

SL IB Geography



Your notes

9.1 Measuring Food & Health

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Your notes

9.1.1 Global Patterns: Nutrition Indicators

Nutrition Indicators

- **Food security** is whether people have continuous access to a diet of sufficient quantity and quality to:
 - Meet daily health needs
 - Lead an active life

Four aspects of food security

- According to the World Bank, there are four main aspects of food security:
 1. Food **availability** - food production and trade in the supply sector
 2. Food **access** - financial or physical access to food at the household level
 3. The **use** of food - the way the body uses nutrients and energy is supported by food preparation, a balanced diet, and a proper diet
 4. **Stability** - consistency of the other 3 aspects over a period of time

Global food security

- There is enough food globally to feed everyone on the planet
- There are issues with **food insecurity** all around the world, in both LICs and HICs
- Weather, war, issues with crop growth, poverty, changing population rates and our changing diets impact food security
- Different areas of the world have too much or too little food
- We use nutrition indicators to measure and demonstrate these differences around the world

Indicators of malnutrition

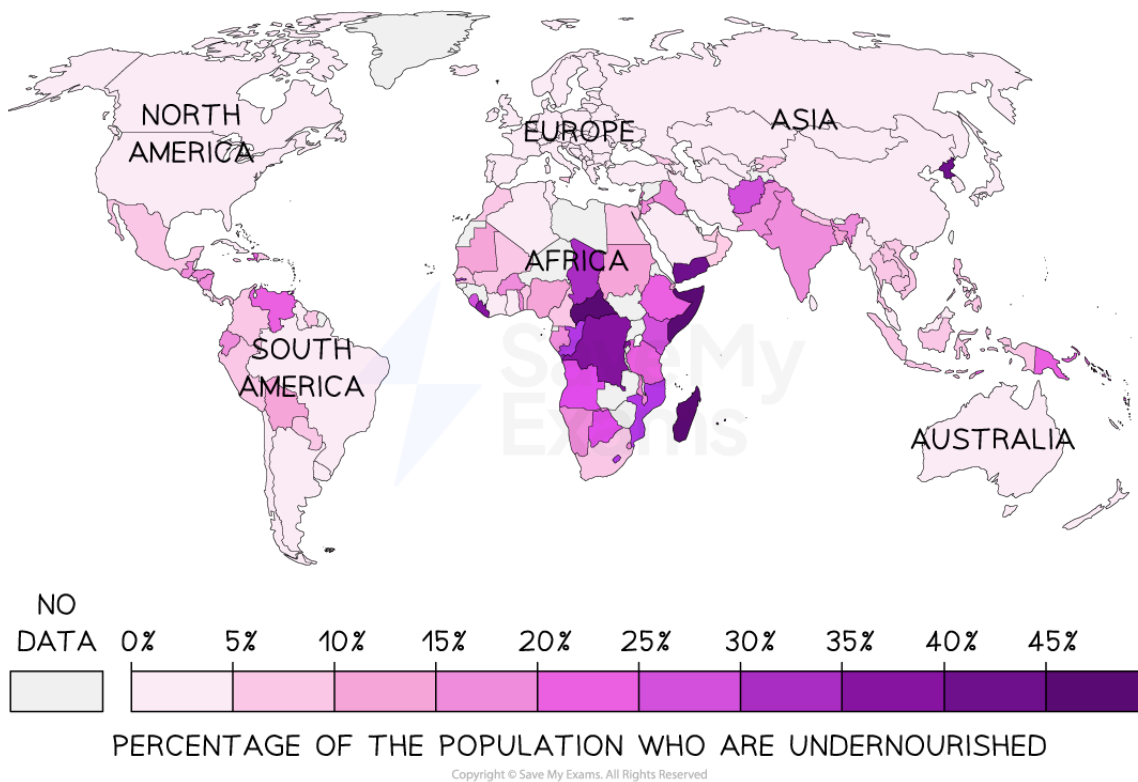
- **Malnutrition** occurs when a person isn't consuming the correct nutrients to stay healthy. This can be a **deficiency** or **surplus**
- Malnutrition can cause:
 - Weight loss (or weight gain)
 - Stunted growth
 - Poor resistance to infection
 - Diseases e.g. Kwashiorkor, Marasmus
 - Brain development issues
- The indicators of malnutrition include:
 - **Stunted growth** - height is smaller (with regard to age)
 - **Wasting** - weight is lower (with regard to height)
 - **Undernutrition** - not eating enough food (energy) over a year to meet dietary standards, resulting in:
 - Being underweight
 - Stunting and/or wasting in children
 - **Micronutrient deficiency**
 - **Micronutrient-related malnutrition/overnutrition** - excessive nutrient consumption, resulting in:
 - Being overweight
 - Obesity



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- Diet-related noncommunicable diseases, e.g. heart disease, cancer and diabetes
- Malnutrition can cause **famine**. Death occurs by **starvation** or deficiency-related diseases
- African, South Asian and South American countries have higher percentages of undernutrition
- An anomaly is North Korea
 - Due to North Korea's isolation, poor resource use and physical problems like natural disasters, undernutrition is high

Patterns in levels of undernutrition in 2020



Patterns in levels of undernutrition in 2020

Food Security Index

- The Global Food Security Index (GFSI) measures food security using **68 indicators**

The Four Categories of Indicators of Global Food Security Index

Category	Measured by
Affordability - the ability to afford food without issues,	Household expenditure in %
	Population below the Global Poverty Line in %



