

Item Rationales for Risk Factors

Introduction The following paragraphs provide specific information and research findings for each of the risk factors that are included in STEPS NCD risk factor surveillance, and are presented in the order they are addressed in a standard STEPS survey.

Tobacco use

- In 2013, WHO Member States agreed to target a 30% relative reduction in prevalence of current tobacco use by 2025 (4).
- In 2010, the global prevalence of current tobacco smoking was estimated at around 22%. Smoking prevalence was about five times higher among men (37%) than among women (7%). Projections for 2025 are that the prevalence will slightly decrease, to around 19% (33% for men and 5% for women) (2,8).
- Smoking prevalence varied widely across the WHO regions in 2010, with the highest percentage of 30% of current smokers in the WHO European Region, and the lowest of 13% in the WHO African Region. However, projections for 2025 include that prevalence in the WHO African Region will increase to 18%, while prevalence in the WHO European Region will decrease to about 23% (2,8).
- Smoking prevalence among women increased with country income group in 2012, while prevalence among men varied less across income groups (2).
- Over 8 of 10 smokers smoke daily (2).
- Manufactured cigarettes, the most common form of smoked tobacco, are used by over 90% of current smokers (2).
- Tobacco use is estimated to cause about 6 million deaths each year (2).
- In 2015, tobacco use caused 6.9% of the global disease burden – as estimated in DALYs (3).
- Second-hand smoking was estimated to cause 1.0% of the global disease burden in 2015, and nearly a million deaths worldwide. Many of these deaths were among children (2,3).
- Smokers have markedly increased risk of multiple cancers, particularly lung cancer, and are at far greater risk of heart disease, stroke, Chronic Obstructive Pulmonary Disease (COPD), diabetes, and other fatal and non-fatal diseases. People who chew tobacco risk cancer of the lip, tongue and mouth (9).
- Intra Uterine Growth Retardation, spontaneous miscarriages and low birth weight babies are known outcomes of smoking during pregnancy (9).
- Non-smokers exposed to second hand smoke have a 20–30% risk of developing lung cancer and a 25–30% increased risk of suffering acute coronary diseases, as well as an increased frequency of chronic respiratory conditions. Small children whose parents smoke at home have an increased risk of suffering lower tract respiratory infections, middle ear infections and asthma (10,11).
- From 2003–2008, smoking-related healthcare accounted for up to 11% of a country's total healthcare costs (9).
- Many studies have shown that in the poorest households in some low-income countries as much as 10% of total household expenditure is on tobacco. In addition to its direct health effects, tobacco leads to malnutrition, increased health care costs and premature death (9,12).

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Item Rationales for Risk Factors, Continued

Harmful alcohol consumption

- In 2013, WHO Member States agreed to target an at least 10% relative reduction in the harmful use of alcohol by 2025, as appropriate, within the national context (4).
- The level of alcohol consumption worldwide in 2010 was estimated at 6.2 litres of pure alcohol per person aged 15 years and over (equivalent to 13.5 g of pure alcohol per day) (2,13).
- A quarter of this consumption (24.8%) was unrecorded, i.e., homemade alcohol, illegally produced or sold outside normal government controls. Of total recorded alcohol consumed worldwide, 50.1% was consumed in the form of spirits (13).
- The global prevalence of heavy episodic drinking during the past 30 days was estimated to be 7.5% in 2010 (2).
- Total alcohol consumption per capita among those aged 15 years and over varied greatly across WHO regions, with the lowest consumption of 0.7 litres of pure alcohol in the Eastern Mediterranean region, and the highest consumption of 10.9 litres in the European region (2).
- In general, the greater the economic wealth of a country, the more alcohol is consumed and the smaller the number of abstainers (2,13).
- Alcohol use causes about 3.3 million deaths each year (1).
- Alcohol use was estimated to cause 5.1% of the global disease burden – as estimated in DALYs – in 2015 (3).
- There are significant sex differences in the proportion of global deaths attributable to alcohol, for example, in 2012, 7.6% of deaths among males and 4.0% of deaths among females were attributable to alcohol (13).
- Harmful use of alcohol is associated with a risk of developing NCDs, mental and behavioural disorders, including alcohol dependence, as well as unintentional and intentional injuries, including those due to road traffic accidents and violence (2).
- There is also a causal relationship between harmful use of alcohol and incidence of infectious disease such as tuberculosis. Alcohol consumption by an expectant mother may cause fetal alcohol syndrome and pre-term birth complications (2,14).
- The highest numbers of deaths from alcohol are from cardiovascular diseases, followed by injuries (especially unintentional injuries), gastrointestinal diseases (mainly liver cirrhosis) and cancers (13).
- From 4% to about 25% of the disease burden due to specific cancers are attributable to alcohol worldwide (13).

