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, implement and evaluate the impact of tobacco control interventions. This report contains country-generated data for both smoking1 and smokeless tobacco use among young people and adults (Appendix XI). It also presents WHO-modelled, age-standardized prevalence estimates for smoking for people aged 15 years and over (Appendix X). This technical note provides information on the method used to generate the age-standardized estimates.

Sources of information

For the analysis, the following sources of information were explored:

- 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 STEPwise surveys and World Health Surveys;
- Other systems-based surveys undertaken by other organizations, including surveys such as the Demographic and Health Surveys (DHS) and the Behavioural Risk Factor Surveillance System (BRFSS) surveys; and
- An extensive search through WHO Regional and WHO Country Offices to identify country-specific surveys not part of international surveillance systems – such as the Survey of Lifestyles, Attitude and Nutrition in the Republic of Ireland, or the Social Weather Station Surveys in the Philippines.

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 country survey summary data for one or more of six tobacco use definitions: daily tobacco user; current tobacco use; daily tobacco smokes; current tobacco smoker; daily cigarette smokes; or current cigarette smoker; and
- Presented prevalence values by age and sex (in the absence of age-specific data, total-age data were used). The above indicators provide for the most complete representation of tobacco smoking 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 grown or manufactured in different regions of the world, data on cigarette smoking and tobacco smoking are the most widely reported and are common to all countries, thereby permitting statistical analyses. Member States were contacted to obtain an official report from recently undertaken surveys.

The information identified above is stored in the WHO Tobacco Control Global DataBank (http://www.who.int/tobacco/surveillance/globaldatabank/) as well as in the WHO Global Infobase, a portal of information on eight risk factors for noncommunicable diseases including tobacco (http://www.who.int/infobase).

Analysis and presentation of tobacco use prevalence indicators

Estimation method

A statistical model based on a Bayesian negative binomial meta-regression was used to derive modelled crude and age-specific estimates for four indicators of tobacco smoking (current and daily tobacco smoking as well as current and daily cigarette smoking) for countries for men and women separately. A full description of the applied method is available as a peer-reviewed article in The Lancet, Volume 385, No. 9972, pp. 966–976 (2015). The age-specific rates derived were used to generate the age-standardized estimates. The data for this report refer to estimates for 2013. Once the prevalence rates from surveys were compiled into a dataset, a two-step process was used to calculate trend estimates for the indicators specified above. These steps involved:

(a) adjusting for differences between surveys, and
(b) running the regression model to generate both the underlying trend as well as the 95% credible interval around the estimate.

Depending on the completeness of country-generated survey data, the model at times makes use of data from other countries to fill information gaps. Countries with less data or broadly inadequate data (“borrow information” from neighbouring countries) in the calculation of their estimates. It was not possible to generate estimates for countries with insufficient survey data (e.g., no existing surveys or where these were too old).

Differences in age groups covered by each survey Survey results for any one country were sometimes reported for a variety of different age groups. The model fills in missing ages in the data by examining the association between age and tobacco use prevalence by sex and survey year. Where data were missing for any age group, 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 geographical region is applied to the country’s data.

Differences in the types of 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 category, 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 geographical region are applied to the country’s data.

The regression models were run separately for males and females in order to obtain age-specific prevalence rates for each region.

Age-standardized prevalence

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. The age-standardized rates are shown in Appendix X.

1 Tobacco smoking includes cigarettes, pipe, hookah, shisha, water-pipe 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 listing of countries by UN region, please refer to Collection of macro geographical (continental) regions, geographical sub-regions, and selected economic and other groupings published by the UN Statistics Division at http:// millenniumindicators.un.org/unsd/methods/m49/regm49reg.htm (accessed Dec 18, 2014). Please note that, for the purposes of this analysis, the Eastern Africa subregion was divided into two regions: Eastern Africa Islands and Remainder of Eastern Africa; the Central Asia region was combined with the Eastern Europe region, the countries Armenia, Azerbaijan, Estonia, Georgia, Latvia and Lithuania were changed to the Eastern Europe region, Cyprus, Israel and Turkey were changed to the Southern Europe region, and the Malaysia, Micronesia and Polynesian subregions were combined into one subregion.