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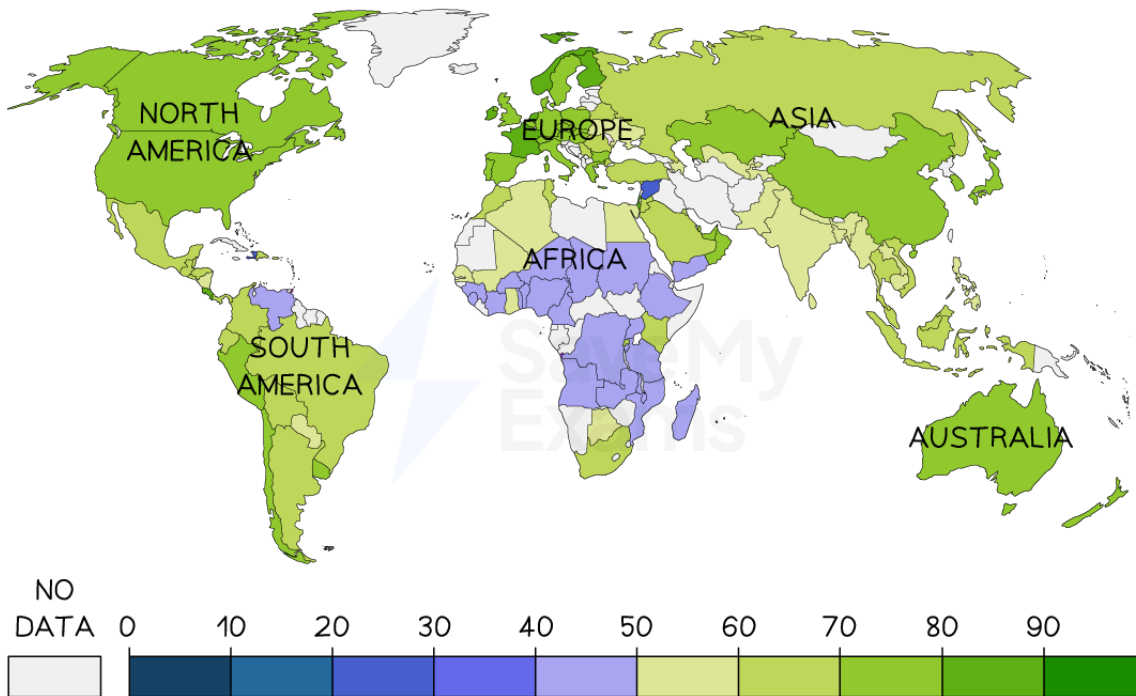
	<p>GDP per capita</p> <p>Import tariffs</p> <p>Existence of food safety-net programmes</p> <p>Financing for farmers</p>
Availability – the supply of food	<p>Sufficiency</p> <p>Money spent on the agriculture industry (research and infrastructure)</p> <p>Unpredictability and disruption</p> <p>Political stability e.g. corruption</p> <p>Loss of food</p> <p>Urban carrying capacity</p>
Quality and safety – average nutritional quality, variety of food and food safety,	<p>Diet diversification</p> <p>Protein quality</p> <p>Food safety</p> <p>Standards of nutrition</p> <p>Availability of micronutrients</p>
Sustainability and adaptation – understanding climate change and mitigation	<p>Exposure to climate change</p> <p>Impacts of climate change</p> <p>Natural resource risks</p> <p>Risk adaptation</p>

- Each indicator is measured between **0–100** (100 being the best)
- The **mean** of each indicator provides the score for each category
- The overall score of the GFSI is the **average** of each category
- LICs have lower GFSI scores, whilst HICs and NEEs have higher scores
- Africa has the majority of lower-scoring GFSI countries
- An anomaly is Syria

The pattern of the Global Food Security Index in 2022



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THE GLOBAL FOOD SECURITY INDEX SCORE

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The pattern of the Global Food Security Index in 2022

The Global Hunger Index

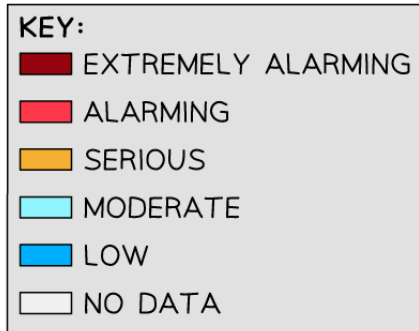
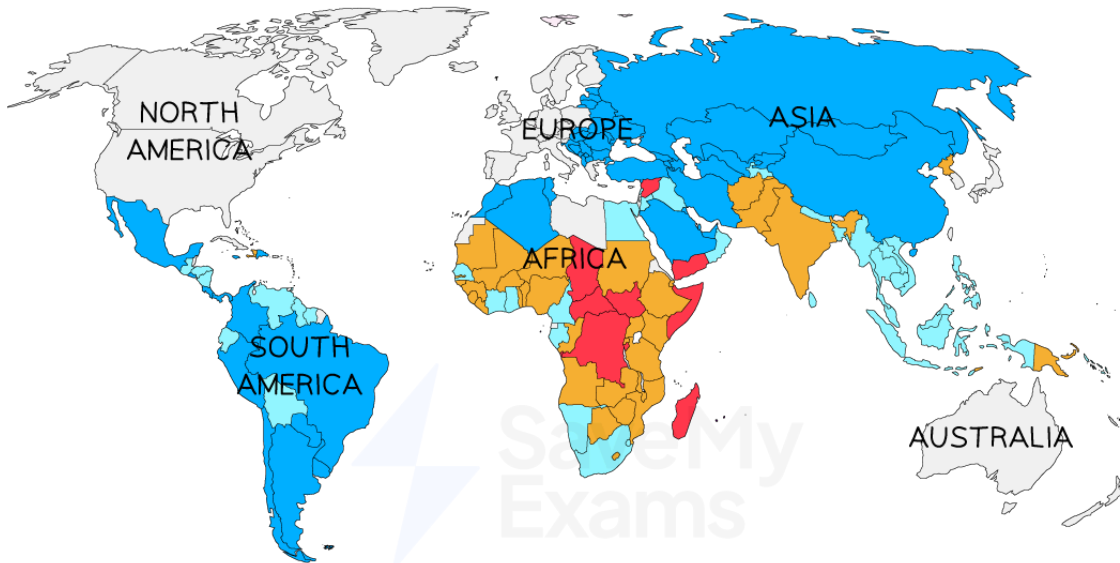
- The **Global Hunger Index (GHI)** measures the rates of hunger on different scales
- Three categories make up the GHI, with four indicators:
 - Inadequate food supply:
 - **Undernourishment** – how much of the population is undernourished (not consuming enough calories):
 - Measures both adults and children
 - Child Mortality
 - **Under-5 mortality** – the number of deaths per 1000 births:
 - Measures the deaths caused by hunger in vulnerable groups
 - Child Undernutrition
 - **Child stunting** – children under 5 who are smaller (according to their age) as a result of chronic (longer periods of) undernutrition
 - **Child wasting** – children under 5 who are underweight (according to their height) as a result of acute (shorter period) undernutrition:
 - It looks at the quality and utilisation of food, not just calories
- The GHI measures hunger from 0–100 (Low–Extremely Alarming)
- Overall, GHI is declining
- In 2022, no country was in the “Extremely Alarming” category

- Africa and South Asia have more countries labelled as “Alarming”



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The pattern of the Global Hunger Index in 2022



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The pattern of the Global Hunger Index in 2022

