RADARS® SYSTEM

Researched Abuse, Diversion and Addiction-Related Surveillance System

QUARTERLY Technical REPORT

Third Quarter, 2018

Rates of Abuse for Opioids with Low Dispensing are Overestimated due to Careless Response Patterns on Treatment Center Program Surveys

Key Findings

- Of the 91,552 paper surveys submitted between 2009Q1 and 2017Q4, 2576 (2.8%) contained evidence of careless responding.
- In 2017 data careless responses varied by drug, ranging from transmucosal fentanyl with rates inflated by 85%, while IR oxycodone rates were inflated by 8%.
- Using established methods from survey science (e.g., patterns of consecutive drug endorsements), careless responses can be identified and rates adjusted to eliminate this source of bias.

Introduction

Anonymous surveys provide a useful tool in assessing the prevalence of illegal behavior such as prescription drug misuse and abuse. However, a limitation of these surveys is that they are vulnerable to participants who are careless in their responses, especially with paper-based or online survey instruments. Careless responding refers to situations where the data recorded are not accurate because respondents do not give sufficient attention to items on a questionnaire. Examples include participants providing the same response to every question or alternating between extremes on survey items in an effort to complete the survey quickly.

The RADARS System Treatment Center Programs (Opioid Treatment Program [OTP] and Survey of Key Informants' Patients Program [SKIP]) use anonymous paper surveys that are completed by individuals who are entering a substance abuse treatment facility. On these surveys, respondents are provided a list of over 100 opioid products and are asked to check a box next to products they have used "to get high" in the past month. These endorsements are used to quantify the extent of abuse of different opioid products among a treatment-seeking population. Since inception, over 92% of surveys had fewer than ten opioid products endorsed, suggesting that most surveys had credible responses, but that special attention needed to be paid to a subset.

A small segment of respondents (less than 0.5%) endorse nearly every product including some products that are not commercially available at the time of survey completion. These surveys are indicative of one kind of careless response and the survey should be considered invalid due to a lack of biological plausibility. Because these surveys make up a small segment of the entire sample the impact is minimal for products with higher abuse endorsement counts. However, for drugs that are rarely endorsed for abuse, even a small number of implausible endorsements have the potential for artificially inflated rates. This analysis sought to identify surveys indicative of careless response and assess the impact of excluding these surveys on prevalence estimates of opioid groups with different outpatient market shares.

Methods

Programs

The RADARS System OTP enrolls individuals entering treatment for opioid use disorders at medication-assisted treatment programs in 36 states across the United States. The RADARS System SKIP Program enrolls individuals with opioid dependence entering treatment primarily at private substance abuse treatment programs in 49 states across the United States. Both programs share a common paper questionnaire. In this analysis, an endorsement of past month abuse was a respondent checking the box indicating “use to get high” in the past month or selecting use in the past month via one of the routes of administration provided.

Statistical Analysis

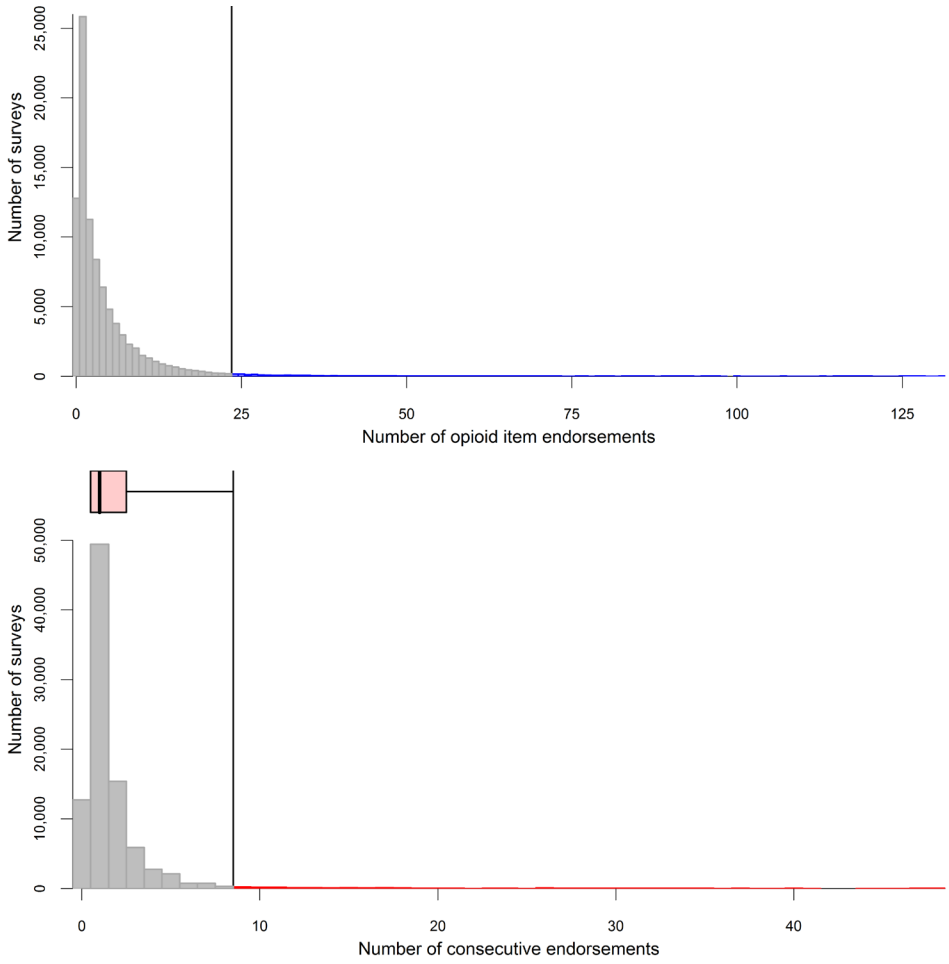
Surveys submitted between 2009Q1 and 2017Q4 were assessed. These analyses applied two methods assessed by Meade and Craig[1] to identify surveys indicative of careless response. We used the total number of opioid items endorsed to identify extreme outliers and used the number of consecutive products endorsed to identify unusual response patterns. Thresholds for both approaches were identified using boxplots modified to account for asymmetric distributions[2]. The semi-interquartile range was calculated for both measures as 2(Q3–Q2) where Q3 represents the 75th percentile and Q2 represents the median. Values greater than three times the semi-interquartile range were excluded for both measures.

