



## UNMC COLLEGE OF PUBLIC HEALTH CENTER FOR HEALTH POLICY

# Economic Implications of Tobacco Use for the State of Nebraska Government

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### SUMMARY

- We examine smoking-related expenditures for the state Medicaid program and for lost productivity among state government employees
- The predicted number of new diagnoses of smoking-related illnesses among government employees ranged from 109 cases of kidney disease to 856 cases of arthritis and related diseases
- We estimate over 6,000 lost workdays due to sick leave among currently smoking vs. non-smoking employees
- Smoking-related illness is estimated to increase state budgetary expenditures on Medicaid by approximately \$114.9 million annually

### BACKGROUND

Although tobacco use has been extensively studied for certain populations, little is known concerning its implications for the state Medicaid program and productivity of State of Nebraska government employees. Tobacco use is likely to have significant

budgetary impact on the State of Nebraska due to its established association with poor health outcomes, but the magnitude of this impact has been uncertain. To address this knowledge gap, Legislative Resolution



(LR) 386 highlighted the need for research on tobacco use. Specifically, LR386 established the following aims:

(1) To identify an exhaustive list of expenditures by the state as a result of the use of tobacco products;

(2) To put special emphasis on Medicaid expenditures as a result of the use of tobacco products; and

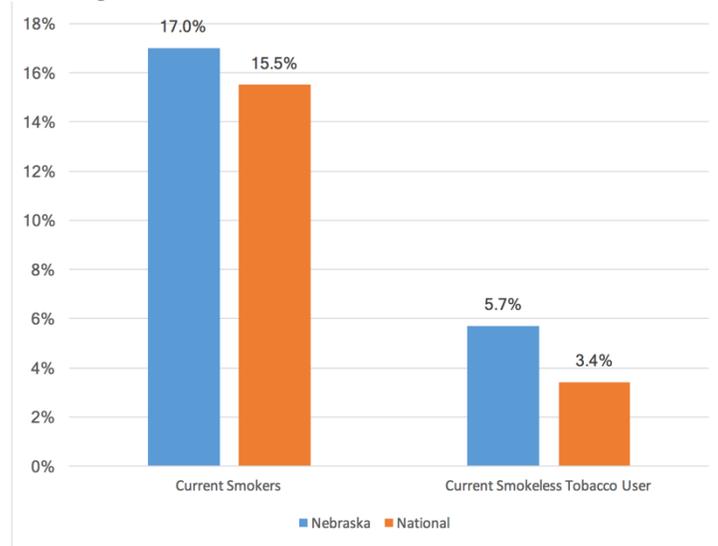
(3) To examine the impact of productivity of the state employee workforce as a result of the use of tobacco products.

Using data on tobacco use in Nebraska, this study estimated the healthcare impact on state government employees and the state Medicaid program. In addition, we estimated the economic impact of smoking on lost workdays associated with smoking among state employees.

## EPIDEMIOLOGY OF TOBACCO USE

Nearly one in five (17%) of Nebraskan adults currently smoke cigarettes, and another 5.7% use smokeless tobacco (e.g., chewing tobacco, snuff or dip).<sup>1</sup> Although rates of cigarette smoking in Nebraska have

**Figure 1. Prevalence of Current Cigarette Smokers in Nebraska and Nationally for Adults Aged 18 or Over, 2016**



declined in recent years,<sup>2</sup> these rates remain higher than the national average for adults (see Figure 1<sup>3</sup>). Previous studies have established the association of tobacco use with cancer and cardiovascular disease.<sup>4</sup> This includes lung, laryngeal, esophageal and other cancer diagnoses, in addition to atherosclerosis, coronary heart disease, stroke, peripheral arterial disease and abdominal aortic aneurysm.<sup>5</sup> For example, over 80% of lung cancer cases are attributable to cigarette smoking.<sup>6</sup>

<sup>1</sup> Authors' analysis of the Behavioral Risk Factor Surveillance System (BRFSS).

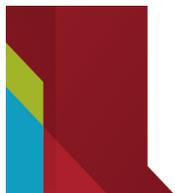
<sup>2</sup> The percent of Nebraskan adults who currently smoke was 20.0% in 2012. Source: United Health Foundation. America's Health Rankings. Smoking in Nebraska in 2017. Available at: <https://www.americashealthrankings.org/explore/annual/measure/Smoking/state/NE>

<sup>3</sup> Authors' analysis of BRFSS; Centers for Disease Control and Prevention (CDC). Current Cigarette Smoking Among Adults — United States, 2016. Morbidity and Mortality Weekly Report (MMWR). 2018;67(2):53-59; and CDC. Smokeless Tobacco Use in the United States. Available at: [https://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/smokeless/use\\_us/index.htm](https://www.cdc.gov/tobacco/data_statistics/fact_sheets/smokeless/use_us/index.htm)

<sup>4</sup> National Cancer Institute. Tobacco. Available at: <https://www.cancer.gov/about-cancer/causes-prevention/risk/tobacco>

<sup>5</sup> Siegel RL, Jacobs EJ, Newton CC. Deaths due to cigarette smoking for 12 smoking-related cancers in the United States. JAMA Intern Med. 2015;175(9):1574-1576; Islami F, Goding Sauer A, Miller KD, et al. Proportion and number of cancer cases and deaths attributable to potentially modifiable risk factors in the United States. CA Cancer J Clin. 2018;68: 31-54; and CDC. Smoking and Cardiovascular Disease. Available at: [https://www.cdc.gov/tobacco/data\\_statistics/sgr/50th-anniversary/pdfs/fs\\_smoking\\_CVD\\_508.pdf](https://www.cdc.gov/tobacco/data_statistics/sgr/50th-anniversary/pdfs/fs_smoking_CVD_508.pdf)

<sup>6</sup> Islami, et al(2018).



