

# **Trends in Opioid Use Among Social Security Disability Insurance Applicants**

**April Yanyuan Wu** (Mathematica), **Denise Hoffman** (Mathematica), **Paul O'Leary**  
(Social Security Administration)

21<sup>st</sup> Annual SSA Research Consortium Meeting

August 1 & 2, 2019

National Press Club

529 14<sup>th</sup> Street NW

Washington, D.C.

This research was supported by a grant from the U.S. Social Security Administration (SSA) as part of the Retirement and Disability Research Consortium (RDRC). The findings and conclusions are solely those of the authors and do not represent the views of SSA, any agency of the federal government, the Center for Retirement Research at Boston College, or Mathematica.

## Introduction

The prevalence of opioid use nationwide, coupled with the large share of new Social Security Disability Insurance (SSDI) awardees who have conditions associated with opioid use, suggests that opioid use may be common and increasing among SSDI applicants. In 2016, 19 percent of the U.S. population filled at least one opioid prescription (Mytelka et al. 2018). Leading up to that year, from 2007 to 2016, there was a rise in SSDI awards made to applicants with musculoskeletal conditions (Social Security Administration [SSA] 2018), which are often associated with opioid use (Carnide et al. 2017). Indeed, a recent analysis suggests that the wider availability of opioids is linked to increases in SSDI applications (Cutler et al. 2017).

Statistics on opioid use among SSDI applicants, who are generally not eligible for Medicare, have been unavailable because of the limited availability of research-ready data. SSDI applicants are required to report their medications, but they often do so in an open-ended text field. In the past, analyzing this information required manual coding, a process that is labor intensive, time consuming, and usually cost prohibitive.

We sought to fill this knowledge gap by documenting trends in opioid use among SSDI applicants. We used a machine-learning method to identify opioids in medication text fields in SSDI administrative data. Specifically, we documented the overall prevalence of opioid use among SSDI applicants from 2007 through 2017, considering differences by demographic and other factors. Understanding the pattern of opioid use among SSDI applicants is important for projecting the resources needed to adjudicate SSDI applications and for predicting the future composition of the SSDI caseload.

## Data

We used data from SSA's Structured Data Repository (SDR) for our analysis. Since 2007, SSA has electronically stored data from SSDI and Supplemental Security Income (SSI) applications in the SDR. All applicants are asked to report any medications they are taking. They can select from a drop-down list of 630 medication names, enter their medications in a free-text field, or both. The analysis is based on a 30-percent random sample of SSDI applicants in each year from 2007 through 2017. The sample included 6.5 million applications and nearly 34 million reported medications. Highlighting the importance of free-text entries, 42 percent of applicants used them exclusively, and 40 percent used them along with the drop-down list.

## Methods

To identify opioids in the free-text entries, the project team used a supervised machine-learning algorithm based on natural-language processing. This process involved several steps. First, we extracted a subset of unique free-text medication entries, and a subject matter expert manually labeled each entry as an opioid or non-opioid medication. We then randomly divided the labeled data into training and test sets.

Using the training set, we created an algorithm to identify opioids. The algorithm drew on natural-language processing and resources on opioids and other drugs, including a list of opioids from the Centers for Disease Control and Prevention (CDC), and more general drug-name resources maintained by the National Library of Medicine. We completed several rounds of testing and refining the algorithm.

After development, we applied the algorithm to the testing data to assess its performance. Ultimately, we achieved an accuracy rate of over 99 percent, with a sensitivity of 0.99 and specificity of 1.00. This means that our algorithm made very few mistakes on the free-text cases in the testing sample, and the kinds of mistakes it made were undercounting a small proportion of true opioid cases. After testing and making adjustments, we used the program to code the remaining unlabeled records. We used a similar approach to classify medications from the drop-down list.

