

FCRN foodsource

A free and evolving resource to empower informed discussion on sustainable food systems



Chapter 7.

How are food systems diets, and health connected?

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Why should you read this Chapter?

Today, billions are malnourished: not eating a diet containing energy and nutrients in healthy amounts. Both lack of food and excess of consumption cause huge levels of disease worldwide. To a significant extent, the food systems in which people participate determine what people can and do eat (i.e. their diets); and as a consequence, their health.

Food systems are, therefore, central to solving many of the world's biggest health challenges. But the way in which they affect health in different regions and among different groups of people is complex, and varies greatly. An understanding of these interconnections and their effects is needed, in order for food systems to be changed in ways that promote human-wellbeing.

The chapter addresses the following:

- What are the drivers of dietary choices at individual and societal levels?
- What is food security and what factors determine or influence it?
- Global challenges for nutrition: what forms can malnutrition take?
 - How do these vary by region and demographic group?
 - What causes malnutrition?
 - How are nutritional problems changing over time?
 - What are the consequences of these problems for society and the economy?

Key points

- Food is linked to health and human well-being of people in numerous ways, including: diet and nutrition; environmental pollution; and the spread of infectious diseases via food production and consumption.
- Food consumption of individuals and households is shaped by multiple, complex, and interlinking factors. Similarly, diet-related health impacts are determined by a range of factors ranging from individual biology, cultural and social context, up to economic and political decisions at national and international levels.
- The health benefits and risks associated with food are unequally distributed between different socioeconomic backgrounds, genders and locations. Food access is critical to this: poorer people typically spend a higher proportion of their weekly budget on food – either cutting back on food or on other health promoting necessities.
- Food security is a necessary condition for human well-being. Food security for any individual or community is the outcome of four necessary conditions being in place: food needs to be available (physically obtainable), accessible (socially / economically obtainable), utilisable (consumable / digestible) – and these three factors have to be stable over time (reliable).
- Malnutrition has various forms: undernutrition; micronutrient deficiencies; and overconsumption. Some progress is being made on undernutrition; micronutrient deficiencies are still widespread; and over consumption and its attendant health concerns are worsening.
- In higher-income countries, overweight and obesity correlates negatively with wealth: i.e. there is a higher prevalence amongst more economically deprived people and their children. However, at a global level, overweight and obesity are more prevalent in richer countries.
- Undernutrition is result of energy deficiencies, leading to low body weight and hunger. Often this arises from poverty and a diet lacking in diversity, dominated by grains or tubers. It is of greatest prevalence in Sub-Saharan Africa and South Asia.
- The geographic prevalence of micronutrient deficiencies depends on the nutrient, as deficiencies can accompany both under- and overnutrition, and depends on local food systems and diets. Nutrient deficiencies can lead to a vast array of specific deficiency diseases, and can occur with or without sufficient total calorie intake.
- Overweight and obesity, caused by overconsumption of calories, are associated with diets rich in energy dense food types, such as fats and sugars, and can contribute to Type 2 diabetes, heart disease, strokes and some cancers. Their causes are multiple and complex, influenced by lifestyle, socioeconomic and genetic factors.
- As food systems become more globalised, countries transition from localised food scarcity and hunger, towards a state of over-consumption (which is where developed countries currently sit), then theoretically and optimistically, towards healthier and more sustainable diets.

7.1 How are food systems and health connected and influenced?

7.1.1 Connections between food and health

Some of the links between food and health are shown below.

Health concern	The food system's role
Environmental health risks	Different environmental health risks exist relating to water and air pollution, in addition to risks to food systems from climate change (see Chapter 6 for climate change impacts on food systems). Manure and agrochemicals cause water pollution which may lead to acute poisoning and long term harms (e.g. cancers, reproductive disorders); field burning and intensive livestock systems cause air pollution and respiratory illnesses; ecosystem damage and climate change (to which food systems contribute) alters patterns of disease and pest movements, leads to loss of resilience, and reduced ability to adapt to future climate shocks.
Food security, nutrition and associated diseases	Critical factors include the type and quantity of food produced, the way it is processed and marketed, its price and availability, access to adequate storage and cooking, and many other factors. These variously give rise to: undernutrition (protein and/or energy deficiencies); overconsumption (leading to obesity and associated chronic diseases); and micronutrient deficiencies.
Infectious diseases and injuries	Zoonotic diseases; food pathogens from livestock production or inadequate storage; antimicrobial resistance especially from intensive livestock systems; vector borne diseases from agri-induced land use change and water infrastructure; pesticide and agrochemical poisonings; occupational hazards (heat stress, injuries, UV radiation, and other unsafe working conditions).
Health equity impacts	Health risks and benefits are unevenly distributed among rich and poor, rural and urban, women and men, land owners and the landless, arising from factors such as affordability, access, time and knowledge.

Table 1: Food and health are connected in many ways.

7.1.2 Influences on food consumption

The influences on food consumption and associated health outcomes are complex and multiple:

- * The influences on food consumption are multiple.
- * Diet-related health outcomes are shaped by multiple social, economic, cultural and political factors.
- * These multiple influences on food consumption interact with other factors (from environmental through to genetic) to influence health outcomes.
- * The affordability of food has a critical influence on health outcomes.

Influences on diet

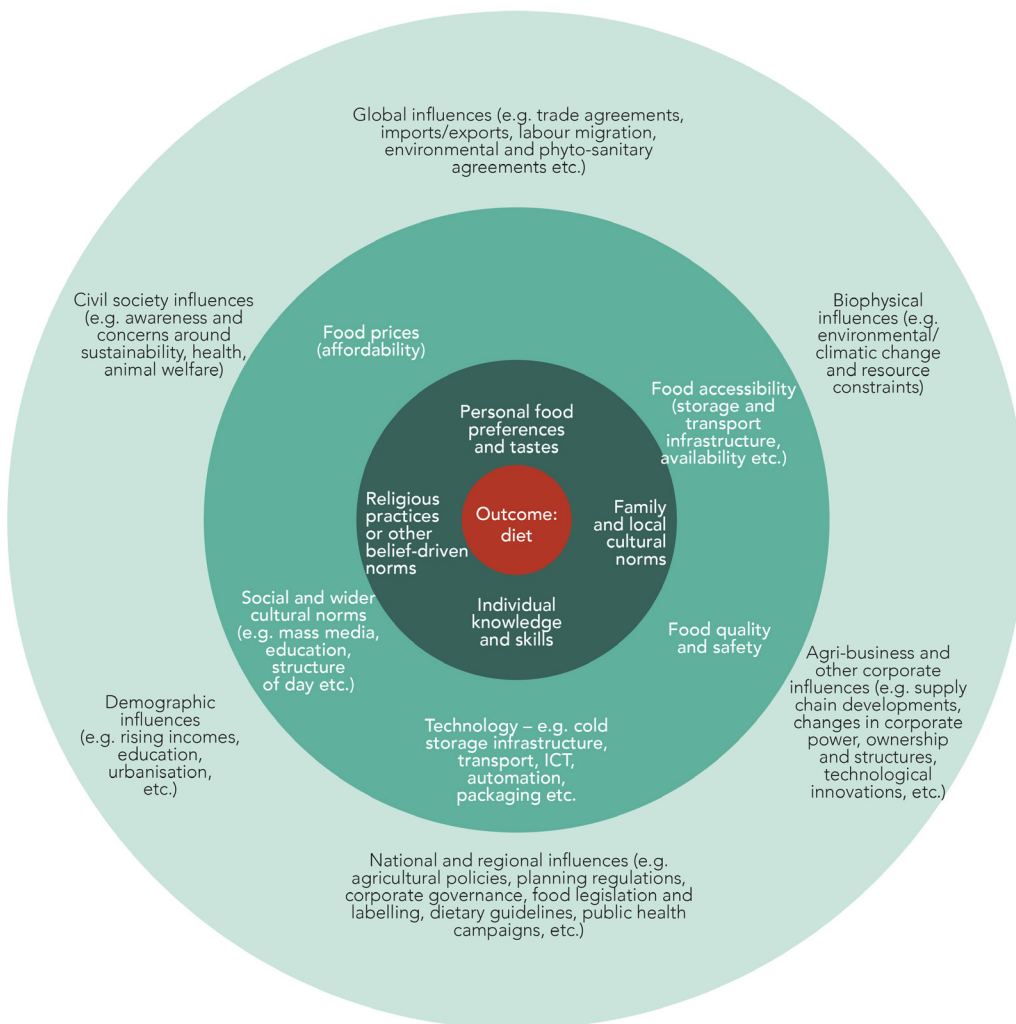


Figure 1: The many influences on diet - both proximate and indirect.

Source: Garnett, T. and Finch, J. (2016, unpublished).

The health impacts of consumption patterns are influenced by many factors, not just food security. These include: levels of economic development, agricultural policy, pricing strategies, changes in how food is produced and distributed, marketing and media, values and aspirations, nutritional knowledge and access to information, and traditional attitudes to food and health. The role of policy is crucial – it shapes the overarching social, infrastructural and economic influences on consumption and the extent to which health consequences are addressed.

Nutrition-related health outcomes are therefore impacted by factors other than just food security, being multi-level, multi-sectoral, and multi-cultural. Some of these factors, relating to socio-economic status and lifestyles are discussed later in this chapter.

7.1.3 The importance of the socio-economic context

This diagram, often known as the social-ecological model of public health, shows that the health of any individual is influenced by a huge range of factors from individual genetics, sex and race through to the broader social, economic and political conditions that influence our lives.

