Oregon Tobacco Facts 2013
Data Sources and Statistical Methods

Data Sources

Survey Data

Behavioral Risk Factor Surveillance System (BRFSS)
The Behavioral Risk Factor Surveillance System (BRFSS) is an ongoing random-digit dialed telephone survey of adults 18 years or older concerning health-related behaviors. The BRFSS was developed by the Centers for Disease Control and Prevention (CDC) and is conducted in all states in the U.S. Each year, between 5,000 and 15,000 adult Oregonians are interviewed. The BRFSS includes questions on health behavior risk factors such as diet, weight control, tobacco and alcohol use, physical activity, preventive health screenings, and use of health care services. The data are weighted to represent all adults aged 18 years and older. A core set of questions is asked annually and other topics are surveyed on a rotating basis.

Every few years, Oregon conducts additional BRFSS surveys among races which have few respondents in the annual surveys. These races include African Americans, American Indians and Alaska Natives, and Asian and Pacific Islanders. The results of these surveys are combined with statewide BRFSS data to provide more reliable estimates for chronic diseases and related risk factors among these groups of Oregonians. The most recent race and ethnicity oversamples were conducted in 2010-2011.The additional surveys were done to ensure that there would be a minimum of 250 surveys for each racial and ethnic group. Data for each racial and ethnic group were weighted to represent the group's population by age and sex. Percentages presented have been age-adjusted to account for potential differences in age distributions between racial and ethnic groups.

Every two years, BRFSS surveys from four consecutive years are aggregated to produce more reliable county-level prevalence estimates. County-level estimates in Oregon Tobacco Facts 2013 are prepared from a combined 2008-2011 dataset.

Starting in 2010, Oregon began collecting data from those who use cell phones. Oregon also changed the method for adjusting (weighting) the data to the demographics of the state. The new method is called "raking weighting"; the older method is referred to as "classic weighting." The national BRFSS also made these changes, but did not implement the changes until 2011.

Due to these data collection and weighting changes, Oregon results from 2010 should not be compared to results from (approximately) 2001 to 2009. For the year 2000 and before, cell phones were not common. Therefore, results up until 2000 can cautiously be compared with results from 2010 and later.

Youth Risk Behavior Survey (YRBS)

The Youth Risk Behavior Survey (YRBS) was developed by the CDC and was administered in a sample of Oregon schools every other year from 1991 to 2000. The final data were weighted to more accurately represent the Oregon high school population. The questionnaire assessed behavioral risks among Oregon high school students (grades 9 through 12) in the areas of vehicle safety, weapon carrying and violence, tobacco use, alcohol use, other drug use, sexual activity and pregnancy, HIV knowledge and attitudes, eating behaviors, nutrition, physical activity, and access to health care including use of school-based health centers. A sample of middle school students (grades 6 through 8) was added in 1997.

Oregon Public School Drug Use Survey (Student Drug Use Survey)

The Oregon Public School Drug Use Survey (SDUS) was administered every other year from 1986-2000 by the Addictions and Mental Health Division (AMHD) of the Oregon Department of Human Services through the Oregon public school system. It was patterned after ongoing national surveys of the National Institute on Drug Abuse and included eighth and eleventh graders since 1986; a sixth grade sample was added in 1994. Schools were randomly sampled using a cluster sample design and in 2000 included over 15,000 students. The questionnaire assessed community characteristics, tobacco use, drug use, alcohol use, drug and alcohol use in student's peer and family network, alcohol and drug refusal skills, susceptibility to future alcohol and drug use, and attitudes toward school and family.

Oregon Healthy Teens (OHT) Survey

Beginning in 2001, the Youth Risk Behavior Survey and the Student Drug Use Survey were combined for Oregon into a single annual survey called Oregon Healthy Teens (OHT). This survey was administered annually from 2001 to 2009, and is administered in odd-numbered years starting in 2010. The OHT Survey is administered to nearly one-half of Oregon's 8th and 11th graders. A random sampling process is used to select districts within counties and then select schools within districts for participation. Data are weighted to more accurately represent Oregon 8th and 11th graders.

Student Wellness Survey (SWS)

The Student Wellness Survey (SWS) was introduced in 2010 to assess school climate, positive youth development, and the behavioral health of Oregon youth. The survey is administered to 6th, 8th, and 11th grade students in even-numbered years by Addiction and Mental Health (AMH) Services. Although AMH would like to obtain data from all students, not all schools participate. Therefore, data are weighted to more accurately represent Oregon 6th, 8th and 11th graders.

Comparing the various youth surveys

The four surveys have some differences among them, including sample population and statistical processing. Nevertheless, their results can be compared with caution.