Calories per person/capita

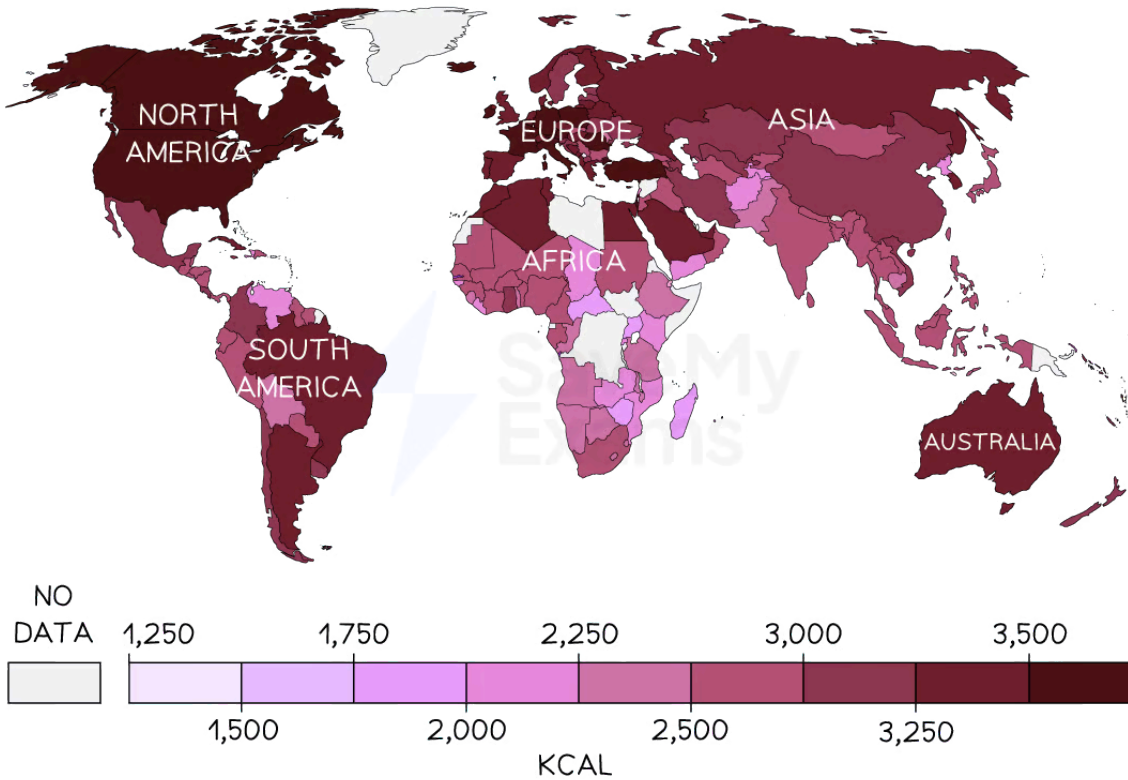
- Calorie measurement is how much energy a person consumes
- It is measured using kilocalories per person per day
- The **standard** calorie intake is 2000 for women and 2500 for men
- Generally, HICs have a higher calorie consumption than LICs
- Reduced calorie consumption can result in:
 - **Undernutrition**
 - **Malnutrition**
 - An increased likelihood of nutrition-related diseases
- Higher calorie consumption results in issues like obesity

- People in HICs may also experience **malnutrition** by:
 - Being in poverty/under the poverty line
 - Eating enough calories but not getting the correct/enough nutrients



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The pattern of calories per person in 2018 (supply not consumption)



The pattern of calories per person in 2018 (supply not consumption)

Advantages and disadvantages of nutrition indicators

Nutrition indicator	Advantages	Disadvantages
Global Food Security Index	Has lots of components, taking into account different factors Sustainability and adaptation were added later, reflecting the effects of climate change on food security	Measurements may be inaccurate Needs to take into account other factors, like cost of living, currency differences and inflation



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The Global Hunger Index	<p>Lots of components, taking into account different factors</p> <p>Measures whether Sustainable Development Goals are being met</p>	<p>Some countries have no data e.g. malnutrition rates in Higher Income Countries may not cause high mortality rates</p> <p>Some countries' data is provisional, due to a lack of information</p> <p>Focuses mainly on children, yet the overall index figure assumes the entire population</p>
Calories per person/capita	<p>Simplistic measurement of general nutrition levels</p> <p>Quantitative measurement</p> <p>Helps to show the level of development and food production efficiency</p>	<p>Isn't enough on its own. Other indicators help to provide a bigger picture</p> <p>Ignores regional variations, demographic groups and yearly fluctuations</p> <p>Doesn't include nutrients, just energy</p>
Indicators of malnutrition	<p>Useful for showing the effects of malnutrition</p> <p>Includes deficiency and excess</p>	<p>Doesn't look at the causes or other socio-political factors</p>

 **Examiner Tip**

Make sure you know the different advantages and disadvantages of each nutrition indicator. You might be asked to compare or discuss how useful they are.