**Table 1. Distribution of Diagnosis of Illness in Percent Stratified by Smoking Status**

Health Condition	Nonsmoker	Current Smoker	Difference
Asthma	11.6%	32.6%	21.0%
COPD, Emphysema, Chronic Bronchitis	2.2%	23.2%	21.0%
Cancer Other than Skin Cancer	5.9%	12.2%	6.3%
Diabetes	7.2%	14.0%	6.8%
Arthritis, Rheumatoid Arthritis, Gout, Lupus, or Fibromyalgia	19.8%	52.1%	32.3%
Myocardial Infarction	2.5%	9.2%	6.7%
Stroke	1.7%	6.5%	4.8%
Kidney Disease	2.5%	6.6%	4.1%

Table 1<sup>7</sup> provides data on the percentage of individuals who are diagnosed with illness by smoking status. For example, although 11.6% of nonsmokers have asthma, one-third of current smokers (32.6%) have been diagnosed with asthma. Over half of current smokers have diagnoses of arthritis, gout, lupus or fibromyalgia (Table 1). For nonsmokers, this percentage is 19.8%.

Utilizing the above data, we can estimate the smoking-related disease burden among state government employees. There are approximately 15,600 full-time employees, excluding University of Nebraska (NU) and State College staff.<sup>8</sup> (NU and State College staff were excluded from all analyses.) Survey data on tobacco use among state employees are not available. However, assuming rates of smoking comparable to the state population, we expect significantly more cases of the diseases listed in Table 1. The predicted

number of excess diagnoses resulting from smoking ranges from 108.7 cases of kidney disease to 856.4 cases of arthritis and related diseases among state employees (Table 2).

## HEALTHCARE EXPENDITURES

Tobacco-related illness results in more than \$300 billion in medical care and productivity costs each year in the United States (US).<sup>9</sup> Over 10% of inpatient and prescription drug expenditures are attributable to cigarette smoking.<sup>10</sup> For Nebraska, smoking-related healthcare expenditures total an estimated \$946.3 million annually (inflation adjusted to

**Table 2. Predicted Increase in Number of Cases of Illness Among State Employees who are Current Smokers**

Health Condition	Increase
Asthma	556.8
COPD, Emphysema, Chronic Bronchitis	556.8
Cancer Other than Skin Cancer	167.0
Diabetes	180.3
Arthritis, Rheumatoid Arthritis, Gout, Lupus, or Fibromyalgia	856.4
Myocardial Infarction	177.6
Stroke	127.3
Kidney Disease	108.7

2018 dollars).<sup>11</sup> These expenditures include \$536 million in hospital-related expenses, \$163.5 million in prescription drug expenses

<sup>7</sup> Nebraska Department of Health and Human Services. Data and Trends on Tobacco Use in Nebraska 2017. Understanding the Burden of Tobacco. Available at:

<http://dhhs.ne.gov/Reports/Data%20and%20Trends%20on%20Tobacco%20Use%20in%20Nebraska%20-%202017.pdf>

<sup>8</sup> State of Nebraska Administrative Services State Personnel Division. Personnel Almanac. June 2018. Available at: <http://das.nebraska.gov/personnel/classncomp/docs/2018-almanac.pdf>

<sup>9</sup> Centers for Disease Control and Prevention (CDC). Smoking & tobacco use. Economic trends in tobacco.

Available at:

[https://www.cdc.gov/tobacco/data\\_statistics/fact\\_sheets/economics/econ\\_facts/index.htm](https://www.cdc.gov/tobacco/data_statistics/fact_sheets/economics/econ_facts/index.htm)

<sup>10</sup> Xu X, Bishop EE, Kennedy SM, Simpson SA, Pechacek TF. Annual healthcare spending attributable to cigarette smoking: an update. *Am J Prev Med.* 2015;48(3):326-333.

<sup>11</sup> Centers for Disease Control and Prevention. State tobacco activities tracking and evaluation (STATE) system. State highlights. Nebraska. Available at: <https://www.cdc.gov/statesystem/statehighlights.html>



and \$117.3 million in ambulatory healthcare expenses.

### IMPACT ON MEDICAID EXPENDITURES

Medicaid beneficiaries account for a substantial proportion of healthcare expenditures in the state. Among all Medicaid programs, 15.2% of expenditures are associated with smoking.<sup>12</sup> Using data on adult medical expenditures by the State of Nebraska Medicaid program,<sup>13</sup> we estimate that smoking-related

Medicaid expenditures are approximately \$242.2 million annually, inflation adjusted to 2018 dollars. Using the Federal Medical Assistance Percentage (FMAP) for Nebraska,<sup>14</sup> the state share of these expenditures is \$114.9 million annually. Unfortunately, an itemization of Medicaid expenditures for each smoking-related diagnosis is not available.