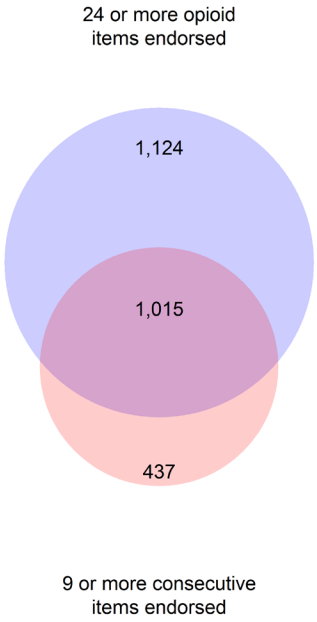
To assess the impact of careless response exclusion, prevalence estimates from eight drug groups with low (transmucosal fentanyl) to high (immediate-release oxycodone) market volume in 2017, a year when all drug groups were included on the survey.

Results

There were 91,552 surveys submitted for OTP and SKIP between 2009Q1 and 2017Q4. The median number of opioids endorsed was 2 and the interquartile range from 1 item to 5 items. The median number of consecutive items endorsed was 1 and the interquartile range was from 1 item to 2 items. Using boxplot calculations modified for asymmetric distributions, surveys where 24 or more opioids were endorsed (n=2,136, 2.3%) or with 9 or more consecutive products endorsed (n=1,452, 1.6%) were identified as outliers and indicative of careless response (Figure 1). In total, 2576 (2.8%) of surveys were suggestive of careless response, 437 due to high number of consecutive endorsements without a high number of endorsements, 1124 due to a high number of endorsements without a high number of consecutive responses, and 1015 due to both methods.

Figure 1. Combined histogram and boxplot of number of opioid items endorsed and number of consecutive items endorsed modified to account for asymmetric distributions; Venn diagram of survey exclusions, 2009Q1 through 2017Q4





The impact on prevalence estimates was assessed using prevalence estimates from eight drug groups in 2017, a year when all drug groups were included on the surveys. The inflation in the estimate of prevalence varies greatly by frequency of formulation endorsement (Table 1). The transmucosal fentanyl product rate is inflated by 85% when careless responses are included whereas the IR oxycodone rate is inflated by 8%.

Table 1. Prevalence estimates unadjusted and adjusted for careless responses by drug group, 2017Q1 through 2017Q4

Drug Group	Unadjusted prevalence	Adjusted prevalence	Rate Inflation (Unadjusted Prevalence/ Adjusted Prevalence)
Transmucosal fentanyl	1.8%	1.0%	+85%
Transdermal fentanyl	4.3%	3.1%	+39%
IR morphine	5.1%	3.4%	+51%
IR oxymorphone	8.3%	6.3%	+31%
IR hydromorphone	8.8%	7.0%	+26%
ER oxycodone	14.7%	12.9%	+14%
IR hydrocodone	16.5%	14.8%	+11%
IR oxycodone	21.9%	20.3%	+8%

"IR" represents immediate-release, "ER" represents extended-release
Only tablets and capsules were used for morphine, oxymorphone, hydromorphone, oxycodone, and hydrocodone
Prevalence estimates are calculated among respondents who endorsed abuse of at least one opioid in the past month

Conclusions

Less than 3% of surveys in the Treatment Center Programs Combined were indicative of careless response. However, by not excluding these surveys prevalence estimates for all opioid drug groups assessed were inflated. The magnitude of the rate inflation was greatest for low volume drugs (e.g., transmucosal fentanyl) than more common drugs (e.g., IR oxycodone).

Suggested Citation

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References

[1]Meade, Adam & Craig, Bart. (2012). Identifying Careless Responses in Survey Data. Psychological methods. 17. 437-55. 10.1037/a0028085.

[2]Kimber, A.C. (1990). Exploratory Data Analysis for Possibly Censored Data From Skewed Distributions. Journal of the Royal Statistical Society. 39. 21-30.

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