These multiple influences on food consumption interact with other factors (from environmental through to genetic) to influence health outcomes

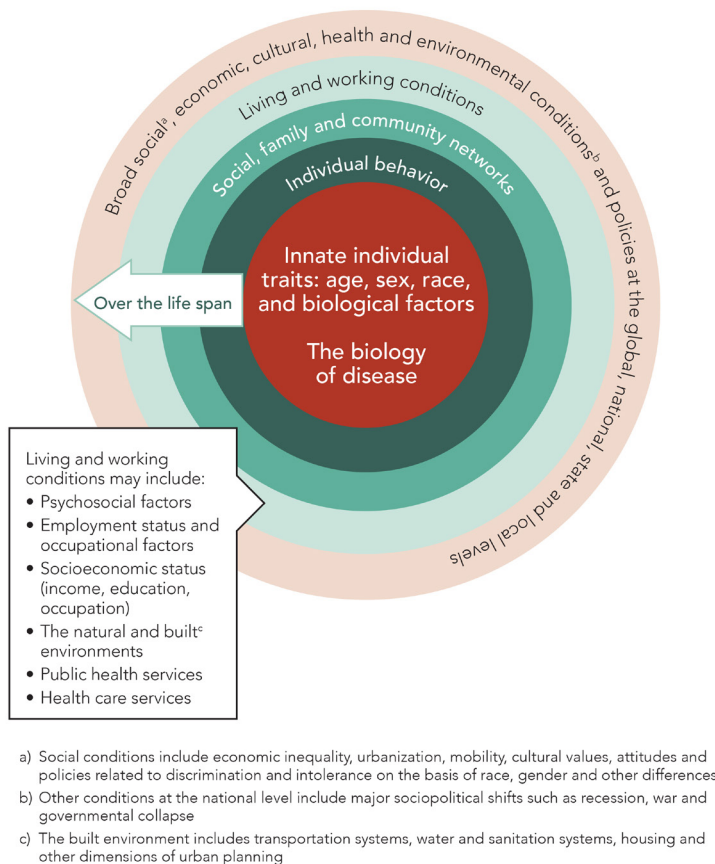


Figure 2: The socio-ecological model of public health.

Source: Based on Institute of Medicine (2003).

Food affordability is critical

- * Poor people spend more of their budget on food.
- * This means less for education, housing and health, increasing overall vulnerability.

Spending on food and drink

Selected countries, 2011, % of total household spending

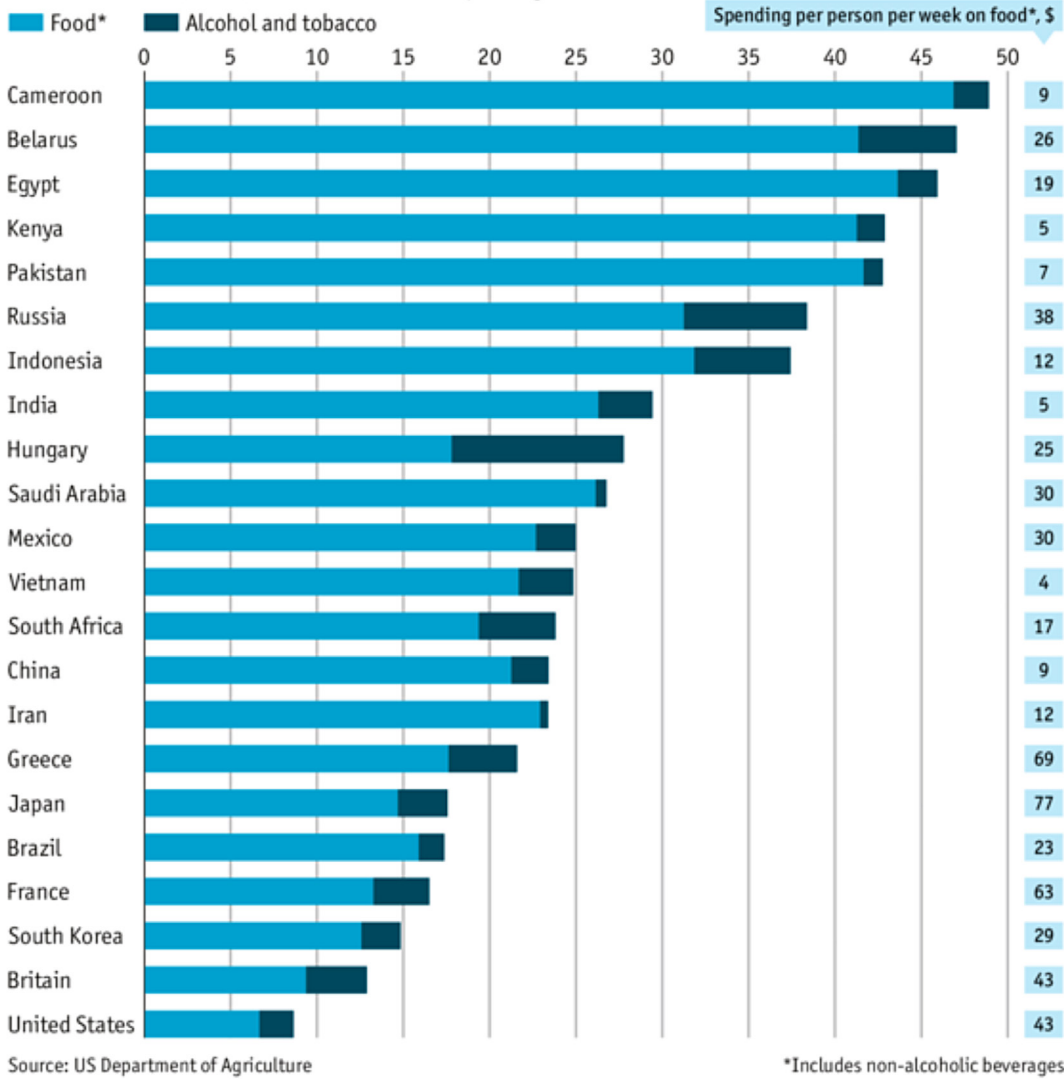


Figure 3: Spending on food and drink as a percentage of household income across countries.

Source: Economist (2013).

The proportion of income that is spent on food varies widely across countries and within populations and is linked to inequality of incomes. Populations who spend a high proportion of their income on food are more vulnerable to supply and price changes in food, but additionally have less disposable income to spend on, for example, education and health. They can also be more vulnerable to sanitation risks, lack of safe drinking water and related illnesses. This poverty trap exacerbates health outcomes; poorer populations are more food insecure and more vulnerable to connected health problems.

7.2 What is food security and how is it defined?

7.2.1 Defining food security

The definition of food security has evolved over time.

- Achieving food security (incorporating good nutrition) is not simply a question of producing enough food.
- Food security is an outcome of four key conditions that need to be in place: food needs to be available, accessible, utilisable – and these three factors have to be stable over time.
- Nutrition-related health outcomes are impacted by multiple social, economic, cultural and political factors.

The most recent well-accepted definition from the FAO is that:

“Food security exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food which meets their dietary needs and food preferences for an active and healthy life.”

7.2.2 Influences on food security

The connection between food and health is complex, and is influenced by availability of nutritious food, accessibility and affordability of food, and other socio-economic and health factors. Food security therefore plays an important part in nutrition outcomes.

Food security is an outcome of many factors, not just supply



Figure 4: The four components of food security and related questions.

Source: FCRN. (2016).

Food security is influenced by adequate supply, food accessibility (physically and also in terms of affordability) and utilisation. For example the wherewithal for food preparation (cooking fuel) or storage needs to be in place. Non nutritional considerations (such as prevalence of illnesses such as diarrhoea) also influence the extent to which the body can absorb and use the nutrients in the food.

Indicators have been produced to allow policy makers to assess whether a population is food secure or not, relating to the four factors: availability, accessibility, utilisation and stability. For more about these indicators, see [this FAO data](#).

7.3 What are the global challenges for nutrition?

Hunger and undernutrition

Caused by insufficient calories and other factors including poor sanitation, poor maternal nutrition and insufficient quantity and quality of food.

Leading to low body weight – of particular concern is stunting and wasting in children, which damages physical wellbeing and can also lead to cognitive impairments.

Micronutrient deficiencies

Lack of essential vitamins and minerals needed in small but adequate amounts by the body for proper growth and development.

Overconsumption

Excessive consumption of calories and leads to undesirable nutrients (saturated fat, sugar, refined carbohydrates, salt, alcohol), lead to obesity and non-communicable diseases.

Poor diets (i.e. high in saturated fat, sugar, refined carbohydrates, salt and alcohol and low in fruit and vegetables and fibre) are a risk factor for non-communicable diseases (for example Type 2 diabetes) independently of whether someone is overweight or obese.

Independently of diet quality, obesity is associated with increased risk of non-communicable diseases (NCDs).

Diets excessive in energy can lead to obesity and are also often poor in nutritional quality.

7.3.1 Malnutrition in all its forms is a global concern

Undernutrition

- 11% of the world's population (794 million people) are estimated to be calorie deficient.
- Nearly 25% of children under age 5 (161 million) are stunted (too short for their age).
- 8% of children under age 5 (51 million) are wasted (they do not weigh enough for their height).
- Prevalence is far higher in Sub Saharan Africa and South Asia.

Micronutrient deficiency

- Over 30% of the world's population (2 billion people) suffer from micronutrient deficiency. The 3 most common forms of deficiencies are iron deficiency anaemia, vitamin A deficiency and iodine deficiency.

Overconsumption

- 39% of adults are overweight (1.9 billion); 13% are obese (600 million).
- 1 in 12 adults worldwide have Type 2 diabetes.
- Over 6% of children under 5 are overweight or obese (42 million out of 652 million).