9.1.2 Nutrition Transition



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Nutrition Transition

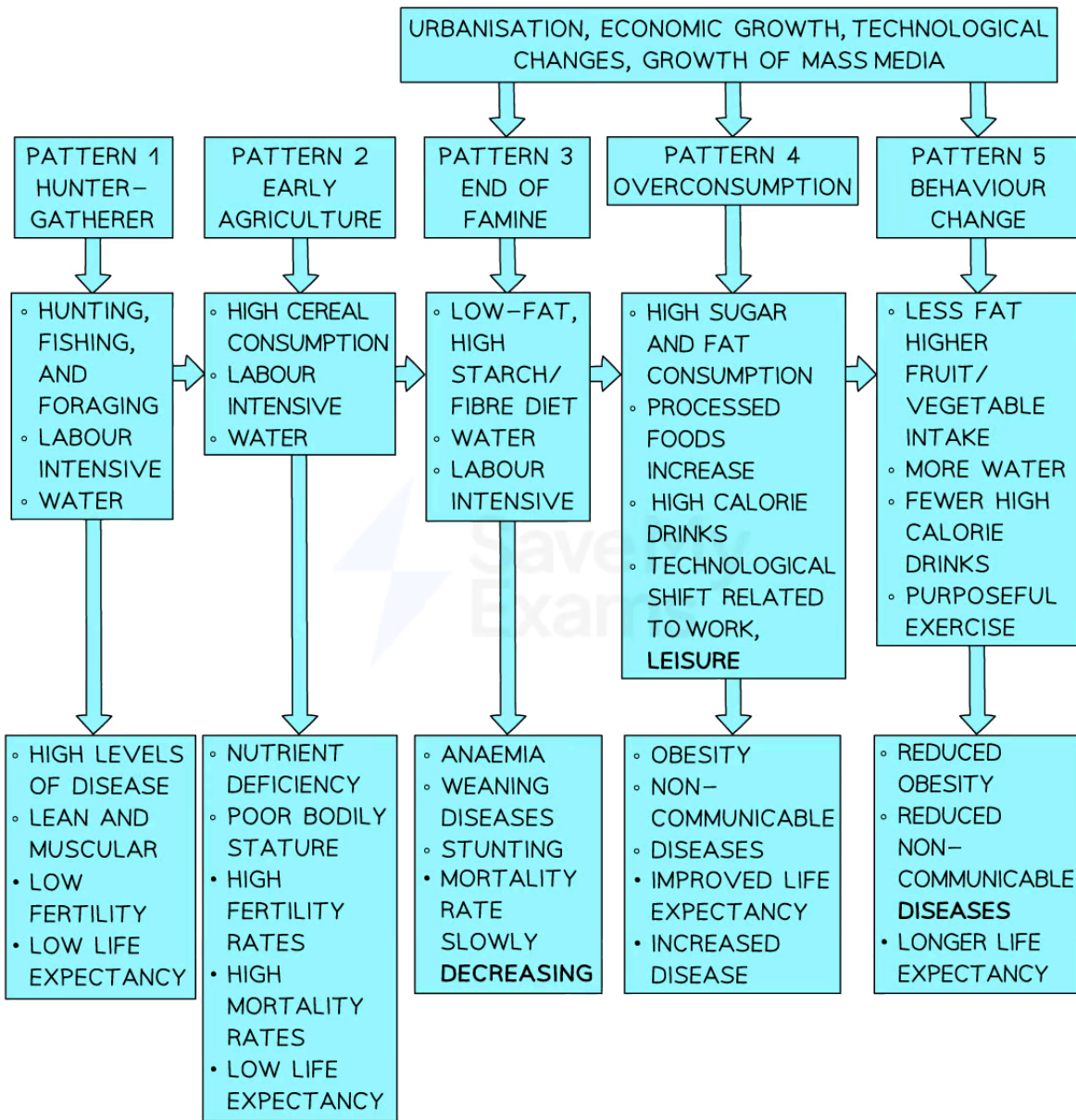
The Nutrient Transition

- The Nutrient Transition is a model showing advancement in diet, in relation to demographic, economic and social change
- It shows changes in diet and associated diseases as societies progress
- The Nutrition Transition has five sections:
 - **1: Hunter Gatherer**
 - **Palaeolithic** man
 - Traditional early lifestyle
 - **2: Early Agriculture**
 - Early monoculture
 - Famine begins
 - **3: End of famine**
 - Period of industrialisation
 - Wealth increases
 - Nutrition gradually improves
 - **4: Overconsumption**
 - **Noncommunicable** or chronic diseases
 - Wealth increases
 - **5: Behaviour change**
 - Societal change and development

The Nutrition Transition



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The Nutrition Transition

- **LICS** are typically located in patterns 1–3, where they are slowly moving to pattern 4:
 - Many countries have moved to a Western diet. It is more energy-dense, bringing with it more diseases associated with Pattern 4 diets
- **HICs** are located in patterns 4 and 5



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Regional Variations of Food Consumption

- Food consumption varies within countries and between countries
- Diets may vary depending on the pattern of the nutrition transition

Coefficient of Variation in calorie intake

- The **coefficient of variation** measures how dispersed the data is from the mean (how much change there is from the average of a data set)
- The coefficient of variation for calorie intake shows the **inequalities** of calorie intake within a population
- A **higher** coefficient of variation shows there is **more** inequality
- African, Asian and South American regions have more calorie intake inequalities:
 - There are stark differences between the rich and poor in these countries
- Obesity** is much higher in much of the Americas, Europe, North Asia and Oceania
- Obesity is lower in much of Africa and Southern Asia
- Some countries within Africa are higher:
 - Caused by dietary change from traditional to more Westernised choices
 - A result of increasing urbanisation, reduced activity and improvements in transport

Examiner Tip

Think about what the increase in obesity levels tells you about nutrition choices. What stage of the Nutrition Transition are many of these countries in? Ensure you consistently link such patterns back to the Nutrition Transition; it'll help you support your point!

Variations of food type

Food type	Regional variation
Fruits	<p>The Americas, Europe, Northern Asia and Oceania consume moderate to higher fruit densities</p> <p>Lower rates of fruit consumption lie in the African continent and some Asian regions</p> <p>There are numerous anomalies. Countries like Ghana, Malawi and Uganda have a higher fruit consumption than many Western countries</p> <p>Countries like Pakistan, Afghanistan, Turkmenistan, Lithuania and Cambodia (among others) also show unusual anomalies</p>
Vegetables	<p>North America, Europe, Asia (excluding East Asia), and Oceania have a higher vegetable consumption</p> <p>Much of North Africa also has a higher vegetable consumption, but Southern Africa and parts of West Africa are much lower</p> <p>Lower rates are also found in parts of South America</p>



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Sugars and Sweeteners	<p>The Americas, Europe, Oceania, North, South and Central Asia, as well as parts of northern and southern Africa, consume high amounts of sugar and sweetener</p> <p>East Asia and much of central Africa have lower rates of sugar and sweetener consumption. Countries like China, Niger and Ethiopia (among others) consumed less than 25g a day in 2015</p> <p>Overall, global sugar and sweetener consumption is relatively high, with much of the world consuming more than 75g per day in 2015</p>
Meat consumption	<p>Meat consumption is higher in America, Europe, Northern Asia and Oceania. Africa and South/East Asia have lower meat consumption rates</p> <p>North Korea is an anomaly</p>

 **Examiner Tip**

Think about these different regional variations in consumption. What are the reasons for the variations and how can you link them with the Nutrition Transition?



