A ccording to a 2017 survey conducted by the National Safety Council, 71% of employers in the United States reported having been affected in some way by employee use of prescription drugs, primarily through absenteeism or impaired work performance.1 The economic costs (both direct and indirect) of nonmedical opioid use are substantial to U.S. employers, not only due to lost productivity but also due to increased health care expenditures, greater costs for workers’ compensation and disability claims, and difficulty meeting recruitment or production targets in regions that experience shortages of healthy workers.

In a recent Society of Actuaries (SOA) report authored by Milliman (including the authors of this article), the total economic cost of the opioid crisis was estimated to exceed $631 billion from 2015 to 2018. Much of this cost was borne by employers, many of which offer health and disability benefits that individuals with opioid use disorder (OUD) rely on. Employers in turn rely on a healthy workforce in order to operate their businesses.

Within this estimate, lost productivity costs due to absenteeism and decreases in labor force participation resulting from nonmedical opioid use were found to total at least $79 billion from 2015 to 2018.2 Excess health care costs for commercially insured patients impacted by OUD, a large portion of which are borne by employers, totaled $67 billion over the same time frame. Substantial employer costs also were associated with disability and workers’ compensation claims, which totaled $3.4 billion from 2015 to 2018. Together, these costs add up to nearly $150 billion across four years. When considering other types of opioid crisis–related costs that are more difficult to measure, the total cost may be substantially higher. This article discusses key findings of this report as they relate to employers.

Many employers are partnering with their pharmacy benefit managers (PBMs), health plans, treatment providers and other community resources to address nonmedical opioid use and related substance use disorders.3 Strategies such as employee assistance and treatment programs, employee education and modifications to health plan benefit designs can be applied to help mitigate the effects of the opioid crisis on the U.S. workforce.

### AT A GLANCE

- The total economic cost of the opioid crisis in the United States was estimated to exceed $631 billion from 2015 to 2018.
- Employer costs include increased spending on health care, lost productivity, and increased disability and workers’ compensation claims and are estimated to total nearly $150 billion from 2015 to 2018.
- Employers aiming to improve the health of their employees or to better manage their financial risks associated with the opioid crisis should consider strategies that encompass both preventive measures as well as supportive measures to help those experiencing OUD to better manage their conditions and move toward recovery.
Lost Productivity

Productivity losses result from reductions in economically productive activity for workers with nonmedical opioid use. Some of this lost productivity takes the form of increased absenteeism for employees with OUD (directly impacting their employers). Some takes the form of reduced labor force participation when individuals with OUD are not able to maintain employment (indirectly impacting employers through a reduction in the healthy workforce). The costs associated with these productivity losses are a function of the prevalence of OUD, typical levels of economic productivity for healthy individuals and the degree to which productivity is decreased for individuals with OUD.

We used several large administrative health care claims databases to develop estimates for the prevalence of OUD across the U.S. and found that nearly 2.3 million nondisabled individuals may have experienced OUD in 2015, increasing to nearly 3.1 million individuals by 2018. Economic productivity varies by age and sex, but a majority of these individuals fell between the ages of 25 and 54, which is when individuals typically have highest economic productivity. Estimates from prior research suggest that individuals with OUD experience 17-18% reductions in economic productivity. Considering these figures together, we estimate that individuals with OUD experienced productivity losses of $16.7 billion in 2015, increasing to $21.9 billion by 2018, or about $78.6 billion across the four-year time period. Table I provides these results for each year from 2015 to 2018.

In the surveys that were used to develop key assumptions, it is likely that these estimates are slightly understated to the extent that individuals may underreport loss of productivity due to substance use. These estimates do not include presenteeism, which is defined as a reduction in productivity for employees working while not in good health. Further, prevalence of nonmedical opioid use was estimated based on diagnoses of opioid abuse, dependence or poisoning in medical claims data, and it is likely that additional costs exist for those with nonmedical opioid use that has not been identified in health care settings.

