

# Statistical and Technical Notes for State and County Tobacco Profiles

## Statistical Notes

The following are statistical notes for calculations in the state and county tobacco profiles sheets.

### Number of events (numerator)

The number of events (numerator) is the estimated count of people or events (such as a hospitalization) among a specific group of people or for a specific health related setting (such as hospitalizations). The number of health events can be focused on specific populations such as a defined age range, geographic region, particular sex, or race or ethnic group.

### Population at risk (denominator)

The population at risk (denominator) is the total count of people that are at risk for a disease or other condition (such as diabetes) or the total count of events of interest (such as hospitalizations). For example, when calculating the rate of people at risk for female breast cancer in Minnesota, the total number of Minnesota women is the denominator.

## Data sets

### Surveys

A survey data set contains information gathered from asking questions of respondents. Two key surveys in Minnesota are the Minnesota Adult Tobacco Survey (MATS) and the Minnesota Student Survey (MSS). MATS is a telephone survey of randomly selected sample of adults, and MSS is administered to all 5<sup>th</sup>, 8<sup>th</sup>, 9<sup>th</sup> and 11<sup>th</sup> grade students in their schools.

When surveys are administered to a sample (versus the total population), each response is weighted to represent the entire Minnesota population. Certain types of people are more likely to take surveys, so their responses contribute less to final calculations. Conversely, certain types of people are less likely to take surveys, so their responses contribute more toward final calculations.

#### **Minnesota Adult Tobacco Survey (MATS)**

MATS is a comprehensive surveillance initiative designed to monitor progress toward meeting the goals of reducing tobacco use among Minnesotans. The major objective of MATS is to collect in-depth, public health surveillance data on the adult population of Minnesota, focusing on tobacco use and cigarettes in particular. MATS is the most comprehensive source of information about smoking prevalence, behaviors, attitudes and beliefs in the adult Minnesota population; further, MATS provides valid scientific data tracking the impact of comprehensive tobacco control efforts in Minnesota. MATS 2014 is the fifth survey in this ongoing surveillance initiative. MATS 2014 was a telephone survey of more than 9,000 adult Minnesotans, conducted between February and July 2014.

**Learn more about the Minnesota Adult Tobacco Survey at [www.mnadulttobaccosurvey.org](http://www.mnadulttobaccosurvey.org).**

### Minnesota Student Survey (MSS)

MSS is conducted every three years among three populations of students in Minnesota public schools:

- students in regular public schools, including charter schools and tribal schools
- students in alternative schools and Area Learning Centers
- students in juvenile correctional facilities

The survey asks questions about activities, experiences and behaviors. Topics covered include tobacco, alcohol and drug use, school climate, physical activity, violence and safety, connections with school and family, health, and other topics. Questions about sexual activity are asked only of high school students. The survey is administered jointly by the Minnesota Departments of Education, Health, Human Services and Public Safety.

**Learn more about the Minnesota Student Survey at [www.health.state.mn.us/divs/chs/mss](http://www.health.state.mn.us/divs/chs/mss).**

## Full count

Examples of full count data sets include birth and death certificates. These data sets include all observations in the population (theoretically every birth and every death), so the results do not require weighting like survey data. However, when counts are small, results can be suppressed due to concerns of confidentiality or reliability.

## Rates (age-adjusted and unadjusted)

A rate is usually the numerator divided by the denominator. Sometimes a rate is stated as a percentage (multiplied by 100) or it can be stated by some other multiplier. For example, one can express the stroke rate as 40 Minnesotans died from a stroke per 100,000 people. This would be calculated by taking the rate and multiplying by 100,000. There are two main types of rates, age-adjusted and unadjusted. The unadjusted rate is sometimes called the crude rate. Both rates have advantages and disadvantages.

Age-adjusted: Because health conditions are often related to age, the most common method for adjustment is age-adjustment. Age-adjusted rates remove the differences in the age composition of two or more populations so that health events in the two populations can be compared. For example, 12.2% of Hennepin county residents are 65 years of age or older, whereas in Aitkin county, 29.2% are 65 years of age or older. Because of these age differences you would want to adjust your rate to equalize the age to compare measures of interest in Aitkin and Hennepin counties. It is currently customary to use the United States 2000 census age characteristics for adjustment. This is often called the 2000 Standard Population. However, age-adjusted rates do not describe the actual burden of a disease because the rate has been adjusted.

Unadjusted (crude): Unadjusted rates describe the actual burden of a disease on a population. However, because health events are affected by many factors, you cannot compare rates to each other unless they are age adjusted.

## Number of people affected

The estimated number of people with a disease, risk factor, screening, or other measure of interest (in this case cigarette smoking). The number of people is estimated by taking the unadjusted rate of the measure of interest (i.e., cigarette smoking) and multiplying by the total population under investigation (i.e., adult population for the county). For example, the number of adults who smoke cigarettes in

## STATISTICAL AND TECHNICAL NOTES FOR STATE AND COUNTY TOBACCO PROFILES

Wabasha County in 2014 was estimated to be 2,527. This number was calculated by taking the rate (.152 or 15.2%) from 2014, multiplying by the total number of people in Wabasha who were age 18 or older in 2010 (16,623), and rounding to the nearest hundred. Population numbers are from the 2010 Census.