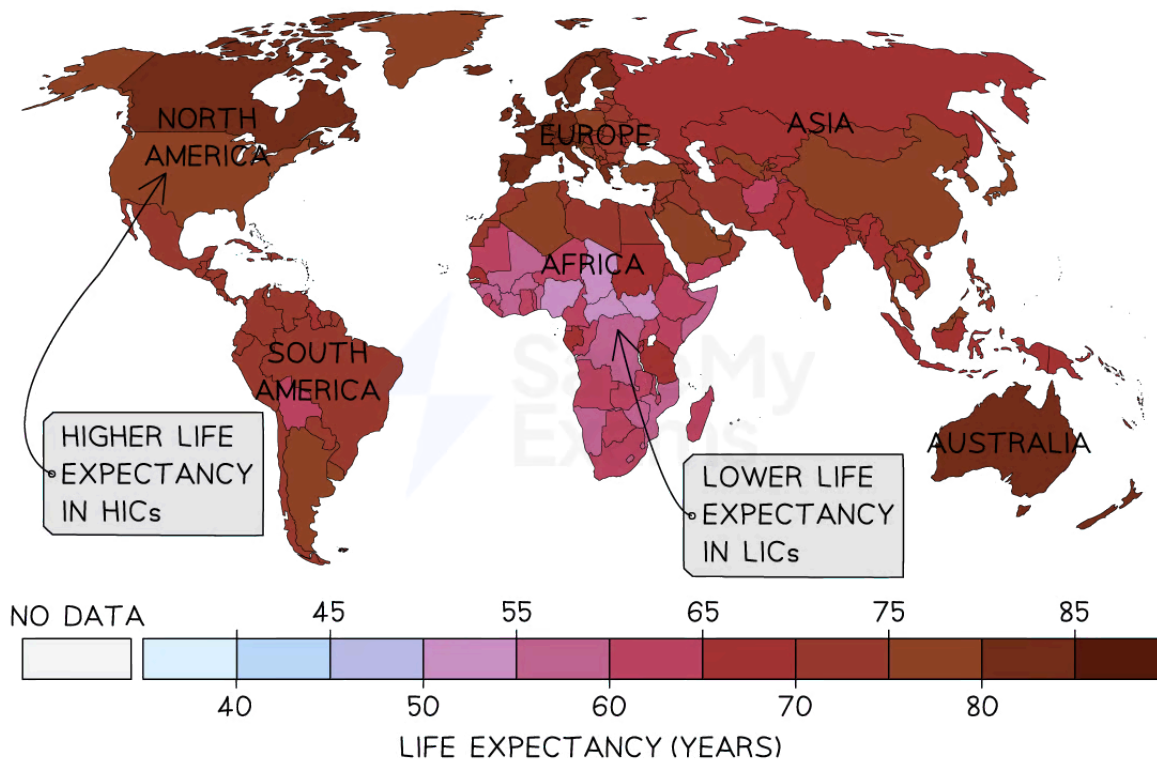
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9.1.3 Health Indicators

Global Patterns in Health Indicators

- Health indicators describe and measure world health
- They show the differences in health and **health inequality** across the world
- The indicators are useful for showing rates of **life expectancy** and the difference in life expectancy between **LICs** and **HICs**
- Life expectancy is higher in countries where good quality healthcare, sanitation, clean water and good hygiene practices exist

Map showing global life expectancy in 2021.



Map showing global life expectancy in 2021

Health-adjusted life expectancy (HALE)

- HALE is the length of time a person will live, **unaffected** by sickness or disease:
 - It is how long a person lives in **good health**
 - It considers those years in which a person may spend in ill health or injured
- HALE calculates the average healthy years of people in an area using morbidity and mortality statistics



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- The World Health Organisation analyses patterns and trends and updates the HALE figures every two years
- HALE is higher in countries with quality healthcare and health policies aimed at decreasing disease severity and chronic conditions
- HALE is also higher in countries with **high education rates**
- **The Sullivan Method** is used to work out HALE:
 - It is calculated by:
 - The likelihood of disability/inability to perform activities – life expectancy
- **Multistate Life Expectancy Tables** contribute to HALE:
 - These show how people may develop/recover from certain illnesses
- The Americas have the highest HALE, whilst Africa has the lowest

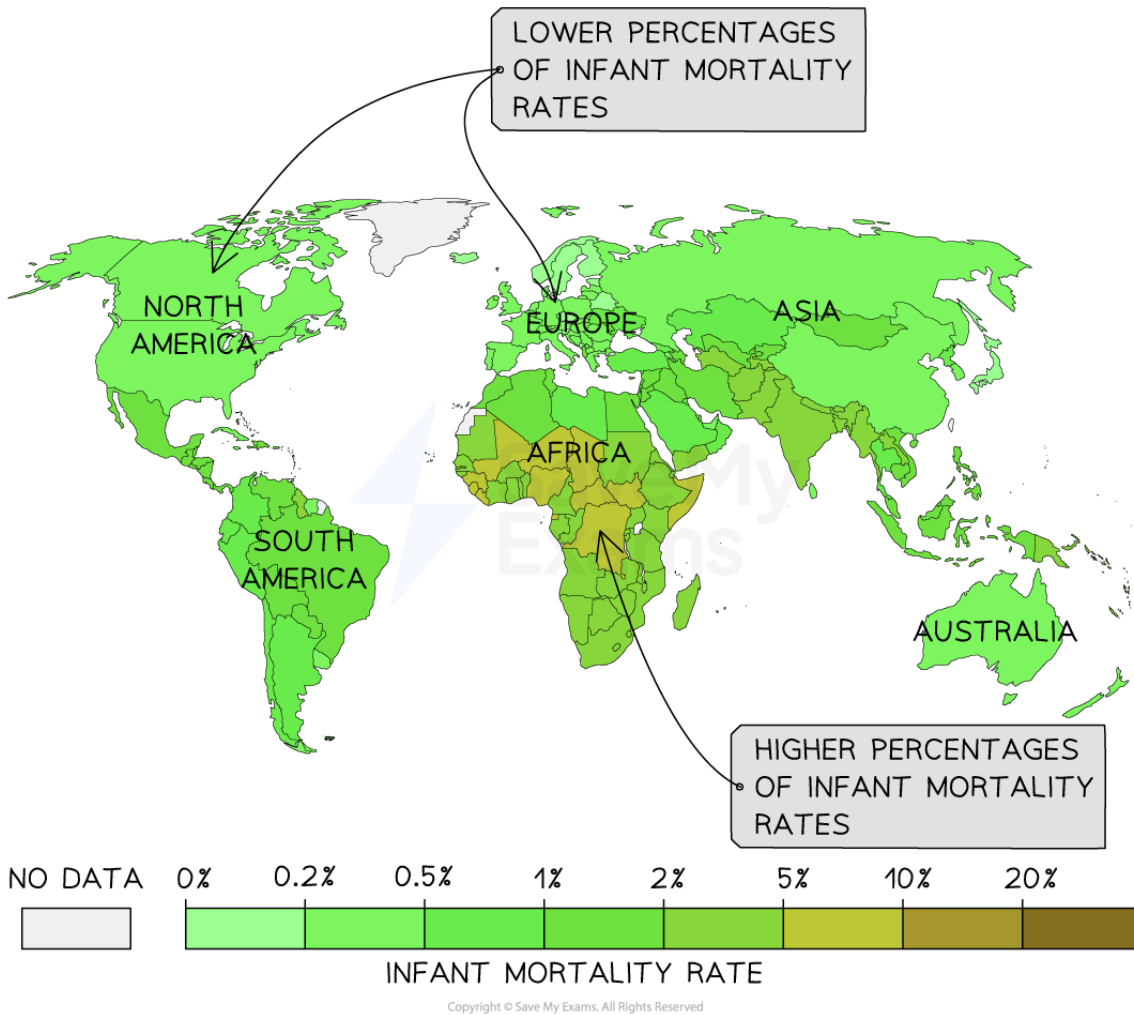
Infant Mortality

- **Infant Mortality** is the number of children who die before the age of 1 (per 1000 living births)
- This can indicate the **maternal health** levels in a country
- Infant mortality rates are **lower** in **HICs** and **higher** in **LICs**
- Infant deaths can be caused by malnutrition, premature birth and diseases like HIV/AIDS, malaria and pneumonia
- The highest infant mortality rates are in Sub-Saharan Africa and parts of southern Asia 200 years ago
 - The infant mortality rate was high as a result of **poverty**, **disease**, and **famine**
- The global infant mortality rate is **decreasing**
- In 2020, the average across the world was 4.3%