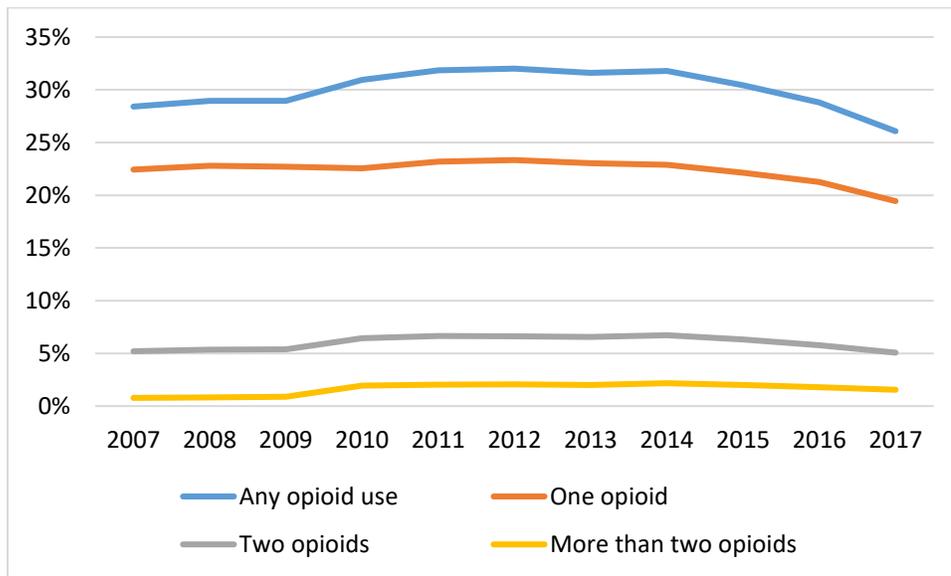
## Results

From 2007 to 2017, one-quarter to one-third of SSDI applicants reported any opioid use (Exhibit 1). In 2007, 28 percent of applicants reported using one or more opioids. That number rose each year to a peak of 32 percent in 2012, before dropping to 26 percent in 2017. This mirrors nationwide trends, which show an increase in opioid prescriptions from 2007 to 2012 followed by a decline from 2013 to 2017 (CDC 2018). Among those who reported opioid use, the majority reported using one opioid. Over the sample period, 20 to 23 percent of all applicants reported using one opioid, 5 to 7 percent reported two opioids, and 1 to 2 percent reported more than two opioids.

Opioid use varied by the demographic characteristics of SSDI applicants. First, opioid use was higher among women than men throughout the period, by a statistically significant amount. For example, in 2012, 34 percent of female applicants reported any opioid use versus 30 percent of male applicants. Second, opioid use was highest among applicants ages 40 to 49 (among whom 31 to 37 percent reported opioid use) and was lowest among those ages 18 to 29 (among who 13 to 18 percent reported

opioid use). Third, opioid use was highest among applicants with some post-secondary education and lowest among those with less than a high school degree.

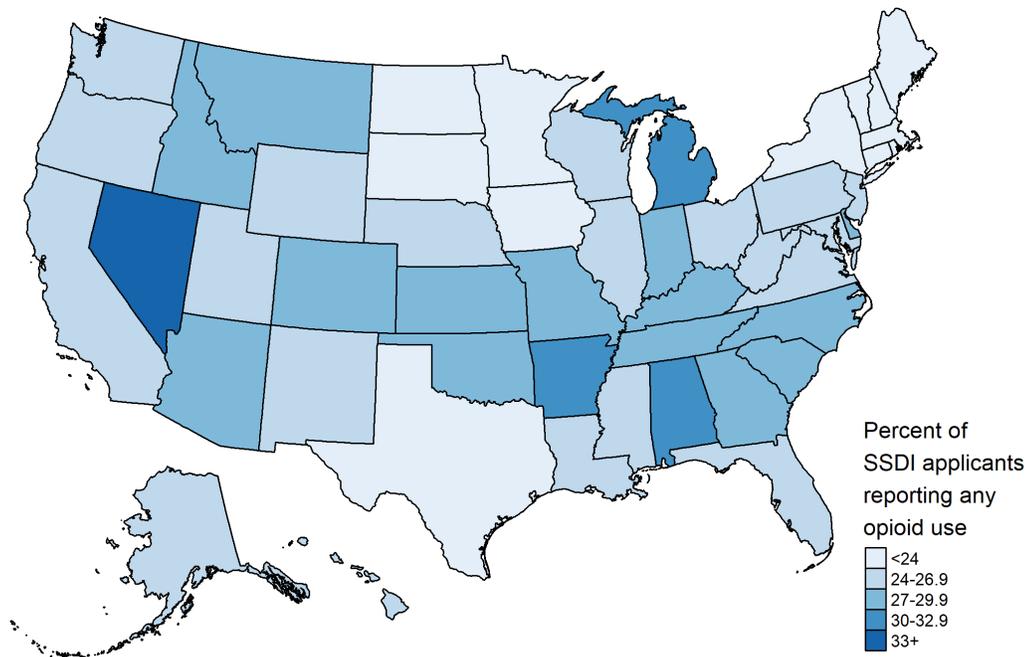
### Exhibit 1. Prevalence of Opioid Use Among Applicants