Oregon Pregnancy Risk Assessment Monitoring System (PRAMS) and the Pregnancy Risk Assessment Monitoring System two-year-old survey (PRAMS-2)

Oregon Pregnancy Risk Assessment Monitoring System (PRAMS) is a project of the Maternal and Child Health Section of the Oregon Health Authority with support from the national Centers for Disease Control and Prevention (CDC). PRAMS is an ongoing, population-based risk factor surveillance system designed to identify and monitor select maternal experiences prior to, during, and immediately after pregnancy. Surveys are mailed to a sample of Oregon women who gave birth to a live infant, shortly after the birth. The sample data are analyzed such that findings can be applied to all Oregon women who have recently had a baby.

In September 2005, Oregon implemented a PRAMS follow-up survey for two-year olds (PRAMS-2). PRAMS-2 makes possible longitudinal analysis, giving greater insight into the relationships between health outcomes for young children and

their mothers' earlier experiences. The survey includes questions in a variety of topic areas including tobacco use, health insurance status, chronic diseases, oral health, breastfeeding, domestic violence, family planning, child nutrition and immunization.

PRAMS-2 results are not displayed in Oregon Tobacco Facts 2013.

Oregon Health Plan (OHP) Adult Medicaid Consumer Assessment of Healthcare Providers & Systems (CAHPS®) Survey

The Oregon Department of Human Services (DHS) Division of Medical Assistance Programs (DMAP) administers satisfaction surveys to Oregon Health Plan (OHP) members, which is Oregon's Medicaid program. The standardized survey instrument used is the Consumer Assessment of Healthcare Providers and Systems (CAHPS) survey was developed by the U.S. Department of Health and Human Services' Agency for Healthcare Research and Quality, RAND Corporation and Harvard University. The survey collects data on consumer experiences related to health care services and informs quality improvement initiatives. Conducted in alternating years since 2000, CAHPS is a multi-method survey. The first phase consists of a mailed survey (up to five mailings) to be completed and mailed back by the member. The second phase of the survey is a Computer Assisted Telephone Interview (CATI) survey of members who have not mailed in their survey or have mailed in an incomplete survey (up to nine telephone contacts). Surveys are available in both English and Spanish languages.

Vital Records Data (Full count data)

Birth Certificate Statistical File

Data from the Birth Certificate Statistical File are coded from birth certificates collected by the State Registrar and represent all births occurring in Oregon and all births occurring out-of-state to Oregon residents. This database includes parental demographic information, conditions of the newborn, congenital anomalies, medical factors of pregnancy, method of delivery, complications of labor and delivery, tobacco, alcohol, or illicit drug use during pregnancy, antenatal and intrapartum procedures, and payor source. The birth data analyzed for this report consist of births to Oregon residents and exclude missing and unknown values.

The National Center for Health Statistics (see below) occasionally redesigns the format in which birth data will be collected. One format was released in 1989. An updated format was released in 2003, and was adopted at various times by different states. Oregon used the 1989 format through 2007, and upgraded to the 2003 format beginning in 2008.

National Center for Health Statistics

The National Center for Health Statistics (NCHS) is part of the CDC. The NCHS is the nation's principal health statistics agency. It compiles nationwide statistical information on population health, including the National Vital Statistics System (NVSS). The NVSS includes birth certificate data from each of the fifty states plus the District of Columbia and several U.S. territories.

Death Certificate Statistical File

The Death Certificate Statistical File includes all deaths occurring in Oregon and deaths occurring out-of-state to Oregon residents. Data are obtained from death certificates that are collected by the State Registrar. The data are used to examine trends in mortality and causes of death. Variables in this database include cause of death, date and place of death, decedent demographic information, whether the death was related to tobacco use, and county, place, and date of injury (if applicable). The mortality data analyzed for this report consist of deaths of Oregon residents.

Other data

Oregon Department of Revenue Cigarette and Smokeless Tobacco Tax Receipts

Data on the number of cigarettes smoked by Oregonians are estimated based on tobacco tax revenue collected by the Oregon Department of Revenue. The Oregon Department of Revenue's Monthly Receipt Statements include data on tax collections derived from sales of cigarettes. The number of packs of cigarettes sold is calculated by dividing the cigarette tax receipts by the tax rate per pack. The number of packs per capita is calculated by dividing the total number of cigarette packs sold by the U.S. Census Bureau's population estimate for Oregon.