Map showing global infant mortality rate in 2021



Your notes



Map showing global infant mortality rate in 2021

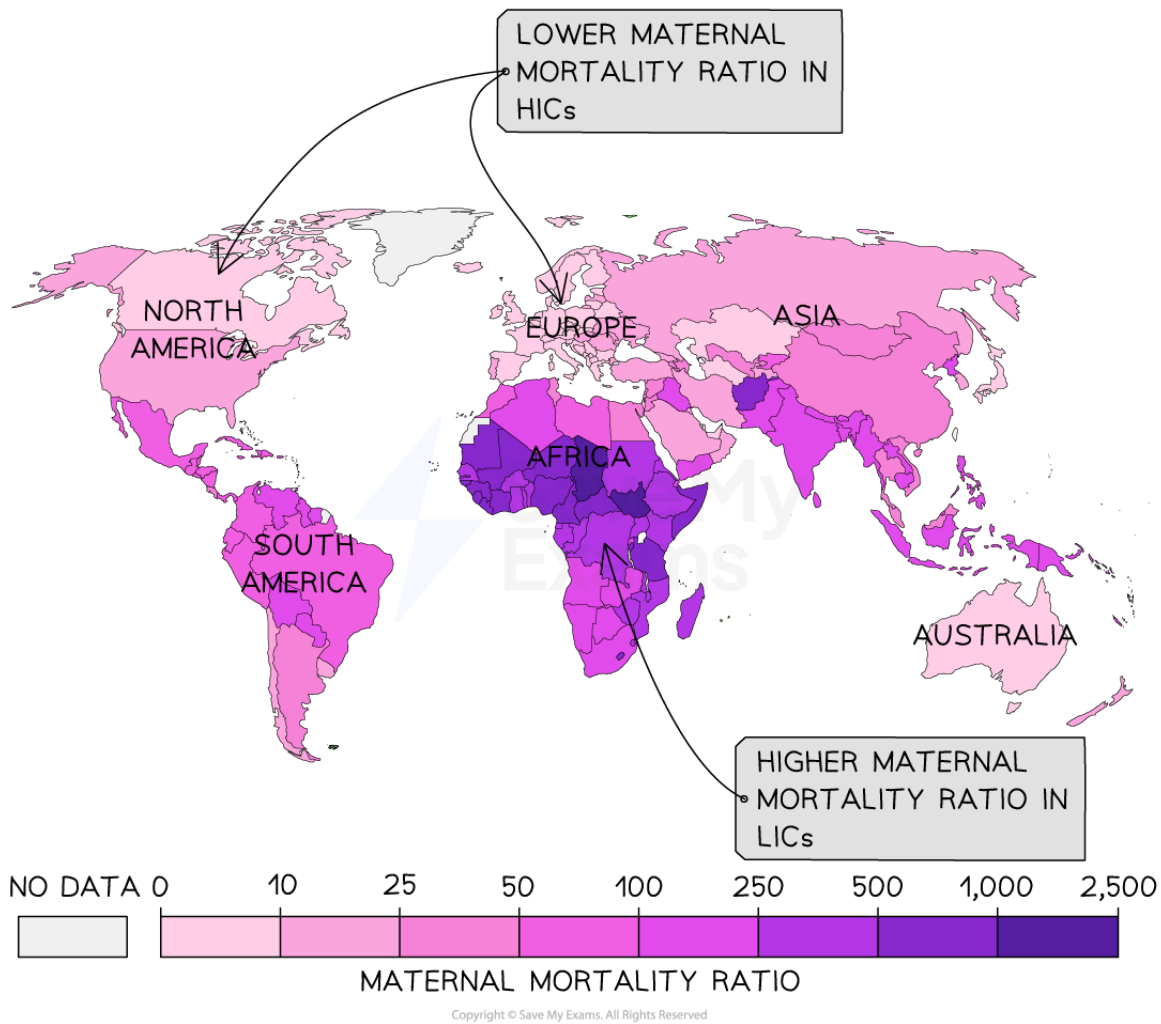
Maternal Mortality

- **Maternal mortality** is the yearly death rate of women as a result of/exacerbated by pregnancy or childbirth (or within 42 days of a pregnancy termination)
- The ratio of maternal mortality is calculated by:
 - $\text{Maternal deaths} \div \text{live births} \times 100,000$
- Maternal mortality is **higher** in LICs and **lower** in HICs
- Higher maternal mortality rates occur in much of Sub-Saharan Africa, southern Asia and South America
- Historically, childbirth was incredibly **dangerous**
- As **healthcare** and **hygiene** have improved, maternal mortality has gone down