Source: Authors' calculations based on the 2007–2017 SDR.

Opioid use was also correlated with application type and state. People applying only to SSDI reported a higher rate of any opioid use relative to people applying to both SSDI and SSI; this difference was statistically significant. In addition, applicants from several states, including Rhode Island and Massachusetts, consistently reported lower-than-average rates of opioid use (Exhibit 2), whereas opioid use was consistently high in Alabama and Michigan.

## Exhibit 2. Prevalence of Opioid Use Among SSDI Applicants in 2017



### Conclusion

Our findings confirm that opioid use is common among SSDI applicants. Over the full analysis period, over 30 percent of applicants reported using one or more opioids. This is higher than the rate of opioid use among the general population (29 versus 16 percent in 2016) but lower than the rate among SSDI beneficiaries who have completed the two-year waiting period for Medicare (32 versus 44 percent in 2011; Morden et al. 2014). The lower rate among applicants relative to awardees likely reflects the fact that awardees have more severe medical conditions than denied applicants, by program design.

Although opioid use is clearly prevalent among applicants, the extent to which opioids ameliorate or exacerbate health conditions that meet SSDI's qualifications and affect return to work among this population is unknown. From a public health perspective, application for SSDI provides an opportunity to identify opioid users and connect them with helpful services and supports. Our future research will focus on the extent to which opioid use by SSDI applicants predicts subsequent mortality and SSDI awards.

## References

- Carnide, N., S. Hogg-Johnson, P. Côté, E. Irvin, D. Van Eerd, M. Koehoorn, and A.D. Furlan. "Early Prescription Opioid Use for Musculoskeletal Disorders and Work Outcomes: A Systematic Review of the Literature." *The Clinical Journal of Pain*, July 2017, vol. 33, no. 7, pp. 647–658.
- Cutler, David, Ellen Meara, and Susan Stewart. "Has Wider Availability of Prescription Drugs for Pain Relief Affected SSDI and SSI Enrollment?" Presented at the Disability Research Consortium Annual Meeting, Washington, DC, August 2017.
- CDC. "Prescription Opioid Data: Prescribing Practices." Last updated 2018. Available at <https://www.cdc.gov/drugoverdose/data/prescribing.html>. Accessed July 8, 2019.

Morden, Nancy E., Jeffrey C. Munson, Carrie H. Colla, Jonathan S. Skinner, Julie P.W.

Bynum, Weiping Zhou, and Ellen R. Meara. "Prescription Opioid Use Among Disabled Medicare Beneficiaries: Intensity, Trends, and Regional Variation." *Medical Care*, vol. 52, 2014, pp. 852–859.

Mytelka, Christine M., Melanie K. Kuester, Colin R. Gray, and Lucas Everheart. "How

Changing Opioid Prescribing Patterns Can Impact Risk Scores: Medicaid Expansion CDPS + Rx Analysis." Seattle, WA: Milliman, 2018.

Social Security Administration. "Annual Statistical Supplement to the Social Security

Bulletin, 2017." SSA Publication No. 13-11700. Washington, DC, March 2018.