### IMPACT ON PRODUCTIVITY

Prior studies suggest that there are significantly more hours lost to absenteeism for smokers than non-smokers.<sup>15</sup> Absenteeism includes workdays lost due to illness. Bunn and colleagues<sup>16</sup> report an average of 53.6 annual lost workhours among current smokers versus 35.2 hours for nonsmokers—a difference of 52% (Table

3). Among all state government employees, we estimate a total of 48,787.4 lost workhours (6,098.4 lost workdays) from absenteeism (Table 4). Using data on total sick leave expenditures (adjusted to 2018 dollars),<sup>17</sup> absenteeism for smokers vs. nonsmokers is estimated to result in an

**Table 3. Average annual number of hours lost due to absenteeism stratified by smoking status**

Category	Non-Smoker	Current Smoker	Difference	
			Hours	Percent
Hours lost to absenteeism	35.2	53.6	18.4	52.3

**Table 4. Predicted total annual losses from absenteeism among State of Nebraska full-time employees who smoke relative to nonsmokers**

Measure	Number of Hours Lost (Days Lost)	Dollar Cost*	Percent of Sick Leave Expenditures
Time lost to absenteeism	48,787.4 (6,098.4)	\$1,332,327	3.8

economic loss of \$1.3 million (Table 4). This constitutes 3.8% of total sick leave expenditures (totaling \$34.9 million) for the state government.

### CONCLUSIONS

We evaluated smoking-related costs associated with Medicaid expenditures and productivity losses for the state government of Nebraska. Productivity losses included estimates of workdays lost to absenteeism among employees who smoke relative to non-smokers. We estimate over 48 thousand lost workhours annually for currently smoking versus nonsmoking state government employees. The economic impact of this lost productivity is estimated to be \$1.3 million per year. However, the impact of lost productivity is substantially

<sup>12</sup> Xu X, et al(2015).

<sup>13</sup> Division of Medicaid & Long-Term Care. Nebraska Medicaid Reform Annual Report for State Fiscal Year 2016-2017. December 1, 2017. Available at: <http://dhhs.ne.gov/Reports/Medicaid%20Annual%20Report-2017.pdf>

<sup>14</sup> Ibid.

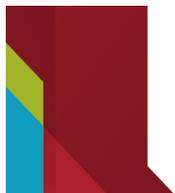
<sup>15</sup> Baker CL, Flores NM, et al. Benefits of quitting smoking on work productivity and activity impairment in the United

States, the European Union and China. Int J Clin Pract. 2017;71(1):e12900.

<sup>16</sup> Bunn WB, Stave GM, Downs KE, Alvir JM, Dirani R. Effect of Smoking Status on Productivity Loss. J Occup Environ Med.2006;48(10):1099-1108.

<sup>17</sup> State of Nebraska. Personnel Almanac. June 2018. Available at:

<http://govdocs.nebraska.gov/epubs/P2000/B004-2018.pdf>



smaller than state budgetary expenditures associated with treatment of smoking-related disease among Medicaid beneficiaries. Based on prior literature, these expenditures are estimated to be \$114.9 million annually.

In total, the combined smoking-related cost to the State of Nebraska government is an estimated \$116.3 million per year. Although beyond the scope of this study, our results help provide insight into the possible cost-benefit from the state government's perspective in implementing proven measures to decrease tobacco use like raising the tobacco excise tax to increase investment in evidence-based tobacco prevention and cessation interventions, increasing the minimum legal age to purchase tobacco, or utilizing other policy mechanisms.

The results of this report should be interpreted in the context of certain limitations. First, there are limited Nebraska-specific data on healthcare utilization and expenditures related to tobacco use or on tobacco use among state government employees. For example, due to data limitations, we do not estimate excess healthcare costs—and, consequently, state budgetary impact—of government employee smokers to the state government. Similarly, data on smokeless tobacco use for Medicaid beneficiaries or state government employees in Nebraska are unavailable. Smokeless tobacco has been associated with significantly increased risk of oral cancer.<sup>18</sup> Further, data are not available on the adverse health effects of exposure to second-hand smoke within employee households or on children

covered in the Medicaid program. Risk of fire associated with smoking may also have significant economic impact on both state and local government. Thus, our findings are conservative estimates on the overall economic impact of tobacco use.

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## FUNDING INFORMATION

Not applicable

## SUGGESTED CITATION

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<sup>18</sup> Boffetta P, Hecht S, Gray N, Gupta P, Straif K. Smokeless tobacco and cancer. *Lancet Oncol.* 2008;9:667–675. doi: 10.1016/S1470-2045(08)70173-6.



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**CONFLICT OF INTERESTS**

None

**DISCLAIMER**

The views expressed herein are those of the authors and do not necessarily reflect the views of collaborating organizations or funders, or of the Regents of the University of Nebraska.

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