



# Evidence for chronic disease risk factors

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## Citation

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This report presents a conceptual framework of the pathways involved in the health of individuals and the population; known as determinants of health. It expands on the concept of risk factors and presents a matrix showing the relationship between selected chronic diseases and their known behavioural and biomedical risk factors.

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## Findings from this report:

- Insufficient physical activity, dietary risks and high blood pressure are also key chronic disease risk factors
- Tobacco smoking, obesity & excessive alcohol consumption increase the likelihood of developing numerous chronic diseases

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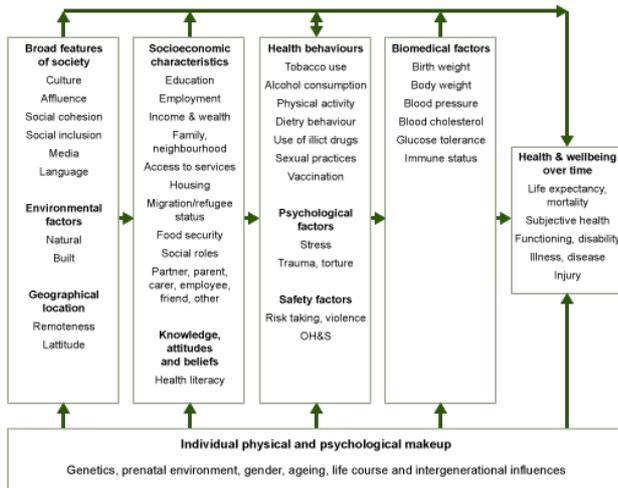
## Summary

The term chronic disease applies to a group of diseases that tend to be long lasting and have persistent effects. This is opposed to **acute** diseases, which have a quick onset and are often brief, intense and/or severe.

Many factors influence how healthy we are. Some of these function on an individual level, for example, health behaviours or genetic make-up, while others function at a broader societal level, such as the availability of health services, vaccination programs or a clean and healthy environment. All these influencing factors are known collectively as **determinants of health**.

Figure 1 presents a conceptual framework of the pathways involved in the health and functioning of individuals and the population.

**Figure 1: A conceptual framework for determinants of health**



Source: AIHW 2012. *Risk factors contributing to chronic disease*. Cat. no. PHE 157.

Health determinants can influence our health in either a positive or negative way. Determinants affecting health in a negative way are commonly referred to as **risk factors**. They can increase the likelihood of developing a chronic disease, or interfere in the management of existing conditions.

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## Behavioural and biomedical risk factors

The relationship between selected chronic diseases and their known behavioural and biomedical risk factors is shown in Table 1.

**Behavioural risk factors** are risk factors that individuals have the most ability to modify, such as diet, tobacco smoking and drinking alcohol. **Biomedical risk factors** are bodily states that carry relatively direct and specific risks for health—such as overweight and obesity and high blood pressure—and are often influenced by health behaviours.

Many chronic diseases share behavioural and biomedical risk factors that are largely preventable. Modifying these risk factors can reduce an individual's risk of developing a chronic disease and result in large health gains by reducing illness and rates of death.

Table 1 reveals that tobacco smoking, obesity and excessive alcohol consumption increase the likelihood of developing numerous chronic diseases. Insufficient physical activity, dietary risks, high blood pressure and abnormal blood lipids are also key risk factors for chronic disease development.

### Criteria for inclusion as a risk factor

Table 1 highlights individual risk factors where there is *strong* evidence of a *direct* association to a chronic disease.

There are numerous risk factors where the evidence is *suggestive* of an effect on chronic disease but the evidence is not as strong. These have not been included in Table 1.

Some risk factors have an *indirect* association to a chronic disease, either through influence on other risk factors or other chronic diseases and these also have not been included in Table 1.