A growing number of countries (e.g. South Africa, India, and Mexico) now shoulder a “double burden” (more accurately triple) of malnutrition, namely the rapid rise in obesity and obesity-related chronic diseases coexisting with undernutrition and ongoing micronutrient deficiencies.

7.3.2 Some progress is being made in reducing undernutrition

Some positive progress is being made in reducing the number of children under 5 years suffering from stunting and wasting, measured against targets set by the WHO's World Health Assembly (viewable [here](#)).

For the poorest groups of society (especially in low income countries) a shift towards more energy dense food can be positive for nutrition.

Tackling undernutrition, as measured by World Health Assembly (WHA) indicators such as child stunting (children too short for their age) and wasting (children not weighing enough for their age), has shown positive trends.

However much work remains to be done to prevent total global undernutrition, with nearly 800 million people still living calorie deficient lives.

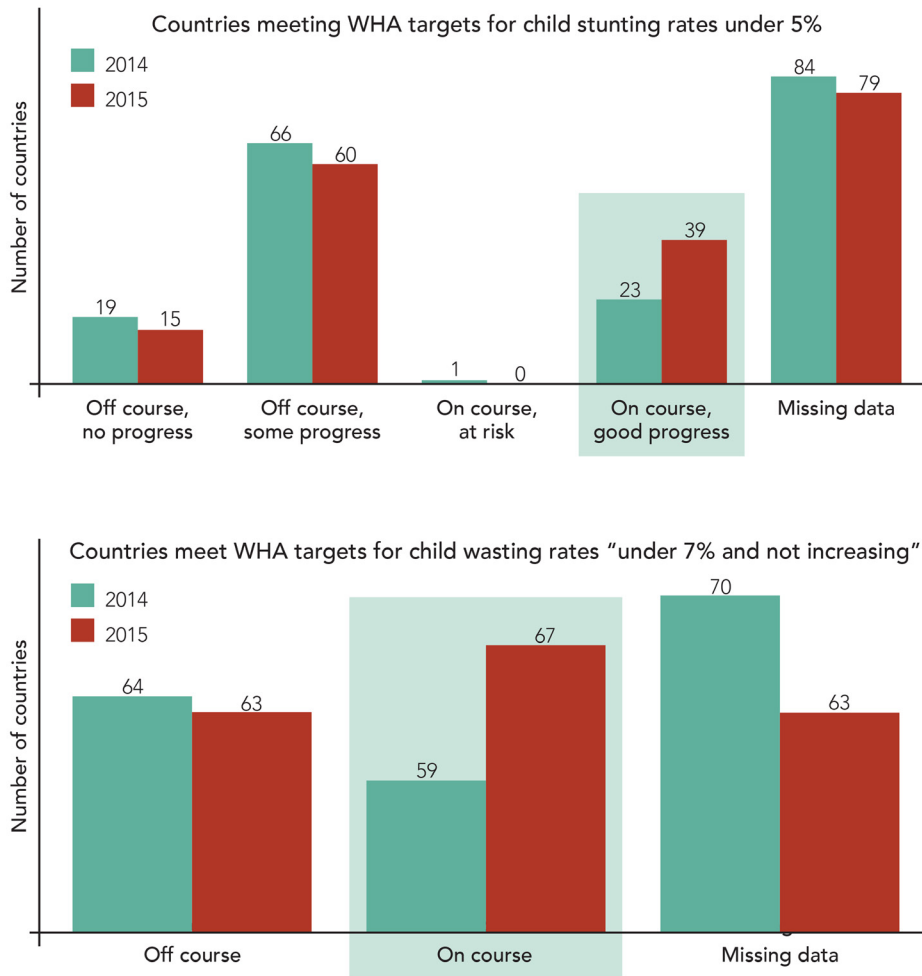


Figure 5 Number of countries meeting World Health Assembly targets for child stunting (top) and wasting (bottom), 2014 to 2015.

Source: Adapted from International Food Policy Research Institute (2015).

7.3.3 Micronutrient deficiencies are still widespread

Micronutrient deficiencies persist: the example of anaemia

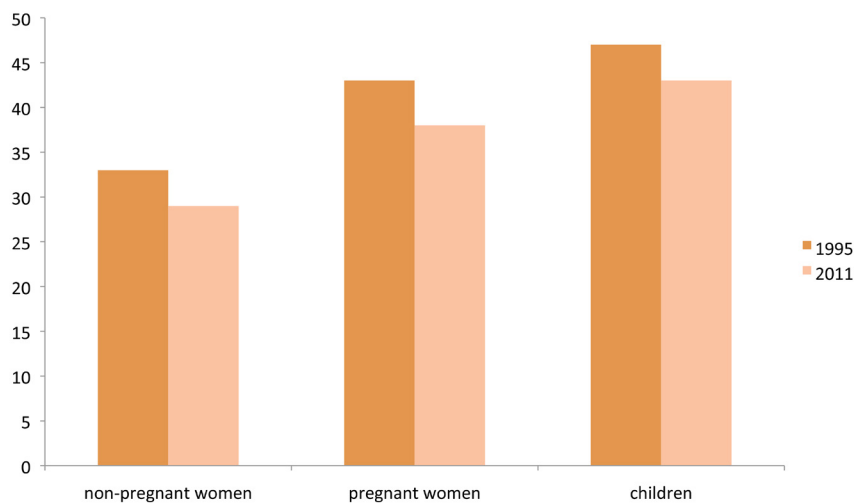


Figure 6: Global prevalence of anaemia.

Source: Adapted from Stevens, *et al.* (2013).

- 496 million non-pregnant women, 32 million pregnant women, and 273 million children were estimated to have anaemia in 2011.
- Prevalence is highest in Central and West Africa and South Asia.

7.3.4 Health problems related to overconsumption are worsening

Health problems related to overconsumption are worsening: adults

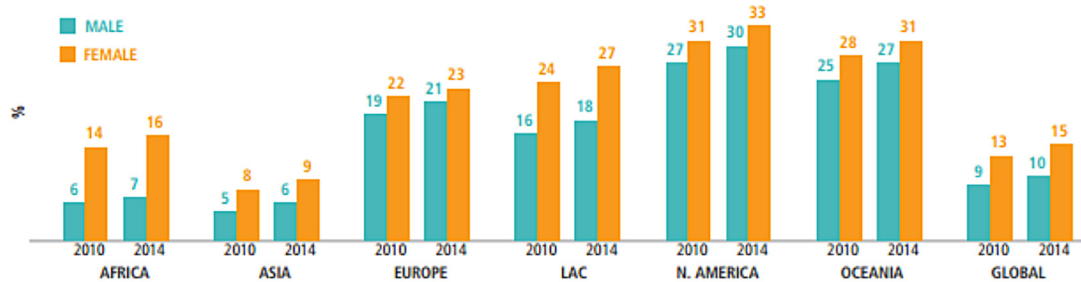


Figure 7: Mean prevalence of obesity for adult males and females by UN region, 2010 and 2014.

Source: International Food Policy Research Institute (2015).

All countries with WHA targets for adult obesity are reporting increased prevalence. Globally, the percentage of women who are obese is slightly higher than adult males, although the difference can be more significant in some regions, possibly due to cultural factors. The mean prevalence of adult obesity is greatest in high income countries but has increased across all regions. In comparison to the undernutrition targets (see above) no countries are on target to meet WHA adult obesity reduction goals.

Health problems related to overconsumption are worsening: pre-school children

Obesity is rising globally in pre-school children, in both developed and developing countries.

In 2010, 43 million pre-school children (35 million in developing countries) were estimated to be overweight and obese.

92 million were at risk of overweight.

The worldwide prevalence of childhood overweight and obesity increased from 4.2% in 1990 to 6.7% in 2010. This trend is expected to reach 9.1% or 60 million, in 2020.

Obesity in childhood is a particular concern because it tends to track through into adulthood. Obesity at an earlier age can mean earlier onset, and ultimately more severe health problems.