Oregon State Cancer Registry (OSCaR)

The Oregon State Cancer Registry (OSCaR) was established by the 1995 Oregon Legislature to conduct statewide cancer surveillance and to guide cancer control

program planning. The registry began collecting information on all reportable cancers diagnosed in Oregon as of January 1, 1996. Oregon physicians and other health care providers are required to report patients newly diagnosed with cancer or benign tumors of the brain and central nervous system. Data from OSCaR help cancer prevention programs, clinicians, policymakers, and the public understand the burden of cancer among Oregonians.

Smoking-Attributable Morbidity, Mortality and Economic Costs (SAMMEC)
Smoking-Attributable Morbidity, Mortality and Economic Costs (SAMMEC) is a computer software program developed by the CDC to calculate several measures of the impact of cigarette smoking for the entire U.S. and for each state. Using state-specific data on smoking prevalence, overall mortality rates, and population data, SAMMEC generates the number of deaths and death rates due to smoking, years of life lost due to premature death from cigarette smoking, and lost productivity (earnings) due to illness and premature death from smoking-related diseases.

The smoking-attributable expenditures (SAEs) were adjusted using the Not Seasonally Adjusted U.S. city average Medical Care Consumer Price Index (All Urban Consumers) published by the U.S. Department of Labor's Bureau of Labor Statistics; the applicable inflation rate from the end of 2004 to the end of 2011 was applied to these expenditures.

Estimates of productivity losses due to premature death were also improved. More recent data were entered into the Centers for Disease Control and Prevention's online SAMMEC calculator. Updates included adult smoking prevalence for males and females for two age categories (35-64 years-old and 65 years-old and older), and tobacco-related disease categories. SAMMEC outputs for the Present Value of Future Earnings were price adjusted to 2011 dollars.

Neonatal healthcare costs associated with a mother smoking during pregnancy are reported in the Maternal and Child Health (MCH) SAMMEC. Neonatal healthcare costs are assigned using private health insurance claims to assess the probability of admission to a neonatal care unit among infants whose mothers smoked during pregnancy. The most recent state-specific MCH SAMMEC estimate uses 2004 dollar amounts. The smoking-attributable expenditures (SAEs) were adjusted using the Not Seasonally Adjusted U.S. city average Medical Care

Consumer Price Index (All Urban Consumers) published by the U.S. Department of Labor Bureau of Labor Statistics, calculating the applicable inflation rate from the end of 2004 to the end of 2009.

Federal Trade Commission (FTC) Tobacco Marketing data

As part of the Master Settlement Agreement, participating tobacco companies are required to submit annual marketing expenditures to the Federal Trade Commission (FTC). The FTC determines the categories of marketing into which the marketing expenditures are to be classified (e.g., magazines, direct mail, price discounts, coupons, etc). The FTC aggregates these data and releases yearly reports on tobacco industry marketing and promotion for both cigarettes and smokeless tobacco products.

The Tax Burden on Tobacco

The Tax Burden on Tobacco is an annual compendium on tobacco revenue and tobacco tax information. The report includes information such as federal, states, and local tobacco taxes, state cigarette tax rates, and tobacco settlement payments by state. The first volume was produced in 1949 by the Virginia-based Tobacco Tax Council under the name *Cigarette Taxes in the United States*. The report is now in its 64th version and is currently being produced by the economic consulting firm Orzechowski and Walker with the financial support of Altria Client Services, the Lorillard Tobacco Company, and Reynolds American. The report is also produced with the cooperation of tobacco tax administrators in the 50 states and the District of Columbia, and the U.S. Department of Treasury's Alcohol and Tobacco Tax Trade Bureau.

Statistical Methods

Types of data

Survey data

A survey dataset contains information gathered from asking questions of randomly selected respondents. For complex surveys, such as the Behavioral Risk Factors Surveillance System (BRFSS), these responses are weighted so that calculated estimates can be used to infer the behavior of the population from which the sample was drawn. Estimates calculated from survey data are subject to sampling variability.

Full count data

A full count dataset theoretically contains every instance of a qualified event (e.g., birth and death). Because every event is available, these data are not subject to sampling variability. However, these data are subject to random variability due to potential measurement errors, processing errors, missing data, and other forms of errors. Thus, even these counts are regarded as estimates.

Prevalence

Prevalence is defined as the percentage of a defined population with a characteristic of interest (e.g., current cigarette smoking) at a given time.

Confidence intervals

A confidence interval (CI) provides an indication of an estimate's precision, or margin or error. A narrow confidence interval indicates high precision and a wide confidence interval indicates low precision. A 95 percent confidence interval is the most common measure of precision used by scientists. One way of thinking of a 95 percent CI is that 95 times out of 100, the true value you are estimating will lie somewhere between the lower bound and upper bound of the CI. In general, when a large number of people are counted, the resulting estimate is relatively precise (has a narrower confidence interval). On the other hand, estimates based on a small number of people have larger confidence intervals and decreased precision.