### Reliability

Rates based on a small population or number of events can fluctuate widely between different populations or from year to year for reasons other than a true difference in the underlying number of events. Therefore, rates are sometimes noted with “may be statistically unreliable and should be interpreted with caution” or are suppressed because the estimate is statistically unreliable to report.

### Technical Notes

The following are technical notes for calculations in the state and county tobacco profiles, organized by profile sections.

### Population estimates

**Data source:** US Census Population Estimates, 2015

**Methods:** The report includes state and county-level population estimates for those age 18 and older, which we term “Adults.” For the counties of Anoka, Carver, Dakota, Hennepin, Ramsey, Scott and Washington adults were defined at 25 years and older.

### Tobacco’s toll in one year

#### Number of Adult smokers

**Data source:** U.S. Census Population Estimates, 2015; Statewide Health Improvement Partnership (SHIP) county surveys, 2013-2016, Minnesota Adult Tobacco Survey, 2014<sup>i</sup>

**Methods:** Current smoking adults were those 18 and older who responded “yes” to having smoked 100 cigarettes in their lifetime and reported now smoking cigarettes “some days” or “every day.” The statewide number of smoking adults was calculated by multiplying the proportion of smoking adults in Minnesota from the Minnesota Adult Tobacco Survey 2014 times the population of Minnesota. The county-level number of smoking adults was calculated by multiplying the proportion of smoking adults in each county times the county population. For the 7-county metro region, insufficient data were obtained from young adults age 18-24 so estimates are based off of the 25+ adult population.

The SHIP county surveys were conducted to represent the population at the county level. To do this, an address-based sample representative of the county population was purchased from a national sampling vendor. The sampling vendor then obtains the list of addresses from the U.S. Postal Service. The address-based sampling method is used to assure that all households in a county have an equal chance of being sampled for the study regardless of their cell phone or landline phone status. To assure that every adult in the household surveyed has an equal chance of being selected, the person in the household who had the most recent birthday is asked to complete the survey.

## STATISTICAL AND TECHNICAL NOTES FOR STATE AND COUNTY TOBACCO PROFILES

The completed surveys are then processed and results are adjusted to make the survey sample representative of the county surveyed.

### Tobacco-related deaths

**Data source:** Minnesota Death Certificate Statistical File, 2012-2015

**Methods:** The total number of tobacco-related deaths for the state of Minnesota was taken from the BlueCross BlueShield Minnesota Cost of Smoking report.<sup>ii</sup> This report followed the methodologies recommended by the Centers for Disease Control and Prevention (CDC) in their Smoking-Attributable Mortality, Morbidity and Economic Costs (SAMMEC) model, summarized in Chapter 12 of the Surgeon General's report on the health consequences of smoking. In 2014, smoking-attributable mortality in the adult and infant population in Minnesota was estimated for each disease identified by the CDC as having evidence of adverse effects associated with cigarette smoking. Mortality data for each of these conditions for 2014 was obtained from the CDC website.<sup>iii</sup> Smoking-attributable mortality for each condition was calculated by multiplying the number of deaths by a condition-specific smoking-attributable fraction (SAF) estimate.<sup>iv</sup>

Tobacco-linked deaths are indicated on Minnesota death certificates. These data were used to calculate tobacco-related deaths for each Minnesota county. Multiple years (2012-2015) of death certificate data were combined to provide a sufficient number of deaths to reliably report at the county level. The proportion of tobacco-related deaths was calculated as a four-year average to produce more reliable results. The proportion was calculated by dividing the number of tobacco-related deaths (as indicated on the death certificate) by the total number of deaths in the county.

### Excess medical costs

**Data source:** BlueCross BlueShield of Minnesota Cost of Smoking report, 2017;<sup>ii</sup> Minnesota Death Certificate Statistical File, 2012-2015

**Methods:** The dollars spent on excess medical expenditures due to tobacco were calculated using the statewide figure for the Cost of Smoking in Minnesota and the proportion of tobacco-related deaths, by county. County-level estimates were calculated by multiplying statewide costs by the county's proportion of all tobacco-related deaths in Minnesota from 2012-2015. Smoking-attributable expenditures are expressed in 2014 dollars.

### Tax burden per household

**Data sources:** Campaign for Tobacco-free Kids<sup>v</sup>

**Methods:** State tax burden equals state residents' federal & state tax payments necessary to cover all state government tobacco-caused costs plus the residents' pro-rated share, based on state populations, of all federal tobacco-caused costs. This estimate was calculated at the state level, and thus, county estimates match the statewide figure. See Xu, X et al., "Annual Healthcare Spending Attributable to Cigarette Smoking: An Update," *Am J Prev Med*, 2014, with other state government tobacco costs taken to be 3% of all state smoking-caused health costs, as in CDC, "Medical Care Expenditures Attributable to Smoking—United States, 1993," *MMWR* 43(26):1-4, July 8, 1994. Cost data are based on 2009 dollars.