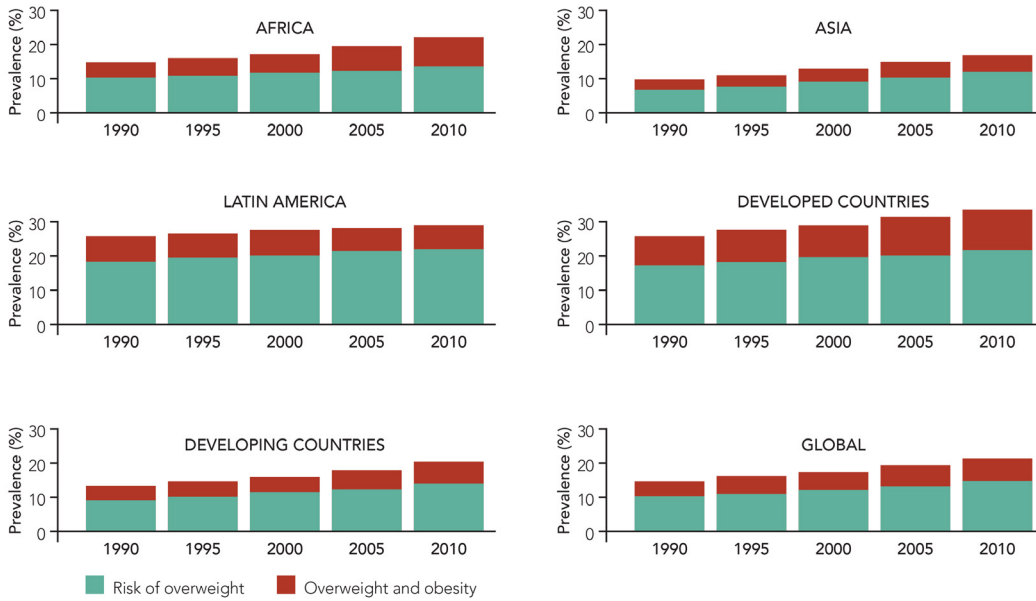
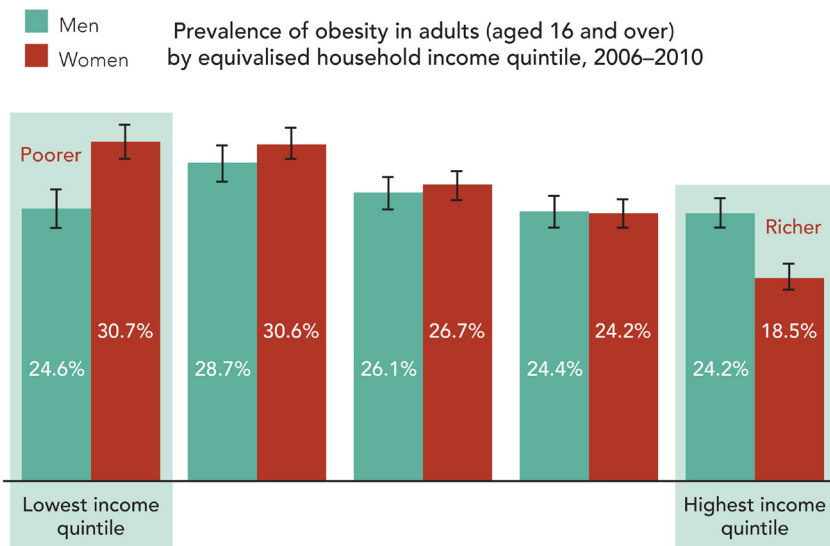


Figure 8: Prevalence of overweight and obesity in preschool-age children in different world regions.

Source: Adapted from International Food Policy Research Institute (2015).

In developed countries lower income is associated with higher obesity: the UK as an example (women and children)



Credit: FCRN 2017

Figure 9: Prevalence of obesity in UK adults according to sex and socio-economic status.

Source: NOO (2012) Adult obesity and economic status.

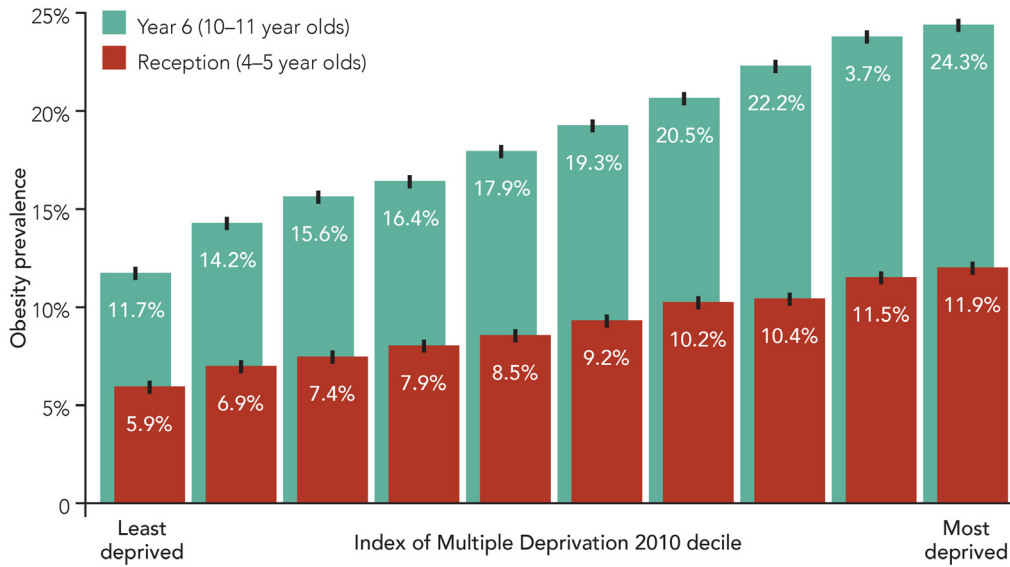


Figure 10: Prevalence of obesity in UK children aged 10–11 and 4–5, according to level of deprivation.

Source: Public Health England (2015).

In developed countries, unhealthy diets have been shown to be cheaper sources of energy than healthy balanced diets. This economic factor has been seen to contribute to increasing obesity with poorer groups in high income countries, although the association is weaker with men than women.

See later in this chapter for more on socio-economic factors.

Similar patterns are found in other high income countries: France for example:

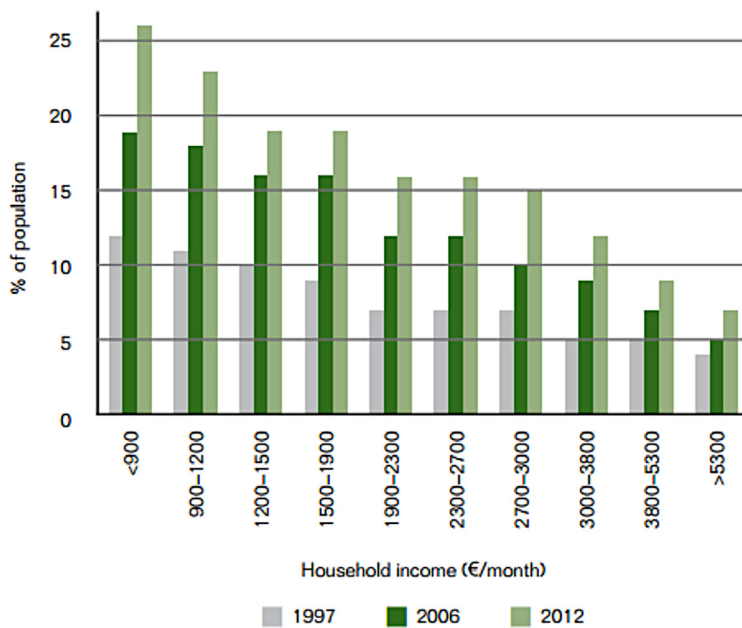


Figure 11: Adult obesity prevalence in France by household income, 1997–2012.

Source: Loring and Robertson (2014).

Obesity is a growing problem in many developed countries across income groups, but the problem is often greatest in lower income groups of society. The link between obesity and socio-economic status is strong, especially among women.

7.4 How does malnutrition in its various forms differ between regions and demographic groups?

Overview of prevalence and distribution of malnutrition

- Prevalence of undernutrition is greatest in Sub-Saharan Africa and South Asia. Undernutrition is rare in developed countries, although it can be a problem among the elderly (particularly those in institutions), those living with disease, and among those with eating disorders.
- Micronutrient deficiencies are also more prevalent in lower income regions although they are also found in developed countries.
- Prevalence of obesity is greatest in high income countries.
- But the absolute number of obese people is greatest in middle income developing countries.
- In many developing countries, obesity is growing rapidly. This is a consequence of the nutrition transition.
- In very low income countries, obesity is rare but is nevertheless growing particularly in urban areas.
- Prevalence of obesity globally is higher in women than men.
- In developed countries obesity is associated with lower income. In developing countries, historically, obesity was associated with wealth. Today, it emerges initially among the most affluent but as the nutrition transition progresses, the relationship with socio-economic status changes and becomes more complex.

7.4.1 Undernutrition

Prevalence of undernutrition is greatest in Sub-Saharan Africa and South Asia

Undernourishment means that a person is not able to acquire enough food to meet the daily minimum dietary energy requirements, over a period of one year. FAO defines hunger as being synonymous with chronic undernourishment.

FAO

The Food and Agriculture Organisation is a specialised agency of the United Nations. It is dedicated to leading international efforts to defeat hunger worldwide.

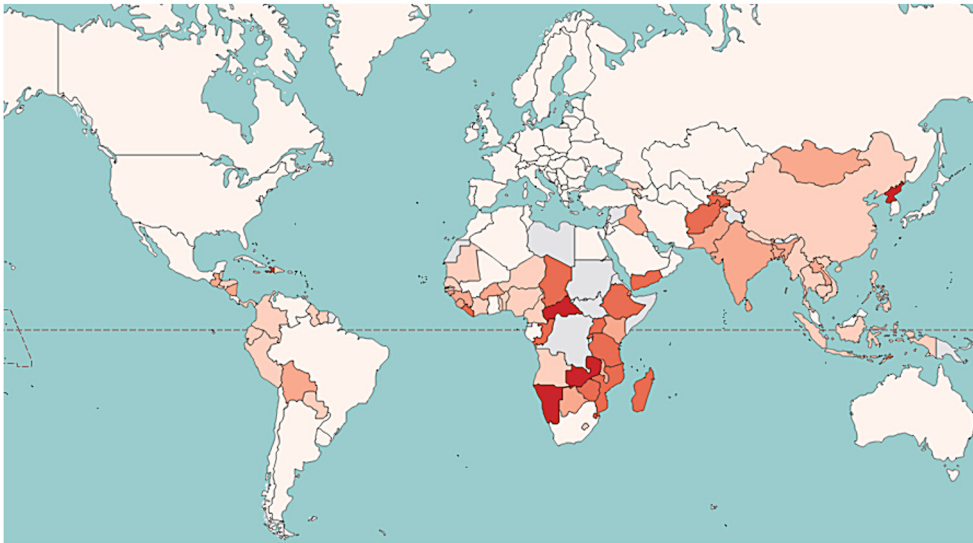


Figure 12: FAO World Hunger Map 2015.