Significant differences

In previous iterations of Oregon Tobacco Facts, significant differences between calculated estimates were determined by examining the confidence intervals (CIs) of the estimates. If the CIs did not overlap, the estimates were considered significantly different. This method of determining significant differences is not statistically accurate. As such, Oregon Tobacco Facts 2013 uses the linear combinations (LC) method of assessing significant differences. Under this method, significant differences are determined by examining linear combinations of coefficients from the Pearson Chi-Square comparison of proportions test using Rao-Scott.

One functional difference of the LC method compared to the CI method is that the LC method always uses non-overlapping sets of data. For example, the former CI method can compare Multnomah County's results with the results for the state of Oregon. However, residents of Multnomah County are also residents of the state of Oregon. For this reason, a significant difference is harder to achieve with the CI method. The LC method will compare Multnomah County with the other 35 counties, grouped together.

A different methodology was used for computing significant differences for the four tables showing cancer incidence and mortality. Incidences and mortality rates (including significant differences) were computed with the National Cancer Institute's SEER*Stat application using the Tiwari modification. In comparing results for a given county (say, Multnomah) with those for the State of Oregon, cancer cases for that county are also included in the count for the State.

Age-adjustment

Age-adjustment is a method to standardize populations with different age distributions. Age-adjustment enables the comparison of different geographic units (such as county or state) and demographics groups (such as racial and ethnic group) regardless of differences in the age structure from place-to-place or between demographic groups.

For example, older people are less likely to smoke cigarettes due to tobacco-related deaths and higher likelihood of quitting, compared with younger

individuals. Suppose that County A has a low unadjusted smoking prevalence and it also has a large senior population. Suppose that in County B, the unadjusted smoking prevalence is higher and the population is much younger. One cannot determine if the difference in smoking prevalence between these counties is true or if it is due to the different age distribution. As such, age-adjusting is necessary for a more accurate comparison of smoking prevalence between the counties

When making direct comparisons between different communities with varying age distributions, it is important to calculate age-adjusted estimates. However, when a comparison is not being made across time, geography or demographic population, unadjusted estimates should be used to assess the true burden of diseases, deaths, injuries or other health outcomes.

Age-adjusted data are standardized to the year 2000 U.S. population by specific age groups.

Confidentiality

Confidentiality is the protection of personal medical information or information related to protected classes of people. To protect confidentiality, estimates for full count datasets are not reported when the size of a group or subgroup is less than ten.

Reliability

Reliability is a method of assessing the stability of an estimate. Reliability is affected by the following:

1. The size of the group or subgroup from which the estimate is based;
2. the variability of the responses; and
3. the size of the variability as compared to the estimate. (For example, an estimate of 98.0% with a 95% confidence interval of 1.5% will be more reliable than an estimate of 2.0% with a 95% confidence interval of 1.5%).

In Oregon Tobacco Facts 2013, some numbers include a warning that they are potentially unreliable or they are unreliable and suppressed. In general, reliability refers to the stability of a number being reported.

The guidelines used to gauge reliability differ depending on the type of data used.

Some data sources include all events under study (such as births, deaths, or hospitalizations). These will be referred to as “full count”. Other data sources are from surveys of randomly selected individuals, adjusted to represent the full population. These will be referred to as “survey”. The text below briefly describes the methods used to determine if the information in this report includes a warning for reliability or is suppressed.

Full Count

Determine the number of events (n).

- n >=12: Report the estimate.
- n>=5 <u>and</u> n <12: Report the estimate and include a warning regarding reliability.
- n <5: Do not report the estimate and state that it is suppressed.

Survey

Determine the total number of persons surveyed (x) for a particular question and calculate the standard error (SE) for the reported number. Use the SE to calculate a statistic call the relative standard error (RSE). RSE is a measure of the variability of an estimate compared with the estimate itself.

1. Determine if the estimate is being calculated on a full population (i.e., everyone) or a subpopulation (i.e., a smaller group of all people surveyed who share a common trait such as their race, county, or medical condition).
2. If the full population, determine if the denominator is >= 50. If yes, proceed; if not, suppress.
3. If a subpopulation, determine if the denominator is >= 20. If yes, proceed; if not, suppress.
4. Apply the following logic to each RSE
   - RSE < 30%: Report the estimate.
   - RSE >= 30% <u>and</u> RSE <50%: Report the estimate, and include a warning regarding reliability.
   - RSE >= 50%: Do not report the estimate and state that it is suppressed.