Tobacco use prevalence in WHO Member States

Monitoring the prevalence of tobacco use is central to efforts to control the global tobacco epidemic. Reliable prevalence data on the magnitude of the tobacco epidemic and its influencing factors provide the information needed to plan, adopt and evaluate the impact of tobacco control interventions. This report contains survey data for both smoking and smokeless tobacco usage among young people and adults (Appendix X). It also presents WHO-modelled, age-standardized prevalence estimates for tobacco use for people aged 15 years and over (Appendix X). This technical note provides information on the method used to generate the WHO prevalence estimates.

Sources of information
For the analysis, the following sources of information were explored (where official survey reports explaining the sampling, methodology and detailed results were not publicly available, Member States were asked to provide them):

- Information on surveys provided by Parties to the WHO FCTC Secretariat;
- Information collected through WHO tobacco-focused surveys conducted under the aegis of the Global Tobacco Surveillance System – in particular, the Global Adult Tobacco Survey (GATS);
- Tobacco information collected through other WHO surveys including WHO STEPS survey and World Health Surveys;
- Other systems-based surveys undertaken by other organizations, including surveys such as the Demographic and Health Surveys (DHS) and the Multiple Indicator Cluster Survey (MICS); and
- An extensive search through WHO regional offices and WHO country offices to identify country-specific surveys not part of international surveillance systems – such as the National Survey of Risk Factors in Argentina, or the Mauritius Non Communicable Diseases Survey.

For the analysis, information from surveys conducted since 1990 was used if:

- It was officially recognized by the national health authority;
- Included randomly selected participants who were representative of the general population;
- Provided data for one or more of six tobacco use definitions: daily tobacco use; current tobacco use; daily tobacco smoker; current tobacco smoker, daily cigarette smoker or current cigarette smoker; and
- Presented prevalence values by age and sex.

The indicators provided for the most complete representation of tobacco use across countries and at the same time help minimize attrition of countries from further analysis because of lack of adequate data. Although differences exist in the types of tobacco products used in different countries and the age at which smoking is considered to be 'serious', the age group is limited to the range of 15 years and above, the model uses available data from a country’s other surveys to estimate the age pattern of tobacco use. For ages that the country has never surveyed, the average age pattern seen in countries in the same UN subregion is applied to the country’s data.

Differences in the indicators of tobacco use measured

Analysis and presentation of tobacco use prevalence indicators

Estimation method
A statistical model based on a Bayesian binomial beta regression was used to model crude adjusted and age-standardized estimates for countries for each indicator (current and daily tobacco use, current and daily tobacco smoking) separately for men and women. A trend was considered to be statistically significant if the posterior probability of the increase or decrease was greater than 0.75. A full description of the method is available as a peer-reviewed article in the Lancet, volume 385, No. 9972, p966–976 (2015).

Once the prevalence rates from national surveys were compiled into a dataset, the model was fit to calculate trend estimates for the six indicators specified above. The model has two main components: (a) adjusting for missing indicators and age groups, and (b) running the regression to generate an estimate of trends over time as well as the credible interval around the estimate. Depending on the completeness of survey data from a particular country, the model at times makes use of data from other countries to fill information gaps. Countries with data gaps “borrow information” from “priors” calculated from their data pooled with data from countries in the same UN subregion.

Differences in age groups covered by each survey
Survey results for any one country were sometimes reported for a variety of different age groups. Where data were missing for any age group in the range of 15 years and above, the model uses available data from a country’s other surveys to estimate the age pattern of tobacco use. For ages that the country has never surveyed, the average age pattern seen in countries in the same UN subregion is applied to the country’s data.

Differences in the indicators of tobacco use measured

Similarly, countries may report different indicators across surveys (e.g. current smoking in one survey and daily smoking in another, or tobacco smoking in one and cigarette smoking in another). Where data were missing for any indicator, the model uses available data from a country’s other surveys to estimate the missing information. For indicators on which the country has never reported, the average relationships seen in countries in the same UN subregion are applied to the country’s data.

Modelling results
The model was run for all countries with surveys that met the inclusion criteria. Results for countries with sufficient survey data (e.g., only one survey with a detailed age breakdown for prevalence for either sex) were not reported. The output of the model is a set of trend lines for each country that summarize its prevalence history from 2000 to the most recent survey, and project trends to 2030. Countries with few surveys will have more borrowed information blended into their trend line than countries with many surveys.

For this report, country-level trends have been summarized into average trends for high-income countries, middle-income countries, low-income countries and a global average. Trends from 2007 to 2017 are presented, with projections of the same lines to 2030. The projection assumes that the pace and level of adoption of new policies during the period covered by the country’s surveys will continue unchanged. In future, when countries adopt stronger tobacco control policies and complete new surveys, recalculated trend lines will reflect the changes.

When calculating global and world Bank income group average prevalence rates, countries without estimates were included in the averages by assuming their prevalence rates are the average rates seen in the UN subregion to which they belong. Age-standardized prevalence rates

Comparison of crude rates between two or more countries at one point in time, or of one country at different points in time, can be misleading if the two populations being compared have significantly different age distributions or differences in tobacco use by sex. The method of age-standardization is commonly used to overcome this problem and allows for meaningful comparison of prevalence between countries, once all other comparison issues described have been addressed. The method involves applying the age-specific rates by sex in each population to one standard population (this report uses the WHO Standard Population, a fictitious population whose age distribution is largely reflective of the population age structure of low- and middle-income countries).

The resulting age-standardized rates refer to the number of smokers per 100 WHO Standard Population. As a result, the rates generated using this process are only hypothetical numbers with no inherent meaning. They are only meaningful when comparing rates obtained from one country with those obtained in another country.

Comparison with smoking estimates in earlier editions of this report

The estimates in this report are consistent with each other but not with estimates produced for earlier editions of this report. While the method of estimation is the same, the updated data set for the period 1990–2018 is much more complete.

For example, since the WHO report on the global tobacco epidemic, 2017, 242 national surveys from 89 countries have been added to the data set, and 46 existing surveys have been updated with additional data points. Each round of WHO estimates is calculated using all available survey data back to 1990. The more data points available, the more robust the trend estimates are. Each estimation round therefore improves upon earlier published estimates, and only the latest round should be used. While country-level estimates in this report pertain only to 2017, the entire trend series from 2000 to 2025 is published in the biennial WHO global report on trends in tobacco smoking, 2000–2025.

1 Tobacco smoking includes cigarette, cigar, pipe, hookah, shisha, water-pipe, heated tobacco products and any other form of smoked tobacco.
2 For countries where prevalence of smokeless tobacco use is reported, we have published these data.
3 For a complete list of countries by UN subregion, please refer to pages 1 to 6 of the World population prospects: the 2017 revision, published by the UN Department of Economic and Social Affairs at https://population.un.org/wpp/Publications/Files/WPP2017_... Volume I, Comprehensive Tables.pdf (accessed April 17, 2019). Please note that, for the purposes of tobacco use analysis, the following adjustments were made: (i) Eastern Africa subregion was divided into two regions: Eastern African Islands and Remainder of Eastern Africa; (ii) Armenia, Azerbaijan, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Tajikistan, Uzbekistan and Turkmenistan were classified with Eastern Europe; (iii) Cyprus, Israel and Turkey were classified with Southern Europe; (iv) Central Africa and Southern Africa were combined into one subregion; (v) Bolivia, Micronesia and Polynesia subregions were combined into one subregion; and (vi) Ireland and the United Kingdom were classified with Northern America.