7.4.2 Micronutrient deficiencies

Prevalence of micronutrient deficiency varies by nutrient – the example of iron deficiency (anaemia)

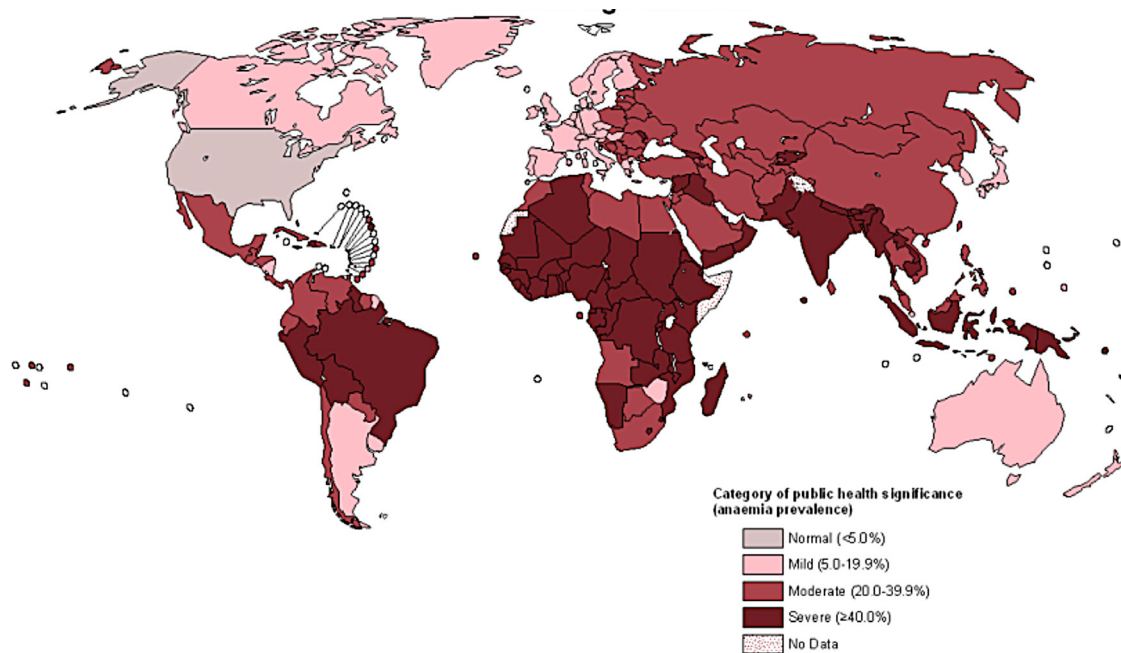


Figure 13: Anaemia as a public health concern by country: Pre-school age children.

Source: De Benoit, et al. (2008).

Anaemia is a common disease resulting from micronutrient deficiency (in this case iron). At the time of this study, the global prevalence of anaemia for the general population was 24.8% and it was estimated that 1620 million people were affected by anaemia. Prevalence was highest in Africa and South-East Asia.

Similar regional patterns are seen for other deficiencies, such as vitamin A.

Countries and areas with survey data: Preschool-age children

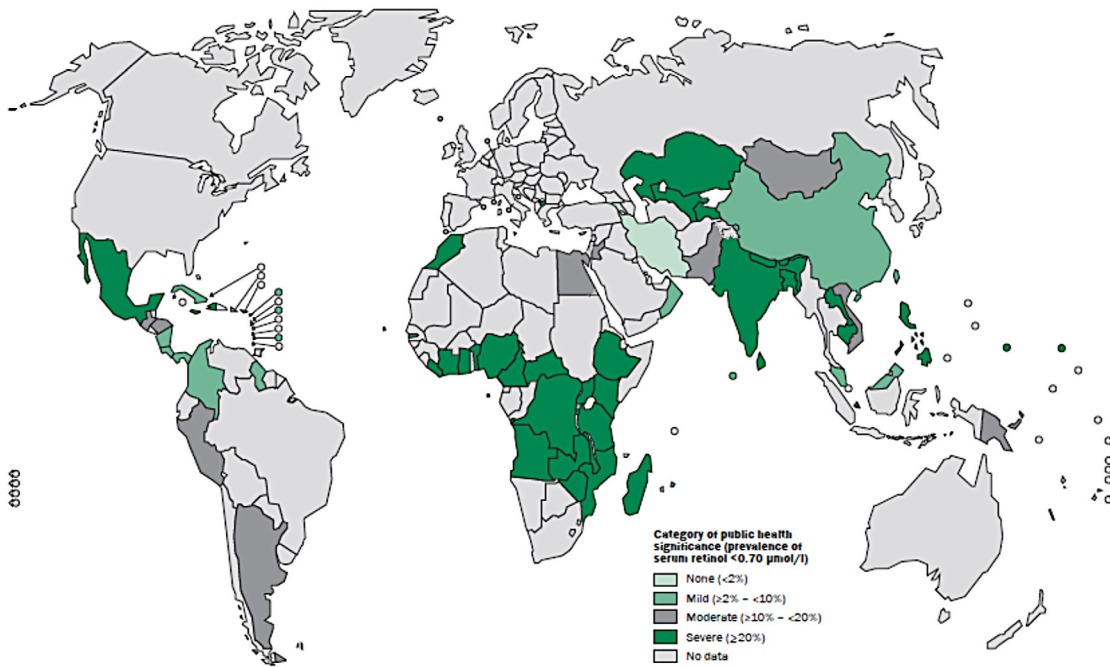


Figure 14: The example of vitamin A deficiency – pre school children.

Source: World Health Organisation Vitamin A Deficiency map, 1995–2005. [online].

Vitamin A deficiency (VAD) is the leading cause of preventable blindness in children and increases the risk of disease and death from severe infections. In pregnant women VAD causes night blindness and may increase the risk of maternal mortality.

An estimated 250 million preschool children are vitamin A deficient and it is likely that in vitamin A deficient areas, a substantial proportion of pregnant women are vitamin A deficient.

Between 250,000 to 500,000 vitamin A-deficient children become blind every year, half of them dying within 12 months of losing their sight.

The WHO has identified the following approaches to tackling the problem: promotion of dietary diversity (in particular consumption of vitamin A rich fruits and vegetables), fortification of staples (e.g. fats, oils, flour) and high-dosage supplementation. Promotion of breastfeeding is also an important element of prevention in infants.

7.4.3 Obesity

Prevalence of obesity is currently greatest in high income countries - but the situation is rapidly changing

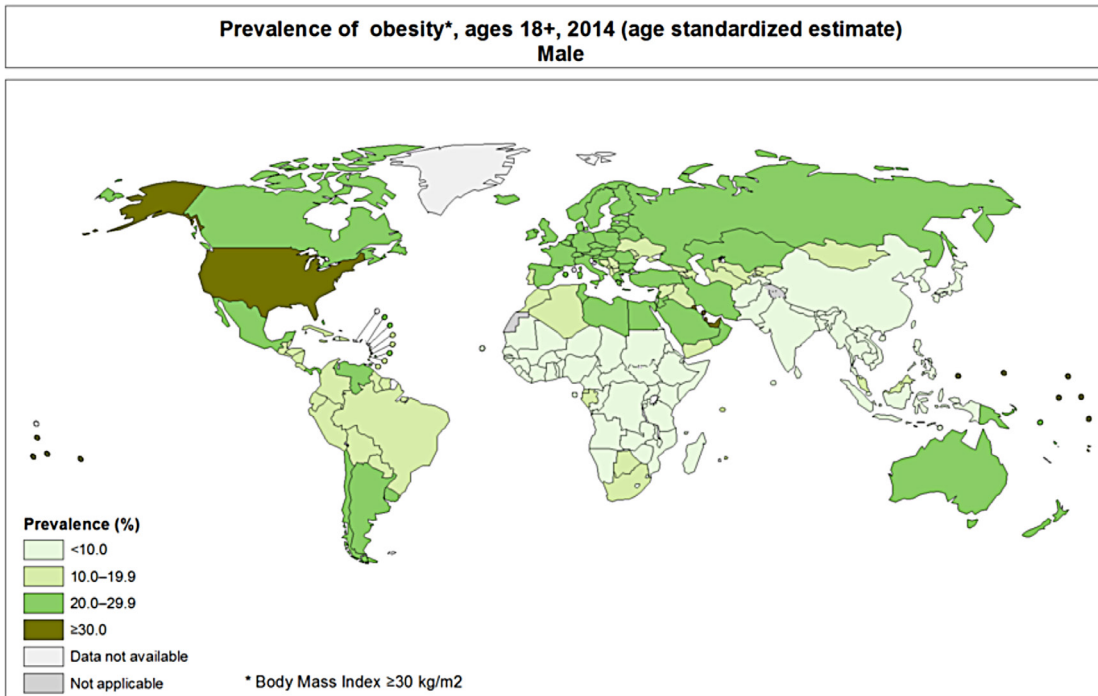


Figure 15: Global prevalence of obesity in male adults over the age of 18 in 2014.

Source: WHO (2015).

High-income countries have the highest prevalence of adult obesity (male adult obesity is shown here). Countries with high prevalence of undernutrition (typically low income countries in Sub-Saharan Africa and South Asia, see above) have lowest levels of obesity.

Percentage of people with obesity is highest in rich countries, but more obese people now live in middle income countries

According to a 2014 report from ODI:

“over one third of all adults across the world are obese or overweight. Between 1980 and 2008, the numbers of people affected in the developing world more than tripled, from 250 million to 904 million. In high-income countries the numbers increased by 1.7 times over the same period.”