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Unhealthy diet – low fruit and vegetable intake

- In 2013, WHO Member States agreed to a diet indicator regarding monitoring of the prevalence of persons aged 18+ years consuming less than five total servings (400 grams) of fruit and vegetables per day (4).
 - In many countries worldwide, the vast majority of the population consumes less than the recommended amount of five servings of fruit and vegetables per day (15).
 - In 2015, low intake of fruits and vegetables was estimated to cause 4.7% of the global disease burden – as estimated in DALYs (3).
 - Adequate consumption of fruit and vegetables reduces the risk of cardiovascular diseases, stomach cancer and colorectal cancer (15).
 - A higher consumption of fruit and vegetables is associated with a lower risk of all-cause mortality, particularly cardiovascular mortality. There was a threshold around five servings of fruit and vegetables a day, after which the risk of all-cause mortality did not reduce further (16).
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Unhealthy diet – diet high in salt

- In 2013, WHO Member States agreed to target a 30% relative reduction in mean population intake of salt/sodium by 2025 (4).
 - WHO recommends a reduction in salt intake to less than 5 g/day (sodium 2 g/day). Current estimates suggest that the global mean intake of salt was around 10 g of salt daily (4 g/day of sodium) in 2010 (2,17,18).
 - Intake in men was approximately 10% higher than in women (2,17,18).
 - In 2010, a diet high in salt was estimated to cause 1.7 million deaths (2).
 - In 2015, a diet high in salt was estimated to cause 3.4% of the global disease burden – as estimated in DALYs (3).
 - High salt consumption is adversely associated with high blood pressure, coronary heart disease and stroke (19-21).
 - A reduction of salt intake by 4g/day is associated with a fall in blood pressure of 5/3 mmHg—systolic/ diastolic respectively—among those with hypertension and 2/1 mmHg among those with normal blood pressure (22).
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Item Rationales for Risk Factors, Continued

Insufficient physical activity

- In 2013, WHO Member States agreed to target a 10% relative reduction in prevalence of insufficient physical activity by 2025 (4).
- Globally, in 2010, 23% of adults aged 18 years and over were insufficiently physically active – i.e. they did less than 150 minutes of moderate-intensity physical activity per week, or equivalent, as recommended by WHO. Women were less active than men, with 27% of women and 20% of men not reaching the recommended level of activity (2,23).
- The WHO Eastern Mediterranean Region (31%) and the Region of the Americas (32%) had the highest prevalence of insufficient physical activity, while the prevalence was lowest in the South-East Asia (15%) and African (21%) Regions (2).
- Insufficient physical activity in adults increased according to the level of country income in 2010, with the prevalence in high-income countries (33%) about double that in low-income countries (17%) (2).
- In 2015, insufficient physical activity was estimated to cause 1.4% of the global disease burden – as estimated in DALYs (3).
- Physically inactive persons have a 20% to 30% increased risk of all-cause mortality as compared to those who adhere to 150 minutes of moderate-intensity activity per week, or equivalent (23).
- It has been shown that participation in regular physical activity reduces the risk of coronary heart disease and stroke, diabetes, hypertension, colon cancer, breast cancer and depression. Additionally, physical activity is a key determinant of energy expenditure, and this is fundamental to energy balance and weight control (23).
- Insufficient physical activity accounts for about 3.8% of cases of dementia worldwide (24).
- In 2013, insufficient physical inactivity cost health-care systems international \$ (INT\$) 53.8 billion worldwide (25).