Table 1 shows *direct* associations between risk factors and chronic disease. It does not show *associations* that may exist between some behavioural risk factors and biomedical risk factors. For example, while poor diet and insufficient physical activity are frequently associated with obesity, high blood pressure and abnormal blood lipids (dyslipidaemia), they may not be recorded in Table 1 unless there is strong evidence of a direct association. Likewise, chronic diseases can in themselves be risk factors for other chronic diseases; for example, cardiovascular disease is a risk factor for type 2 diabetes and chronic kidney disease but they are not recorded in Table 1 as this analysis focuses on biomedical and behavioural risk factors only.

In treating or preventing chronic diseases, it is often important to target associated behavioural risk factors to limit the diseases' development or progression.

**Table 1: Strong evidence of direct associations between selected chronic diseases and behavioural and biomedical risk factors**

	Behavioural: Tobacco smoking	Behavioural: Insufficient physical activity	Behavioural: Excessive alcohol consumption	Behavioural: Dietary risks	Biomedical: Obesity	Biomedical: High blood pressure	Biomedical: Abnormal blood lipids
CVD	•	•	–	• (a)	•	•	•
Stroke	•	•	•	–	•	•	•
Type 2 diabetes	•	•	–	• (a)	•	–	–
Osteoporosis	•	•	•	• (b)	–	–	–
Colorectal cancer	•	–	•	• (c)	•	–	–
Oral health	• (d)	–	• (e)	• (f)	–	–	–
CKD	•	–	–	–	•	•	–
Breast cancer (female)	–	–	•	–	• (g)	–	–
Depression	–	–	–	–	•	–	–
Osteoarthritis	–	–	–	–	•	–	–

Rheumatoid arthritis	•	–	–	–	–	–	–
Lung cancer	•	–	–	–	–	–	–
Cervical cancer <sup>(h)</sup>	•	–	–	–	–	–	–
COPD	•	–	–	–	–	–	–
Asthma	•	–	–	–	–	–	–

• = Strong evidence in support of a direct association between the chronic disease and behavioural or biomedical risk factor.

– = There is either not a direct association or the evidence for a direct association is not strong.

CVD = cardiovascular disease. CKD = chronic kidney disease. COPD = chronic obstructive pulmonary disease.

- For coronary heart disease and type 2 diabetes, dietary risks relates to high intake of saturated fat.
- For osteoporosis, dietary risks relates to insufficient calcium and vitamin D. The recommendation is to enhance vitamin D levels through adequate sun exposure and/or supplements if required.
- For colorectal cancer, dietary risks relates to high intakes of processed (preserved) meat. In addition, a high intake of red meat is associated with an increased risk of colorectal cancer. The Australian Dietary Guidelines (ADGs) therefore recommend that processed meat intake should be limited (also because of its high saturated fat content). In addition, to enhance dietary variety and reduce some of the health risks associated with consuming red meat, the ADGs recommend Australian adults should consume up to a maximum of 455g per week (one serve [65 g] per day) of lean red meats.
- The evidence for tobacco smoking and oral health relates to oral cancer and adult periodontal diseases.
- The evidence for excessive alcohol consumption and oral health relates to oral cancer.
- For oral health, dietary risks relates to amount and frequency of free sugars for dental caries; soft drinks and fruit juices for dental erosion; excess fluoride for enamel developmental defects; deficiency of vitamin C for periodontal disease.
- The evidence for obesity and breast cancer is for post-menopausal women.
- Persistent infection with the human papillomavirus (HPV) is a central cause of cervical cancer. HPV infection is not identified in Table 1 as it only includes those risk factors that are implicated in more than one chronic disease and have the greatest prevalence within the population. It is important to recognise that the behavioural risk factors of multiple sexual partners and early age at initiation of sexual activity reflect the probability of being infected with HPV.

#### Notes

- The chronic diseases included in Table 1 are those that currently contribute the most to burden of disease and/or are the focus of ongoing national surveillance efforts.
- The behavioural and biomedical risk factors included in Table 1 are those that are implicated in more than one chronic disease and have the greatest prevalence within the population.