High-income countries have the highest rates of obese/overweight adults as a percentage of population, but more obese or overweight adults now live in developing countries.

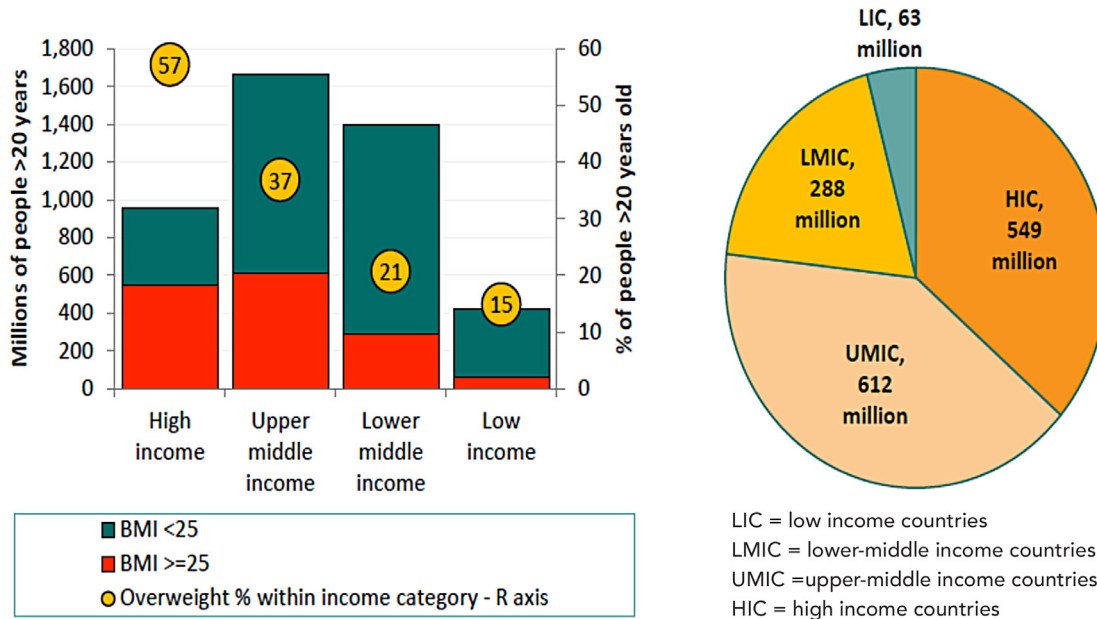


Figure 16: Share of overweight people in countries according to level of income (left), and distribution according to country level income (right).

Source: Keats and Wiggins (2014).

Diets have been seen to change in line with rising incomes, with a shift from cereals and tubers towards foods high in energy, fat (including saturated) and sugar, including meats, processed foods, oils and fats. While fruit consumption also increases, vegetable and legume intakes decline.

7.5 What causes different forms of malnutrition?

Overview

- Diets deficient in calories lead to undernutrition.
- Diets deficient in calories are also often deficient in essential macro-/micro-nutrients, often made worse by poor sanitation and high prevalence of disease - factors that undermine nutrient absorption.
- Diets adequate in energy but deficient in essential micronutrients have various health consequences including for example night blindness (vitamin A deficiency) and anaemia (iron deficiency).
- Diets that are high in fats and sugar but low in fruit and vegetables are usually high in energy and therefore associated with obesity.
- Such diets are also, independent of obesity, associated with non-communicable diseases such as heart disease, and Type 2 diabetes.
- The links between overconsumption and poor health need to be seen in the context of the diet as a whole, and other lifestyle and socio-economic influences on health.

7.5.1 Undernutrition

Undernutrition is a consequence of energy deficiencies

Hunger is generally a consequence of poverty and insufficient disposable income.

Inadequate food energy leads to low body weight and hunger.

Diets that are inadequate in energy may be inadequate in important macro-nutrients (e.g. protein) and are usually deficient in micronutrients.

Diets leading to hunger and undernutrition are usually:

- Overwhelmingly grain or tuber based.
- Lacking in other foods – e.g. fruits and vegetables, legumes, animal products.
- Lacking in diversity.
- As discussed at the start of this chapter, inaccessibility of healthy food is only one factor in nutritional problems. Insufficient health care in general and other socio-economic factors such as lack of clean drinking water can exacerbate these problems. For example, diarrhoea-related illnesses can inhibit nutrient uptake, increasing vulnerability to the effects of undernutrition.

7.5.2 Nutrient deficiencies

Nutrient deficiency leads to various problems including, for e.g. anaemia (iron deficiency), night blindness (vitamin A deficiency), goitre (iodine deficiency) neural tube defects (folate), osteoporosis (calcium deficiencies).

Nutrient deficiencies often occur alongside undernutrition, but may also occur when energy intakes are adequate or excessive.

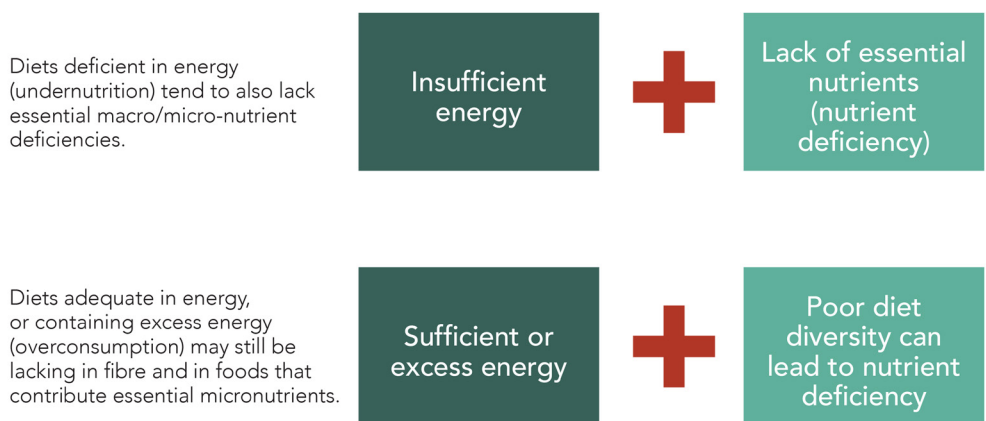


Figure 17: Different pathways to nutrient deficiency depending on levels of energy consumption.

Source: FCRN. (2016).

7.5.3 Obesity

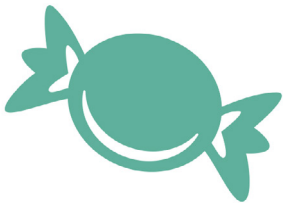
Overconsumption: diets high in fat, salt and sugar are associated with obesity, Type 2 diabetes and other diseases



High intake of (saturated) fat, salt and sugar are associated with high Body Mass Index (i.e. overweight or obesity), raised cholesterol and raised blood pressure.

Which increase risks of developing:

- Type 2 diabetes.
- Heart disease.
- Strokes.
- Some cancers.



Overconsumption arises from excess energy consumption and can lead to obesity.

Poor diets (independent of obesity) that are high in saturated fats, salt, and sugar, but low in fruit and vegetables are also associated with non-communicable diseases such as chronic heart disease. For more on healthy diets, see [Chapter 9](#).

As such, people can suffer from obesity, from both obesity and non-communicable diseases, or from non-communicable diseases (such as heart disease and Type 2 diabetes).

Diets high in meat, especially processed meat, can be high in fat, sugar and salt and have consequently been associated with such diseases.

High intake of sugar is common in many processed foods and has also been linked to obesity and Type 2 diabetes.

However, an association does not mean causation nor does it mean that, for example, meat or processed food consumption are necessarily and/or solely responsible.

Meat can be rich in nutrients and energy and the health risk is relative to consumption levels. In other words, moderate levels of meat can be part of a healthy diet. However increasingly research indicates that processed meats should be avoided and red meat intakes limited.

The links between overconsumption and poor health need to be seen in the context of the whole diet and other lifestyle, socio-economic and genetic factors

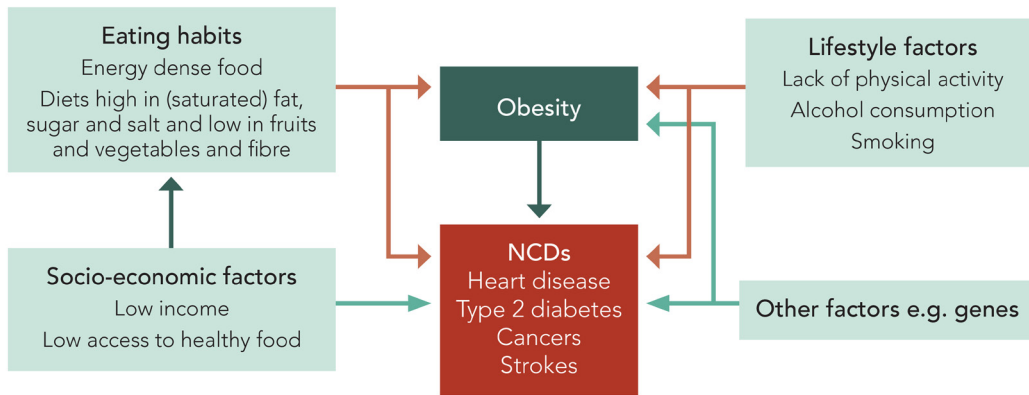


Figure 18: The relationship between factors that influence obesity and non-communicable diseases.

Source: FCRN (2017).

Eating habits

High consumption of energy dense foods such as some meats, oils and fats, and sugars is often characteristic of poor eating habits general. As such, the association between these foods and obesity and non communicable diseases must be seen in the context of the diet as a whole. See Chapter 8 for a more in-depth discussion of the links between meat consumption and health.