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Item Rationales for Risk Factors, Continued

Cervical Cancer Screening

- In 2013, WHO Member States agreed to an indicator regarding monitoring of the proportion of women between the ages 30-49 years screened for cervical cancer at least once, or more often, and for lower or higher age groups according to national programmes and policies (4).
 - Each year, more than half a million new cases of cervical cancer are diagnosed (26).
 - Cervical cancer is a largely preventable disease, but worldwide it is one of the leading causes of cancer death in women. Most deaths occur in low- and middle-income countries (26,27).
 - 70% of cervical cancer is caused by the Human papillomavirus (HPV) types 16 and 18, for which there is a multivalent vaccine available. Without vaccination, almost every sexually active person will be infected with HPV at some time in their life (26).
 - Primary prevention of most cervical cancer can be taken by administering the HPV vaccine to women and is most efficacious among girls between the ages of 9–13 who are not yet sexually active (26).
 - If cancer develops, the time from HPV infection to invasive cervical cancer can be several decades, making it a good target for screening and early detection (28).
 - Cervical cancer screening is recommended for women over 30 and can be done by pap smear, visual inspection with acetic acid (VIA), or HPV testing for high risk HPV types (26).
 - Well established cytology-based screening and treatment programmes have resulted in a 50–90% reduction in cervical cancer annual rates (29).
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Overweight and obesity

- In 2013, WHO Member States agreed to target to halt the rise in obesity by 2025 (4).
 - In 2014, 39% of adults aged 18 years and older (38% of men and 40% of women) were overweight (Body Mass Index (BMI) ≥ 25), and 13% were obese (BMI ≥ 30), including 11% of men and 15% of women (1,2).
 - Worldwide, obesity has more than doubled since 1980 (1,2).
 - The prevalence of overweight and obesity was highest in the Region of the Americas (61% overweight, 27% obese) and lowest in the South-East Asia Region (22% overweight, 5% obese) in 2014 (1,2).
 - The prevalence of overweight and obesity increased with the income level of countries, with the prevalence of obesity in high- and upper-middle income countries having been more than double of that of low-income countries in 2014 (1,2).
 - Overweight and obesity cause nearly 4 million deaths annually (3,30).
 - Overweight and obesity cause about 4.9% of the global disease burden – as estimated in DALYs (3).
 - Obesity increases the likelihood of diabetes, hypertension, coronary heart disease, stroke, certain cancers, obstructive sleep apnoea and osteoarthritis. It also negatively affects reproductive performance (2).
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Item Rationales for Risk Factors, Continued

- Overweight and obesity, cont.**
- Obesity also leads to adverse metabolic effects on cholesterol and triglycerides (31).
 - Waist circumference is an approximate index of intra-abdominal fat mass and total body fat. Changes in waist circumference reflect changes in risk factors for cardiovascular disease and other forms of NCDs (32).
 - Waist circumference or waist-to-hip ratio are powerful determinants of subsequent risk of type 2 diabetes (33).
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- Raised blood pressure**
- In 2013, WHO Member States agreed to target a 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances by 2025 (4).
 - The global prevalence of raised blood pressure (defined as systolic and/or diastolic blood pressure $\geq 140/90$ mmHg) in adults aged 18 years and over was around 22% (23% for men, 21% for women) in 2014 (2).
 - Across the WHO regions, raised blood pressure was highest in Africa (30%), and lowest in the Region of the Americas (18%). In all WHO regions, men had slightly higher prevalence of raised blood pressure than women (2).
 - The prevalence of raised blood pressure in adults was higher in low-income countries compared to middle- and high-income countries in 2014 (2).
 - During the past four decades, the highest worldwide blood pressure levels have shifted from high-income to low-income countries in south Asia and sub-Saharan Africa due to opposite trends, while blood pressure has been persistently high in central and eastern Europe (34).
 - Raised blood pressure is one of the leading risk factors for global mortality and is estimated to cause about 10 million deaths each year (2,3).
 - Raised blood pressure was estimated to cause 8.6% of the disease burden – as measured in DALYs – in 2015 (3).
 - Raised blood pressure and hypertension, if left uncontrolled, can cause stroke, myocardial infarction, cardiac failure, dementia, renal failure and blindness, causing human suffering and imposing severe financial and service burdens on health systems (2,35).
 - A reduction in systolic blood pressure of 10 mmHg is associated with a 22% reduction in coronary heart disease, and a 41% reduction in stroke in randomized trials, and a 41-46% reduction in cardiometabolic mortality in epidemiological studies (36,37).
 - Identifying and treating hypertension early is associated with a reduction in the risk of heart attack, heart failure, stroke, and kidney failure (36,37).
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Item Rationales for Risk Factors, Continued

