referring to heroin as diamorphine may increase support for prescribing it to people with a substance use disorder, opinions may change as respondents learn they are different names for the same substance.

#### Role of the funding source

This study was supported by RAND Corporation’s Investment in People and Ideas program.

#### Contributors

Taylor and Kilmer conceived of the study concept and design and were responsible for data acquisition and obtaining funding. Smart, Kilmer, and Caulkins analyzed and interpreted the data. Smart performed statistical analysis. Kilmer was responsible for study supervision. All authors contributed to the manuscript and approved the final article.

#### Conflicts of interest

All authors declare that they have no conflicts of interest.

#### References

- Ahmad, F.B., Rossen, L.M., Spencer, M.R., Warner, M., Sutton, P., 2018. Provisional Drug Overdose Death Counts (Accessed 26 October 2018). National Center for Health Statistics. <https://www.cdc.gov/nchs/nvss/vsrr/drug-overdose-data.htm>.
- AP-NORC, 2018. Americans Recognize the Growing Problem of Opioid Addiction (Accessed 26 October 2018). <http://www.apnorc.org/projects/Pages/Americans-Recognize-the-Growing-Problem-of-Opioid-Addiction.aspx>.
- Centers for Disease Control and Prevention (CDC), 2018. U.S. Drug Overdose Deaths Continue to Rise; Increase Fueled by Synthetic Opioids (Accessed 26 October 2018). <https://www.cdc.gov/media/releases/2018/p0329-drug-overdose-deaths.html>.
- Farrell, M., Hall, W., 2015. Heroin-assisted treatment: has a controversial treatment come of age? *Br. J. Psychiatry* 207, 3–4.
- Ferri, M., Davoli, M., Perucci, C.A., 2011. Heroin maintenance for chronic heroin-dependent individuals. *Cochrane Database Syst. Rev* CD003410.
- Furst, R.T., Evans, D.N., 2014. An exploration of stigma in the lives of sex offenders and heroin abusers. *Deviant Behav.* 36, 130–145.
- Gomes, T., Tadrus, M., Mamdani, M.M., Paterson, J.M., Juurlink, D.N., 2018. The burden of opioid-related mortality in the United States. *JAMA Netw. Open* 1, e180217.
- Kilmer, B., Taylor, J., Caulkins, J., Mueller, P., Ober, A., Pardo, B., Smart, R., Strang, L., Reuter, P., 2018. Considering Heroin-assisted Treatment and Supervised Drug Consumption Sites in the United States. RAND Corporation, Santa Monica (Accessed 16 January 2019). [https://www.rand.org/pubs/research\\_reports/RR2693.html](https://www.rand.org/pubs/research_reports/RR2693.html).
- McGinty, E., Barry, C., Stone, E., Niederdeppe, J., Kennedy-Hendricks, A., Linden, S., Sherman, S., 2018. Public support for safe consumption sites and syringe services programs to combat the opioid epidemic. *Prev. Med.* 111, 73–77.
- Musto, D.F., 1999. *The American Disease: Origins of Narcotic Control*. Oxford University Press, New York.
- National Academies of Sciences, Engineering, and Medicine, 2017. *Pain Management and the Opioid Epidemic: Balancing Societal and Individual Benefits and Risks of Prescription Opioid Use*. The National Academies Press, Washington, DC.
- Pardo, B., Reuter, P., 2018. Facing fentanyl: should the USA consider trialling prescription

- heroin? *Lancet Psychiatry* 5, 613–615.
- Pollard, M., Baird, M.D., 2017. The RAND American Life Panel: Technical Description. RAND Corporation, Santa Monica.
- President's Commission on Combating Drug Addiction and the Opioid Crisis, 2017. President's Commission on Combating Drug Addiction and the Opioid Crisis (Accessed 26 October 2018). . [https://www.whitehouse.gov/sites/whitehouse.gov/files/images/Final\\_Report\\_Draft\\_11-15-2017.pdf](https://www.whitehouse.gov/sites/whitehouse.gov/files/images/Final_Report_Draft_11-15-2017.pdf).
- Rubin, R., 2017. Illicit fentanyl driving opioid overdose deaths. *JAMA* 318, 2174.
- Ruhm, C.J., 2018. Corrected US opioid-involved drug poisoning deaths and mortality rates. *Addiction* 113, 1339–1344.
- Strang, J., Groshkova, T., Uchtenhagen, A., van den Brink, W., Haasen, C., Schechter, M.T., Lintzeris, N., Bell, J., Pirona, A., Oviedo-Joekes, E., Simon, R., Metrebian, N., 2015. Heroin on trial: Systematic review and meta-analysis of randomised trials of diamorphine-prescribing as treatment for refractory heroin addiction. *Br. J. Psychiatry* 207, 5–14.