Socio-economic factors

Lack of access to healthy foods and socio-economic factors such as education can contribute to poor eating habits.

Price gaps between healthy and unhealthy food are increasing in some parts of the world (for example in the UK), potentially making healthy food less affordable for poorer people.

Lifestyle factors

Sedentary lifestyles, smoking and alcohol consumption also contribute to obesity and non communicable diseases. People with unhealthy lifestyles also tend to have poor diets.

Some research has shown that the ill-health effects associated with red meat and processed meat consumption are confounded by lifestyle factors such as generally unhealthy eating patterns, lack of exercise, other negative lifestyle habits, and socio-economic factors.

Processed meats and sugars are often found in fast food and pre-prepared foods, and increasingly these have been shown to be cheaper sources of energy than healthy balanced diets.

Urbanisation is increasing globally, with more people now living in urban environments than rural. On the one hand, obesity prevalence has been shown to be higher in cities than rural areas. On the other hand, urban populations are sometimes better educated and there is some evidence (in high income countries) that this leads to lower BMIs and healthier eating habits. However, strong differences exist between high and low income contexts and trends are in flux.

7.6 How are diets changing globally?

7.6.1 What is the nutrition transition?

The nutrition transition is a term used to characterise the shift in dietary consumption and energy expenditure that coincides with economic, demographic, and epidemiological (shift from infectious to non communicable diseases) changes. It generally refers to the transition taking place in developing countries from traditional diets high in cereal and fibre to Western pattern diets high in sugars, fat (especially saturated), and animal-source food. The nutrition transition tends to go hand in hand with other lifestyle changes.

The nutrition transition and trends in developing countries

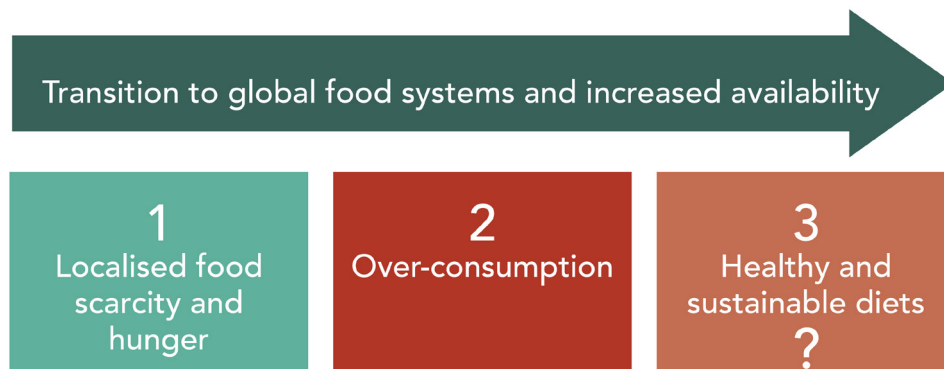


Figure 19: Schematic stages of a nutrition transition.

Source: Adapted from Harvard T.H. Chan School of Public Health [online].

Developed country eating habits are already at stage 2.

Many developing countries are rapidly moving from stage 1 (end of famine) to stage 2 (overconsumption).

The transition from traditional diets to energy-dense Western-style diets has been a key contributor to the obesity epidemic in low- and middle-income countries (see later in this chapter).

The challenge is to move, globally to stage 3 – towards diets that both healthy and environmentally sustainable.

7.6.2 What are the trends?

Eating habits are changing

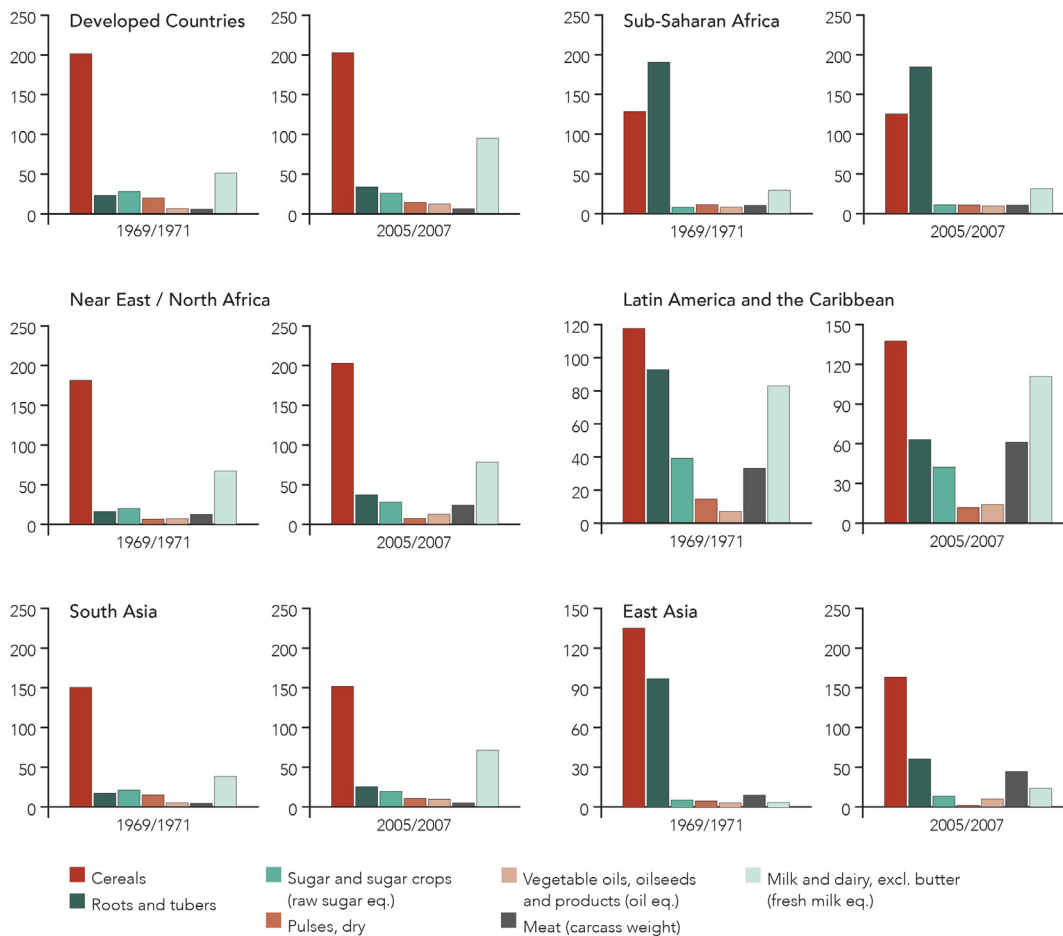


Figure 20: Changes in consumption of agricultural products by world region, 1969/1971 to 2005/2007.

Source: Adapted from data in Alexandratos and Bruinsma (2012).

People are eating more food overall.

In particular more animal products.

This leads to increased energy intake.

There is a decrease in plant-based foods in most regions.

Chapter 4 discusses these changes and future projections in more detail.

The growth in consumption of animal products (and with it processed meats) is not limited to developed countries. The 2014 ODI report on future diets shows the historical shift towards increased food consumption in general, but in many cases there is also an increase in the proportion meat contributes to eating patterns. Consumption of cereals, pulses, roots and tubers has generally declined.

Consumption of processed foods has increased globally

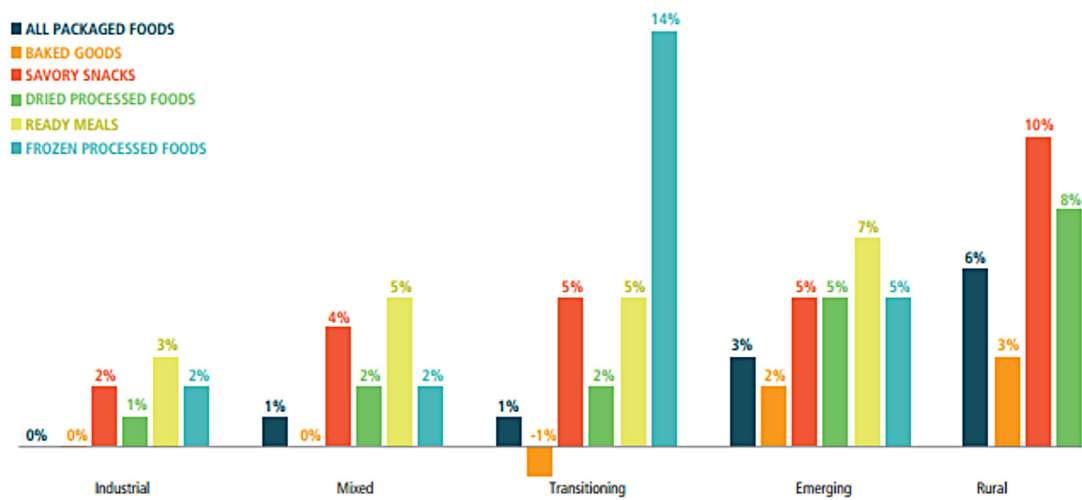


Figure 21: Change in processed food retail sales by food system type, 2000–2014.

Source: International Food Policy Research Institute (2015).

The 2015 Global Nutrition Report shows a rise in consumption of processed foods across multiple different types of food system.

In the food systems of high and increasingly middle income countries processed foods are common and affordable. People in these countries consume “80–90 kilograms per person per year of energy-dense, ultraprocessed foods, with added salt, refined sugars, and low amounts of essential micronutrients”. IFPRI (2015). Populations in emerging economies and more rural food systems consume “20–30 kilograms of ultraprocessed foods per person each year, but this is growing faster than in developed countries”.