Disability and Workers’ Compensation Costs

In addition to reductions in productivity, employers also face increased costs from short- and long-term disability claims as well as increased workers’ compensation costs for employees with OUD. Short- and long-term disability insurance programs provide partial wage replacement for employees unable to work due to qualifying injuries or illnesses. In order to estimate the costs to employers associated with these benefits, we compared costs between employees with OUD and otherwise similar employees without OUD.

We leveraged large research databases containing linked health care, disability and workers’ compensation claims data for individuals with employer-sponsored insurance and estimated that nearly 700,000 employees may have experienced OUD in 2015, increasing to more than 850,000 by 2018. In 2018, employees with OUD cost on average $1,251 more in short-term disability, $135 more in long-term disability and $622 more in workers’ compensation claims compared with otherwise similar employees without OUD. Across the entire benefit-eligible population in the U.S., total costs to employers for these benefits added up to $702 million in 2015, increasing to $955 million in 2018, or a total of $3.4 billion.

### Table I

<table>
<thead>
<tr>
<th>Year</th>
<th>Individuals With OUD</th>
<th>Total Annual Productivity (Millions)</th>
<th>Productivity Lost to Nonmedical Opioid Use (Millions)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2015</td>
<td>2,267,693</td>
<td>$96,685</td>
<td>$16,719</td>
</tr>
<tr>
<td>2016</td>
<td>2,761,680</td>
<td>$111,862</td>
<td>$19,356</td>
</tr>
<tr>
<td>2017</td>
<td>2,937,889</td>
<td>$119,739</td>
<td>$20,717</td>
</tr>
<tr>
<td>2018</td>
<td>3,066,771</td>
<td>$126,297</td>
<td>$21,852</td>
</tr>
</tbody>
</table>
billion across the four-year time period. Table II provides these results for each year from 2015 through 2018.

These estimates do not reflect any additional costs incurred by employers that needed to retain other staff to fill roles or responsibilities that employees with OUD could not fulfill due to their disabilities or injuries, and thus may be understated.

**Health Care Costs**

In addition to disability and workers’ compensation costs, employers that sponsor health insurance plans also bear much of the burden of health care costs for their employees and dependents. Studies have shown that individuals with OUD have more complex health care needs than those without, as well as lower reported physical and mental qualities of life.16,11 Those with OUD incur health care costs not only from the direct treatment of OUD but also from increased use of all types of health care services (including both physical health and behavioral health services in inpatient, outpatient and professional settings). Similar to our estimates of disability and workers’ compensation costs, we estimated the additional health care costs associated with OUD by comparing health care costs between patients with OUD and otherwise similar patients without OUD.

Again, using large national research databases containing administrative health care claims data, we estimate that more than 600,000 commercially insured individuals had OUD in 2015, increasing to more than 800,000 individuals by 2018. Nationwide, individu-
als with OUD experienced an average of more than $22,000 in additional health care costs compared with otherwise similar individuals without OUD. Across the entire commercially insured population, we estimate that these excess health care costs exceeded $12.5 billion in 2015, increasing to nearly $17.9 billion by 2018, or about $63 billion across the four-year time period. Table III provides these results for each year from 2015 through 2018.

Over the time period studied, both the total number of individuals with OUD and the average cost per individual increased. A significant portion of this $63 billion burden fell on employers, in the form of increased premiums (for fully insured plans) or increased liabilities (for self-funded plans).

The impact of nonmedical opioid use also extends beyond the patient to family members of individuals with diagnosed OUD. We compared health care costs between individuals with a family member diagnosed with OUD and otherwise similar individuals without a family member with OUD. We found that more than 960,000 individuals with commercial insurance coverage may have had a family member with OUD in 2015, increasing to nearly 1.3 million individuals by 2018. These individuals experienced health care costs that were about 20% higher than those of otherwise similar individuals who did not have a family member with OUD, or about $829 in excess costs per individual in 2018. Across the U.S., we estimate that this led to an additional $727 million in health care costs in 2015, increasing to more than $1 billion by 2018, or about $3.7 billion across the four-year time period. Table IV provides these results for each year from 2015 through 2018.