## References

### Cardiovascular disease (CVD)

U.S. Department of Health and Human Services and U.S. Department of Agriculture 2015. 2015-2020 Dietary Guidelines for Americans. 8th Edition. Available at <http://health.gov/dietaryguidelines/2015/guidelines/>.

US Department of Health and Human Services 2014. The health consequences of smoking: 50 years of progress. A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, National Centre for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

WHO 2004. The atlas of heart disease and stroke, Mackay J and Mensah G, Editors. Geneva: World Health Organization.

### Stroke

Norrving B, Davis S, Feigin V, Mensah G, Sacco R & Varghese C 2015. Stroke Prevention Worldwide – What Could Make It Work? *Neuroepidemiology* 45:215-20.

NHMRC 2009. Australian guidelines to reduce health risks from drinking alcohol. Canberra: National Health and Medical Research Council.

Ronksley PE, Brien SE, Turner BJ, Mukamal KJ & Ghali WA 2011. Association of alcohol consumption with selected cardiovascular disease outcomes: a systematic review and meta-analysis. *BMJ* 342:d671.

US Department of Health and Human Services 2014. The health consequences of smoking: 50 years of progress. A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, National Centre for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

WHO 2003. Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation. Geneva: World Health Organization.

WHO 2004. The atlas of heart disease and stroke, Mackay J and Mensah G, Editors. Geneva: World Health Organization.

### **Type 2 diabetes**

U.S. Department of Health and Human Services and U.S. Department of Agriculture 2015. 2015-2020 Dietary Guidelines for Americans. 8th Edition. Available at <http://health.gov/dietaryguidelines/2015/guidelines/>.

Steyn NP, Mann J, Bennett PH, Temple N, Zimmet P, Tuomilehto J et al. 2004. Diet, nutrition and the prevention of type 2 diabetes. *Public Health Nutr* 7:147-65.

US Department of Health and Human Services 2014. The health consequences of smoking: 50 years of progress. A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, National Centre for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

WHO 2003. Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation. Geneva: World Health Organization.

### **Chronic kidney disease (CKD)**

Chen T & Harris D 2015. Challenges of chronic kidney disease prevention. *Medical Journal of Australia* 203:doi: 10.5694/mja15.00241.

Hallan S & Orth SR 2011. Smoking is a risk factor in the progression to kidney failure. *Kidney Int* 80:516-23.

Johnson D 2012. Risk factors for early chronic kidney disease. Melbourne: Kidney Health Australia.

### **Rheumatoid arthritis**

Arthritis Australia 2014. Time to move: Rheumatoid arthritis. A national strategy to reduce a costly burden. Broadway, NSW: Arthritis Australia.

Lahiri M, Morgan C, Symmons D & Bruce I 2012. Modifiable risk factors for RA: prevention, better than cure? *Rheumatology (Oxford)* 51:499-512.

US Department of Health and Human Services 2014. The health consequences of smoking: 50 years of progress. A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, National Centre for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

### **Osteoarthritis**

Musumeci G, Aiello FC, Szychlinska MA, Di Rosa M, Castrogiovanni P & Mobasher A 2015. Osteoarthritis in the XXIst century: risk factors and behaviours that influence disease onset and progression. *Int J Mol Sci* 16:6093-112.

Muthuri S, Hui M, Doherty M & Zhang W 2011. What if we prevent obesity? Risk reduction in knee osteoarthritis estimated through a meta-analysis of observational studies. *Arthritis Care & Research* 63:982-90.

### **Osteoporosis**

Ebeling PR, Daly RM, Kerr DA & Kimlin MG 2013. Building healthy bones throughout life: an evidence-informed strategy to prevent osteoporosis in Australia. *MJA Open Suppl* 1:1-46.

Hendrickx G, Boudin E & Van Hul W 2015. A look behind the scenes: the risk and pathogenesis of primary osteoporosis. *Nat Rev Rheumatol* 11:462-74.

US Department of Health and Human Services 2014. The health consequences of smoking: 50 years of progress. A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, National Centre for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

WHO 2003. Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation. Geneva: World Health Organization.