Obesity and diet-related non-communicable diseases are an increasing problem in developing countries: China as an example

China is an example of a country undergoing a transformation in its food system. During economic development, urbanisation and industrialisation, diets have changed and lifestyles have become more sedentary. As diets transition (more meat, more processed foods, more fats and sugars, fewer vegetables and legumes) new diet-related health challenges are emerging.

Adult and childhood obesity levels are increasing even though undernutrition does persist in some rural areas.

Adults:

- 28.5% men and 25.5% women overweight / obese.
- 10% diabetic + 15% prediabetic.

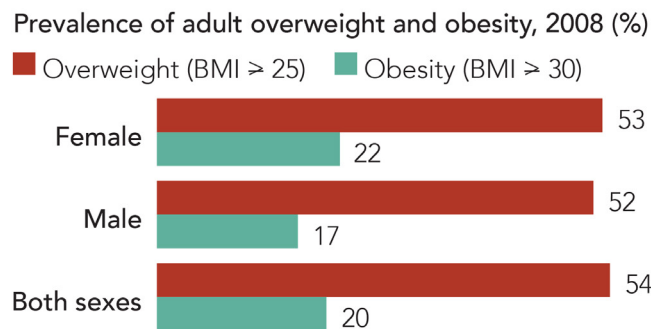
Children:

- 13% overweight or obese, 15% prediabetic.
- 1/3 have at least one cardiometabolic risk factor.

National trends in obesity are associated with economic development, but mediated by cultural and contextual factors

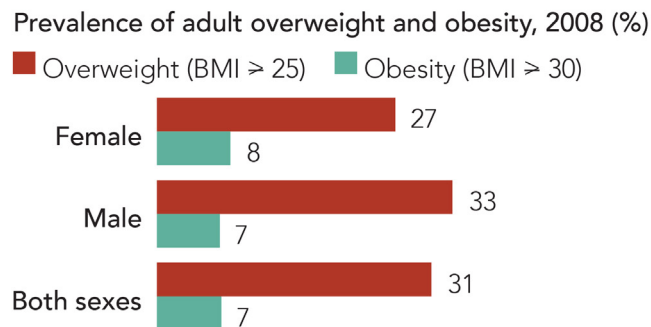
Brazil as an example

Some middle income countries now have obesity rates similar to high income countries.



The Republic of Korea as an example

Government public health driven campaigns to promote traditional diets may explain relatively low obesity rates. However the prevalence of eating disorders especially among young women is high.



Zimbabwe as an example

Obesity rates are lower in low income countries, but not insignificant. The challenge is to decouple obesity from economic development.

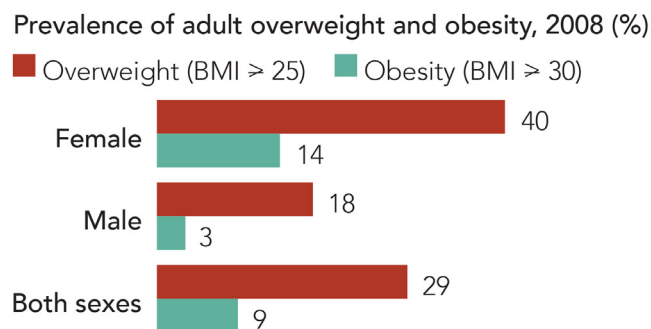


Figure 22: National prevalences in overweight and obesity, in Brazil, Korea, and Zimbabwe, according to sex.

Source Adapted from Mi Jun and Bae Choi (2014).

While there is a general trend towards increases in the prevalence of obesity with economic development, this is not always the case. Other factors such as culture and religion influence eating habits. Cultural beliefs and attitudes towards, for example, food and exercise, interact with other environmental factors and socio-structural dynamics, and this can create a predisposition towards overweight. See, for example, Sobal (2002).

7.7 What are the societal and economic consequences of malnutrition in all its forms?

7.7.1 Socio-economic costs of undernutrition

Global socio-economic costs of undernutrition remain high

Undernutrition causes physical and cognitive impairments, loss of economic productivity and increased related health costs.

Loss of economic productivity from undernutrition and micronutrient deficiency is estimated to amount to 2-3% of global GDP, between \$1.4-2.1 trillion. Good nutrition is obviously a requirement for health and well-being, and additionally for economic and labour productivity.

Improvements in nutrition can raise economic productivity and help to break poverty cycles: healthy mothers tend to have healthier babies. Healthy adults can work more, increasing their incomes and enabling them to spend more on education and health-care.

7.7.2 Economic costs of overconsumption

The global economic cost of obesity is significant and rising

The global economic impact from obesity is roughly \$2.0 trillion, or 2.8 percent of global GDP, roughly equivalent to the global impact from smoking or armed violence, war, and terrorism.

The McKinsey report estimates that the health-care costs to developed countries of treating obesity are estimated at between 2 and 7 percent of health-care spending. If indirect costs – e.g. the costs of treating related diseases such as Type 2 diabetes and heart disease – are included, then the costs rise to about 20 percent.

Whilst these costs are high in developed countries, they are increasingly significant in developing countries too.

Obesity is one of the top three global social burdens generated by human beings

Estimated annual global direct economic impact and investment to mitigate selected global burdens, 2012¹

GDP, \$ trillion

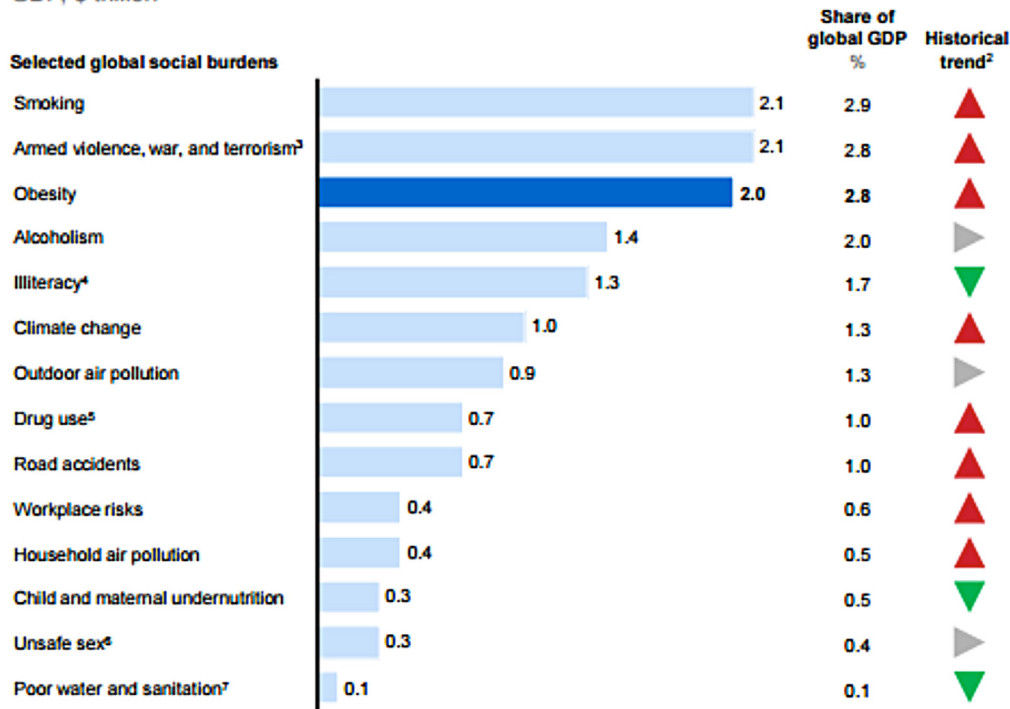


Figure 23: The Global economic impact of obesity is around \$2 trillion – 2.8% of global GDP.

Source McKinsey report (2014).

In China, in 2003, 3.7% of total national medical costs were attributable to overweight and obesity; this proportion is likely to have risen since then but is already greater as a percentage of total health expenditure than in Australia and Canada.

Economic costs for diabetes (see earlier in this chapter for associations between eating habits and Type 2 diabetes) were estimated to be \$245 billion in 2012 for the US, a 41% increase from 2007 estimates.

In the UK, estimated annual costs of treating Type 2 diabetes are £8.8 billion, predicted to rise to £16.9 billion by 2035.

Indirect costs to the economy from related factors, such as work sickness and loss of productivity are additional to this, and could be higher still.

7.7.3 Social costs of related non-communicable diseases

Social costs of related diseases are high: the example of Type 2 diabetes in the UK

- Diabetes accounts for around 23,300 premature deaths in England every year, most of which will be attributable to Type 2 diabetes (owing to its considerably higher prevalence than Type 1).
- Diabetes is the leading cause of blindness in people of working age in the UK.
- Over 100 amputations are carried out every week on people with diabetes because of complications connected with their condition. Up to 80 per cent of these are preventable.

7.8 Conclusions

- Food systems affect health in many ways:
 - Environmental health risks;
 - Food security and nutrition;
 - Infectious diseases and injuries;
 - Health equity impacts.
- But the link between food, diet and health outcomes is clearly an important one.
- Diet related problems are shifting, moving from “not enough” to “too much of the wrong kind”.
- But hunger and micronutrient deficiencies persist.
- Health impacts of poor diets are one element of other unhealthy lifestyle factors – i.e. part of an unhealthy ‘package’.
- The social and economic context is very important – poor people across the world have poorer diets and poorer health outcomes than the wealthy.
- The challenge is to identify what healthy and sustainable eating patterns look like, appropriate to different socio-economic, cultural and geographical contexts.

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