Raised blood glucose

- In 2013, WHO Member States agreed to target to halt the rise in diabetes by 2025 (4).
- The global prevalence of diabetes (defined as a fasting plasma glucose value \geq 7.0 mmol/L [126 mg/dl] or being on medication for raised blood glucose) was estimated to be 8.5% in 2014 (38).
- The global prevalence of diabetes has nearly doubled since 1980 (38).
- Over the past decade, diabetes has risen faster in low- and middle-income countries than in high-income countries (38).
- The prevalence of diabetes was highest in the WHO Eastern Mediterranean Region (14%) and lowest in the African and European Regions (7%) in 2014 (38).
- In 2012, diabetes was estimated to cause 1.5 million deaths worldwide, and higher-than-optimal blood glucose caused an additional 2.2 million deaths. Forty-three percent of these 3.7 million deaths occurred before the age of 70 years (38).
- In 2015, raised blood glucose was estimated to cause 5.8% of the global disease burden – as estimated in DALYs (3).
- Diabetes is a well-recognized cause of premature death and disability, including heart attack, stroke, kidney failure, blindness, nerve damage, and lower-limb amputation (2,38).
- Impaired glucose tolerance and impaired fasting glycaemia are risk categories for future development of diabetes and cardiovascular disease (39,40).
- Cardiovascular disease is a main cause of mortality and morbidity among those with diabetes. Those with type 2 diabetes often have comorbidities such as obesity, hypertension, and abnormal blood lipids that further increase the risk of cardiovascular disease (41).
- Approximately one-third of people with diabetes develop some degree of diabetes-related eye damage, or retinopathy (42).
- Clinical trials have shown that type 2 diabetes can be prevented or delayed for long periods of time if lifestyle and/or medical intervention is sought. Returning to normal glucose levels from prediabetes reduces the risk of developing diabetes (39).
- Lower extremity amputations are at least 8 times more common in people with diabetes than in non-diabetic individuals in developed countries, and around half of all non-traumatic lower limb amputations are due to diabetes (43-45).

Abnormal blood lipids

- In 2013, WHO Member States agreed to an indicator regarding monitoring of the prevalence of raised total cholesterol among persons aged 18+ years (defined as total cholesterol \geq 5.0 mmol/l or 190 mg/dl); and mean total cholesterol concentration (4).
- Globally, the prevalence of raised total cholesterol (defined as \geq 5.0 mmol/l) was at nearly 40% in 2008 (15).

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Abnormal blood lipids, cont.

- The prevalence of raised total cholesterol was highest in the WHO European Region (54%), followed by the Region of the Americas (48%). The WHO African Region and the WHO South-East Asia Region showed the lowest percentages (23% and 30%, respectively) (15).
 - The prevalence of raised total cholesterol increased according to the income level of the country. In low-income countries, around a quarter of adults had raised total cholesterol in 2008, while in high-income countries, the prevalence was over 50% (15).
 - In 2015, raised total cholesterol was estimated to cause 3.6% of the global disease burden – as estimated in DALYs (3).
 - Raised total cholesterol is a major cause of disease burden in both the developed and developing world as a risk factor for ischaemic heart disease, stroke and other vascular diseases (15).
 - Lowering cholesterol through dietary changes and/treatment is associated with a reduction of risk of cardiovascular disease. 1 mmol/L lower total cholesterol is associated with about a half lower heart disease-related mortality in those aged 40–49, a third lower in those aged 50–69, and a sixth lower in those aged 70–89 through the main range of total cholesterol levels (46,47).
 - Levels of plasma high-density lipoprotein (HDL) cholesterol are inversely related to coronary artery disease incidence, and the relationship is independent of total, low-density lipoprotein (LDL) cholesterol and triglyceride levels (48).
 - An elevated triglyceride level is commonly accompanied by high LDL and low HDL cholesterol, and this combination (i.e. the atherogenic dyslipidemic triad) is associated with the highest risk of cardiovascular disease. Therefore, triglyceride levels appear to provide unique information as a biomarker of risk, especially when combined with low HDL and elevated LDL cholesterol (49).
 - A large proportion of people with raised blood lipids remain unaware of or untreated for their condition (50).
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