The largest relative increase in costs for this population was for substance use disorder treatment services, which suggests that other nonopioid-related substance use disorders may be more common in households where a family member has OUD compared with those without.

**Employer Considerations**

Employers aiming to improve the health of their employees or to better manage their financial risks associated with the opioid crisis should consider strategies that encompass both preventive measures for those not yet experiencing complicated opioid use as well as supportive measures to help those already experiencing OUD to better manage their conditions and move to-

### Table III

**Additional Commercial Health Care Costs for Individuals With Diagnosed Opioid Use Disorder (OUD), 2015-2018**

<table>
<thead>
<tr>
<th>Year</th>
<th>Prevalence of OUD</th>
<th>Additional Costs for Individuals With OUD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Per 1,000</td>
<td>Total</td>
</tr>
<tr>
<td>2015</td>
<td>3.49</td>
<td>608,701</td>
</tr>
<tr>
<td>2016</td>
<td>4.20</td>
<td>738,350</td>
</tr>
<tr>
<td>2017</td>
<td>4.36</td>
<td>770,751</td>
</tr>
<tr>
<td>2018</td>
<td>4.52</td>
<td>805,372</td>
</tr>
</tbody>
</table>

### Table IV

**Additional Commercial Health Care Costs for Patients With a Family Member Diagnosed With Opioid Use Disorder (OUD), 2015-2018**

<table>
<thead>
<tr>
<th>Year</th>
<th>Individuals With a Family Member Diagnosed With OUD</th>
<th>Additional Costs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>Per Individual</td>
</tr>
<tr>
<td>2015</td>
<td>962,039</td>
<td>$756</td>
</tr>
<tr>
<td>2016</td>
<td>1,165,659</td>
<td>$785</td>
</tr>
<tr>
<td>2017</td>
<td>1,216,454</td>
<td>$814</td>
</tr>
<tr>
<td>2018</td>
<td>1,271,096</td>
<td>$829</td>
</tr>
</tbody>
</table>
ward recovery. While those who have already been diagnosed with OUD may be relatively easy to identify for outreach and enhanced care using health care claims data, those at increased risk for developing OUD in the future can be harder to identify.

In a 2018 Milliman study, we compared prescription opioid use patterns between individuals with diagnosed OUD versus those who filled opioid prescriptions in similar quantities, frequencies or potencies but who had not been diagnosed with OUD (referred to as long-term opioid users). In a study of a commercially insured population (predominately comprised of individuals with employer-sponsored insurance) we found that long-term opioid users outnumbered those with diagnosed OUD by factors of six to nine, depending on the chosen opioid use threshold. These findings suggest that the number of individuals already diagnosed with OUD may be the tip of an iceberg relative to the overall risks posed by high opioid use within any given population.

Table V shows our national estimates for the number of commercially insured patients who exceeded key opioid use thresholds in 2015. This table shows:

- The number of patients prescribed high quantities of opioids (at least a 360-day supply, equivalent to 12 30-day prescriptions in a year)
- Patients treated with high-potency opioids—on average of more than 200 morphine milligram equivalents (MME) per day—which is well in excess of the Centers for Disease Control and Prevention (CDC) guideline to avoid prescribing more than 90 MME per day without careful consideration
- Patients with high opioid coverage over the course of a year (over 75% of their insurance eligibility covered by an opioid prescription in 2015).

As illustrated in Table V, a significant number of individuals without diagnosed OUD consume the same elevated level of opioids as those with a diagnosed OUD. These levels of opioid use may be clinically justified in some circumstances and, in some cases, inappropriate or forced tapering can also be harmful to patients, but CDC recommends carefully assessing the evidence of individual benefits and risks when prescribing opioids. Individual decisions should be determined by patients and their care providers.