Map showing global maternal mortality rates in 2020



Your notes



Map showing global maternal mortality rates in 2020

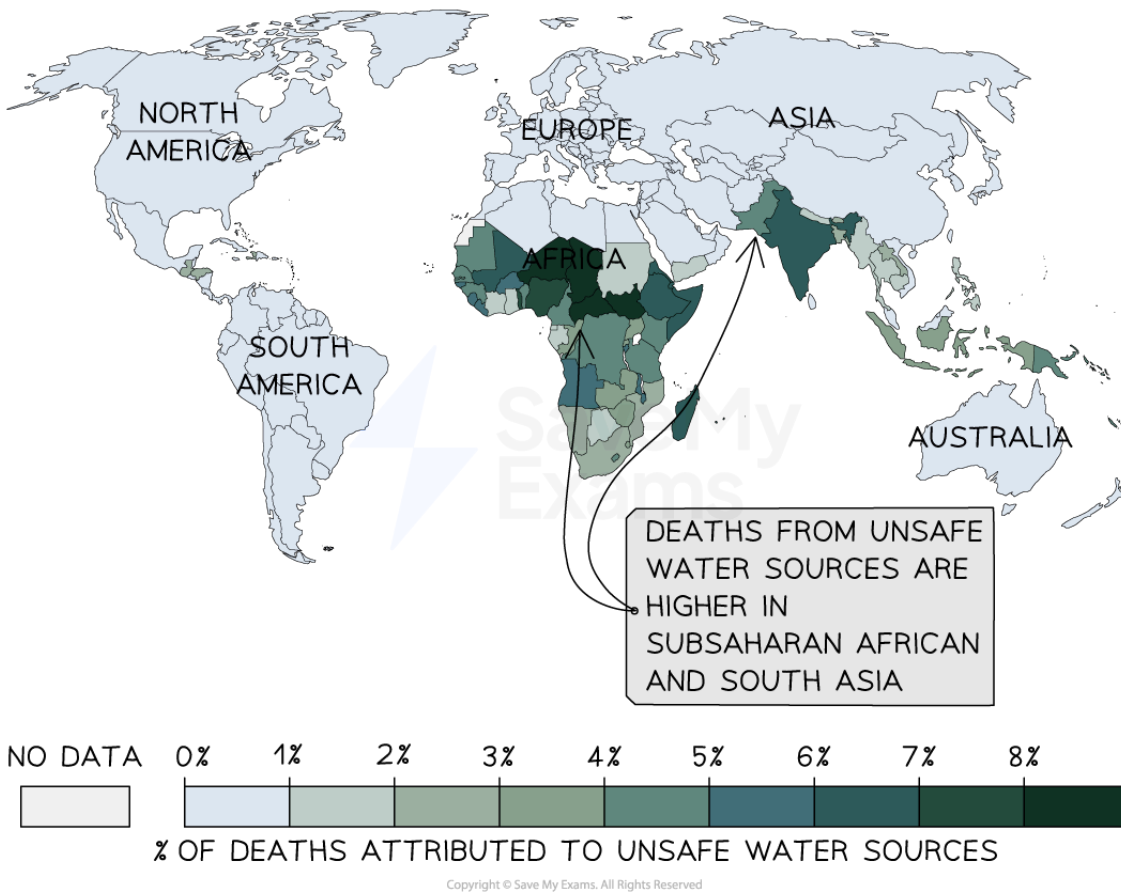
Access to Sanitation

- Access to clean/safe water and sanitation is often used to measure the general health of a population
- Poor sanitation and dirty water result in **waterborne diseases** like cholera, typhoid, diarrhoea and dysentery
- A **triple threat** occurs from **poor sanitation, unsafe water** and **poor hygiene**
- **LICs** have **higher death rates** caused by unsafe water, as a result of:
 - Poverty
 - Poor infrastructure
 - Political issues
 - Climate change and natural disasters
- More deaths from unsafe water occur in Sub-Saharan Africa and South Asia

Map showing the deaths attributed to unsafe water sources in 2019



Your notes



Map showing the deaths attributed to unsafe water sources in 2019

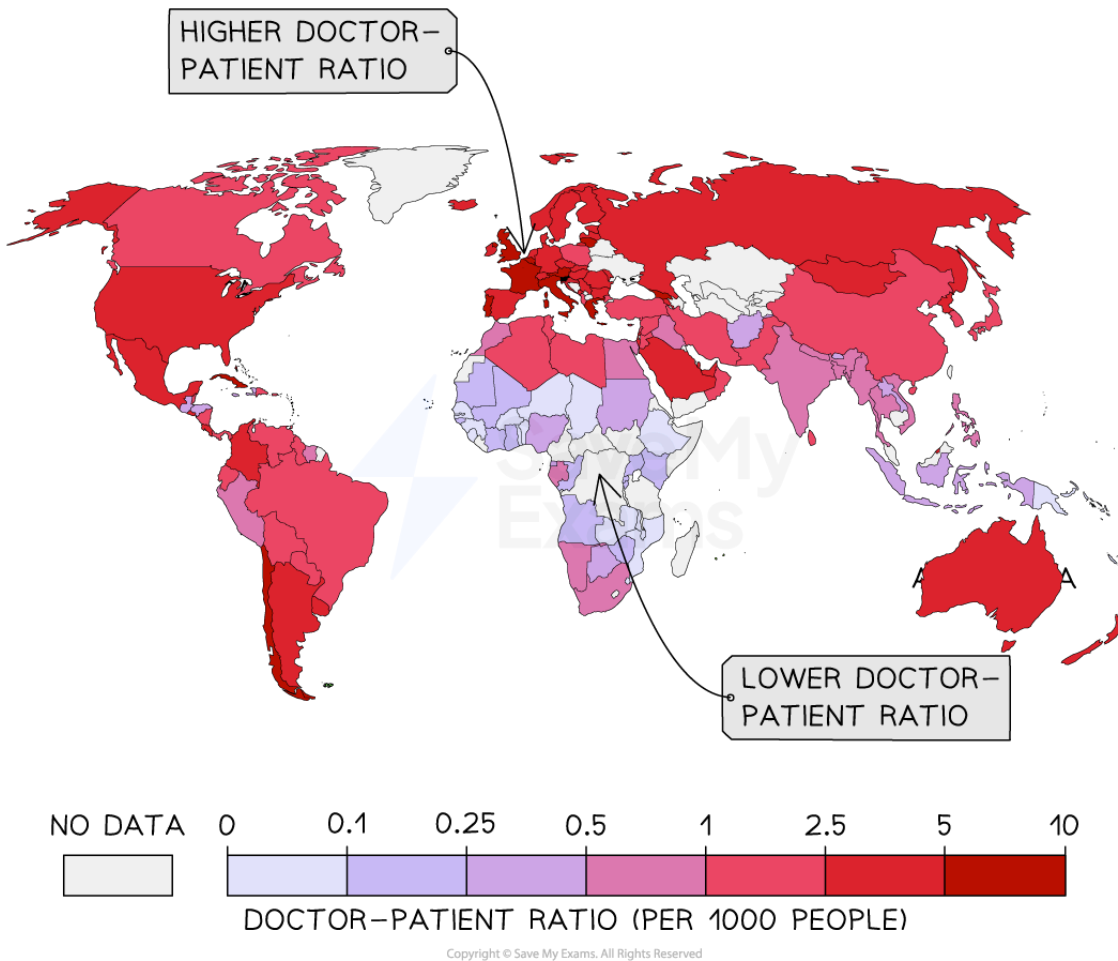
Doctor/Patient ratio

- The **doctor-to-patient ratio** describes how many doctors there are for every 1000 people
- This shows whether people have adequate access to healthcare services, medical professionals and infrastructure like surgeries, clinics and medical education centres
- **HICs** tend to have a **higher** doctor-to-patient ratio, whereas in **LICs** the ratio is much **lower**
- There is a much lower doctor-to-patient ratio in much of Africa, Southern Asia and parts of South America
- The highest doctor-patient ratios are mainly in European countries, with a few **anomalies** like Chile, Georgia, Israel and Cuba