### Tobacco retail assessments

**Data sources:** County-level assessments of tobacco retailers

## STATISTICAL AND TECHNICAL NOTES FOR STATE AND COUNTY TOBACCO PROFILES

**Methods:** Each of the local public health departments in Minnesota who are working on Point-of-Sale through SHIP conducted assessments of tobacco retailers in their communities in 2016. Data were collected on tobacco product availability, price, and placement, and the presence of advertising and price promotions. Retail assessments in the state of Minnesota were driven by availability of local resources (e.g., staff, time) for this work and as such the process for assessments was not completely uniform from county to county. There were variations in assessors (e.g., local SHIP staff vs. hired student workers) and assessor training. The data collection instrument used was a precursor to the Standardized Assessment for Retail Settings (STARS) survey, which was developed by a workgroup of national content matter experts and represents an effort to standardize and streamline tobacco-focused retail data collection. The Minnesota tool combined national standard items with MN state regulations and Tobacco Prevention and Control priorities. The STARS instrument is also supplemented with a PowerPoint presentation to use for training assessors and a field guide that includes color photos of each item captured on the survey. Store assessment data were collected and summarized from 1,019 tobacco retail outlets across Minnesota in 2016; note there are approximately 5,028 tobacco retailers in the state as of this writing.

### Tobacco industry spending

**Data source:** U.S. Federal Trade Commission (FTC), Federal Trade Commission (FTC). Cigarette Report for 2015, 2017, See also, FTC, Smokeless Tobacco Report for 2015, 2017

**Methods:** State total is a prorated estimate based on cigarette pack sales in the state. For tobacco marketing influence on youth, see Pollay, R., et al., "The Last Straw? Cigarette Advertising and Realized Market Shares Among Youths and Adults," *Journal of Marketing* 60(2):1-16, April 1996; Evans, N., et al., "Influence of Tobacco Marketing and Exposure to Smokers on Adolescent Susceptibility to Smoking," *Journal of the National Cancer Institute* 87(20): 1538-45, October 1995; Pierce, J.P., et al., "Tobacco Industry Promotion of Cigarettes and Adolescent Smoking," *Journal of the American Medical Association (JAMA)* 279(7): 511-505, February 1998 [with erratum in *JAMA* 280(5): 422, August 1998].

## Additional data

### Youth tobacco use

**Data source:** Minnesota Student Survey<sup>vi</sup>

**Methods:** The proportions of 9<sup>th</sup> and 11<sup>th</sup> graders who used cigarettes or e-cigarettes were calculated by dividing the number that reported using the product by the number that reported use or non-use of the product in the past 30 days. The proportion of 9<sup>th</sup> and 11<sup>th</sup> graders that used any tobacco was calculated by dividing the number that reported using cigarettes, cigars, chewing tobacco, hookah, or e-cigarettes by the number that reported use or non-use of one or more of these five tobacco products in the past 30 days. Students were considered users if they reported use on one or more days in the past 30 days.

### Disparities in tobacco use

**Data source:** Minnesota Student Survey

**Methods:** See "Youth tobacco use" section.

## Cigarette smoking during pregnancy

**Data source:** Minnesota Birth Certificate Statistical File, 2012-2015; CDC National Center for Health Statistics, Natality public-use data, 2012-2015<sup>vii</sup>

**Methods:** The prevalence of cigarette smoking among birth mothers in Minnesota was calculated using aggregated data from Minnesota resident births over the time periods 2012-2015. The prevalence of cigarette smoking among birth mothers in the United States was calculated over the same time period using data from the CDC National Center for Health Statistics (NCHS), Division of Vital Statistics, Natality public-use data 2012-2015, on CDC WONDER Online Database, February 2017.

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<sup>i</sup> <http://www.mnadulttobaccosurvey.org/>

<sup>ii</sup> <http://www.centerforpreventionmn.com/newsroom/press-releases/2017-cost-of-smoking-report>

<sup>iii</sup> US Department of Health and Human Services, Centers for Disease Control and Prevention (2016). Multiple cause of death 1999 – 2014. Retrieved from <https://wonder.cdc.gov/wonder/help/mcd.html>

<sup>iv</sup> US Department of Health and Human Services (2014). Chapter 12: Smoking-attributable morbidity, mortality, and economic costs. In *The health consequences of smoking—50 years of progress: a report of the Surgeon General*. Atlanta, GA: US Department of Health and Human Services, Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion, Office on Smoking and Health. Retrieved from <https://www.surgeongeneral.gov/library/reports/50-years-of-progress/>

<sup>v</sup> <https://www.tobaccofreekids.org/problem/toll-us/minnesota>

<sup>vi</sup> <http://www.health.state.mn.us/divs/chs/mss/>

<sup>vii</sup> <https://wonder.cdc.gov/natality-current.html>