A range of screening tools and analytical approaches are available or under development to aid in the process of identifying at-risk individuals. Employers looking to understand the prevalence of opioid use issues in their populations could analyze prescription drug claims for elevated opioid levels in addition to medical claims data. Employers have been using claims analysis to target prescriptions that fall outside of CDC guidelines and identify individuals who may be at risk of developing a use disorder. In addition, many employers are partnering with their PBMs and health plans to address problematic use of prescription opioids.

Following are some strategies suggested by the National Business Group on Health.

1. Encourage use of employee assistance programs for treatment and help returning to work.
2. Educate employees about how to seek alternative pain management strategies, properly dispose of unused pills and identify signs of drug addiction.
3. Consider benefit design strategies, such as:
   a. Implementing CDC guidelines for opioid prescriptions
b. Limiting the number and potency of opioid prescrip-
tions that can be prescribed

c. Establishing prescription drug formularies that en-
courage use of nonopioid pain medication

d. Creating benefit designs that encourage employees
to use providers with opioid-reduction strategies.

It is important to note that opioid prescribing practices
are a sensitive topic, since pressures to reduce prescriptions
challenge the needs of chronic pain patients. Overprescrib-
ing opioids can lead to abuse and addiction, but limiting the
prescriptions available to chronic pain patients can leave
those patients feeling abandoned by the health care system.
In some cases, it may exacerbate a shift toward illicit opioid
use, which can be far more dangerous. Reducing the number
of opioid prescriptions may be one component of the nation-
al strategy in addressing the opioid epidemic, but access to
comprehensive treatment options for both chronic pain and
substance use disorders will be critical to ensure that patient
needs are not left out of the discussion.

Conclusion

The opioid crisis in the U.S. has exacted a considerable
human toll as it has developed in recent years, and those
impacts are accompanied by significant economic costs. A
considerable portion of the economic burden is borne by
employers, many of which support their employees and de-
pendents with health and disability benefits and, in turn, de-
pend on a healthy workforce in order to maintain and grow
their business operations.

In our 2019 report for SOA, we estimate that the opioid
crisis cost $150 billion in lost productivity and excess health
and disability costs for those with employer-sponsored
benefits from 2015 through 2018. These estimates under-
state the true cost to employers, since they do not include
a number of other significant costs that are harder to mea-
sure, including presenteeism, difficulty hiring and retaining
a sufficient workforce, or lost economic opportunities
for businesses unable to meet demand for their services.
Employers that work to better support their employees and
dependents with OUD may have an opportunity to better
manage their financial risks while improving the health of
their populations.

Endnotes

   from www.nsc.org/Portals/0/Documents/NewsDocuments/2017/National
2. S. Davenport, A. Weaver and M. Caverly (October 2019). Economic
   Impact of Non-Medical Opioid Use in the United States. Society of Actuaries.
   -infographic.pdf.
4. These figures exclude Medicare disability beneficiaries, who are
generally precluded from typical employment opportunities due to their
health status and Medicare eligibility requirements, as well as those under
15 years old.
5. S. D. Grosse, K. V. Krueger, and M. Mvundura (July 2009). “Eco-
nomic productivity by age and sex: 2007 estimates for the United States.”
behavioral and mental health


6. Due to the intertwined nature of nonmedical opioid use and socioeconomic disadvantages, we have not attempted to adjust the economic productivity values for socioeconomic differences between those with and without OUD.


8. This Includes ICD-9-CM codes beginning with 304.0, 304.7, 305.5, and 965.0 and ICD-10-CM codes beginning with F11, T40.0, T40.1, T40.2, and T40.3. The diagnosis codes used to identify opioid use disorder (OUD) include a range of severities, including some cases of uncomplicated use and some in remission. In addition, opioid poisoning doesn’t always happen within the context of an OUD.

9. Individuals with OUD were matched compared against individuals without OUD who were of the same age and sex, who lived in the same state, who had the same type of insurance coverage and who had similar health risk scores in a baseline time period.