### **Lung cancer**

IARC 2012. Personal habits and indoor combustions. Volume 100E. IRAC monographs on the evaluation of carcinogenic risks to humans. Lyon: International Agency for Research on Cancer.

US Department of Health and Human Services 2014. The health consequences of smoking: 50 years of progress. A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, National Centre for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

### **Colorectal cancer**

IARC 2012. Personal habits and indoor combustions. Volume 100E. IRAC monographs on the evaluation of carcinogenic risks to humans. Lyon: International Agency for Research on Cancer.

NHMRC 2013. Australian dietary guidelines. Canberra: National Health and Medical Research Council.

US Department of Health and Human Services 2014. The health consequences of smoking: 50 years of progress. A report of the Surgeon General, US Department of Health and Human Services, National Centre for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health: Atlanta, GA.

WCRF & AICR 2011. Continuous update project report. Food, nutrition, physical activity, and the prevention of colorectal cancer. Washington DC: World Cancer Research Fund & American Institute for Cancer Research.

#### **Breast cancer (female)**

IARC 2012. Personal habits and indoor combustions. Volume 100E. IRAC monographs on the evaluation of carcinogenic risks to humans. Lyon: International Agency for Research on Cancer.

WCRF & AICR 2010. Continuous update project. Food, nutrition, physical activity, and the prevention of breast cancer. Washington DC: World Cancer Research Fund & American Institute for Cancer Research.

#### **Cervical cancer**

IARC 2007. IARC monographs on the evaluation of carcinogenic risks to humans, Volume 90, Human papillomavirus. Lyon: International Agency for Research on Cancer.

IARC 2012. Personal habits and indoor combustions. Volume 100E. IRAC monographs on the evaluation of carcinogenic risks to humans. Lyon: International Agency for Research on Cancer.

US Department of Health and Human Services 2014. The health consequences of smoking: 50 years of progress. A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, National Centre for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

WHO 2008. World Cancer Report 2008. Lyon: International Agency for Research on Cancer.

#### **COPD**

US Department of Health and Human Services 2014. The health consequences of smoking: 50 years of progress. A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, National Centre for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

#### **Asthma**

US Department of Health and Human Services 2014. The health consequences of smoking: 50 years of progress. A report of the Surgeon General. Atlanta, GA: US Department of Health and Human Services, National Centre for Chronic Disease Prevention and Health Promotion, Office of Smoking and Health.

#### **Depression**

Faith M, Butryn M, Wadden T, Fabricatore A, Nguyen A & Heymsfield S 2011. Evidence for prospective associations among depression and obesity in population-based studies. *Obes Rev* 12:e438-53.

Luppino F, de Wit L, Bouvy P, Stijnen T, Cuijpers P, Penninx B et al. 2010. Overweight, obesity, and depression: a systematic review and meta-analysis of longitudinal studies. *Arch Gen Psychiatry* 67:220-9.

Sanders R, Han A, Baker J & Copley S 2015. Childhood obesity and its physical and psychological co-morbidities: a systematic review of Australian children and adolescents. *Eur J Pediatr* 174(6):715-46.

#### **Oral health**

IARC 2012. Personal habits and indoor combustions. Volume 100E. IRAC monographs on the evaluation of carcinogenic risks to humans. Lyon: International Agency for Research on Cancer.

WHO 2003. Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation. Geneva: World Health Organization.

WHO 2015. Guideline: Sugars intake for adults and children. Geneva: World Health Organization.

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## Related material

### Resources

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#### [Presentation: Associations between chronic diseases and risk factors](#)

This single slide presentation shows the association between 15 common chronic diseases and various risk factors (behavioural and biomedical). For example, chronic kidney disease is associated with tobacco smoking, obesity and high blood pressure.

[Download Presentation: Associations between chronic diseases and risk factors. Format: PPTX 89Kb PPTX 89Kb](#)

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- [Risk factors](#)
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