Map showing the number of doctors per 1000 people in 2019



Your notes



Map showing the number of doctors per 1000 people in 2019

Strengths and Weaknesses of Health Indicators

Health Indicator	Strengths	Weaknesses
HALE	<p>Better than life expectancy, which measures all years in equal health</p> <p>Good for showing the health of the population, rather than just how long they live for</p> <p>Highlights specific groups e.g. gender and race have categories</p>	<p>It is very complicated</p> <p>It doesn't measure the disability of a person. The DALY indicator helps to support this</p> <p>Some data is unreliable</p>



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	Regular updates of figures	
Infant Mortality	<p>It helps to indicate levels of development, e.g. female education, sanitation and maternal healthcare</p> <p>Useful for guiding policymakers on development</p>	<p>Only shows below the age of one</p> <p>Doesn't show how many deaths have occurred</p> <p>Only shows live births; it doesn't include children who died during birth</p> <p>It doesn't show variations within a country</p> <p>May not indicate socio-economic issues, but political issues instead, e.g. China's One Child Policy</p>
Maternal mortality	Shows level of development, e.g. maternal healthcare, education for mothers	<p>Higher figures in LICs may be due to higher birth rates</p> <p>It is difficult to measure as healthcare systems may be less advanced</p> <p>Even in developed countries, some are poorly categorised or not reported</p>
Access to sanitation	<p>Shows the disease prevalence in water</p> <p>Indicates the level of development a country may have, which can influence policy-making</p>	<p>May not show variations within a country</p> <p>Does not indicate education levels; water may be safe but knowledge about hygiene is poor</p> <p>Rapidly developing figures, as development improves, may need constant updates</p>
Doctor/patient ratio	Gives information about the state of healthcare (people and infrastructure)	This is quantitative. It does not show the healthcare quality or the skills of professionals

Supports other indicators, e.g. a higher doctor-patient ratio will result in lower infant mortality and general death rates

Doesn't indicate whether there is enough money for professional healthcare to function well

Figures can differ between urban and rural areas, skewing the overall density of doctors



Your notes

Examiner Tip

Ensure you know each health indicator's strengths and weaknesses. You might be asked to discuss their effectiveness in describing patterns in global health!



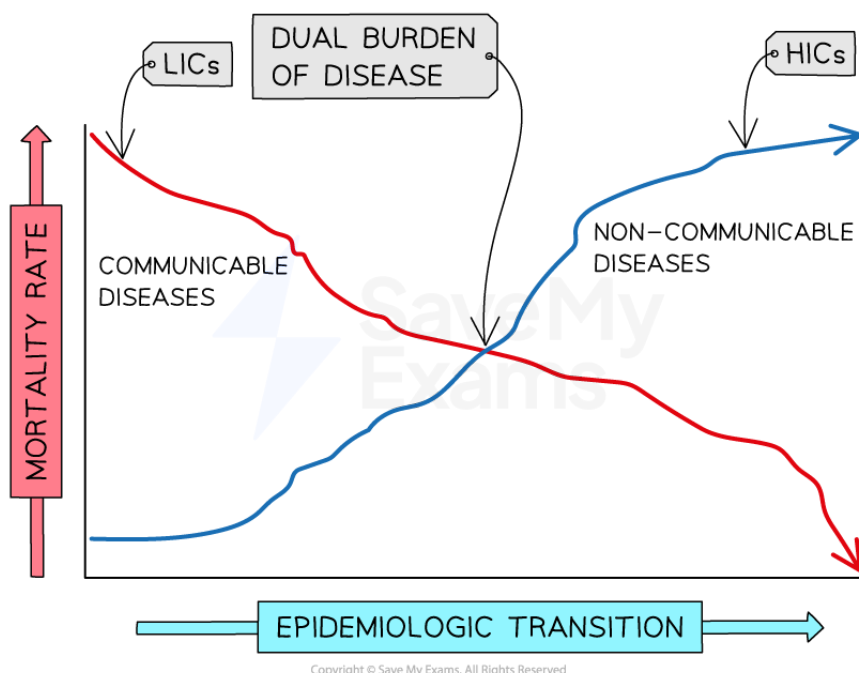
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9.1.4 The Epidemiology Transition

The Disease Continuum

- The **Epidemiology Transition** describes fluctuations in disease and morbidity
- It directly links to the **Nutrition Transition** and Demographic Transition:
 - Dietary changes occur as countries become more developed
 - As a result, there are fluctuations in disease and morbidity
- As development improves and diets change:
 - **Communicable** (infectious) disease rates will go down
 - **Noncommunicable** (non-infectious) disease rates will increase
- At the **beginning** of the Epidemiology Transition:
 - Countries are **less developed** and **mortality rates** for communicable diseases are **high**
 - There are low rates of non-communicable disease
- Towards the **end** of the Epidemiology Transition:
 - **Development is higher** and **mortality** rates for noncommunicable diseases **increase**
 - There are low rates of communicable disease
- Where the lines **intersect** indicates a **dual burden of disease**:
 - Both **communicable** and **non-communicable** diseases exist
 - This burden affects some LICs and NEEs e.g. India

The Epidemiology Transition



The Epidemiology Transition

The Disease Continuum

- The Disease Continuum looks at **diseases of poverty** and **diseases of affluence**
- **Diseases of poverty** are diseases located in poorer areas. This can be in LICs or areas within HICs:
 - Diseases of poverty include **communicable** diseases, **parasites** and **deficiency** diseases e.g. HIV/AIDS, malaria, kwashiorkor, tuberculosis and waterborne diseases like cholera
 - This is a result of poor education, poor sanitation access and hygiene, unsafe water, poor nutrition, and inadequate healthcare
- **Diseases of affluence** are diseases located in richer areas, typically in HICs:
 - This includes **noncommunicable** diseases, like heart disease, type 2 diabetes, obesity and some allergies and asthmas
 - It can also include **longevity-related illnesses** like dementia (as life expectancy is longer)
 - May also include **mental health issues** like stress and depression
 - This is a result of westernisation, overconsumption of diets and lifestyles and longer life expectancy
 - Diseases of affluence are steadily making their way into poorer countries as they develop further

Examiner Tip

Make sure you know the difference between diseases of poverty and diseases of affluence. You might be asked to discuss the difference between the two. How can the disease continuum relate to the Epidemiological Transition? How can it all be tied in with the Nutrition Transition?



Your notes



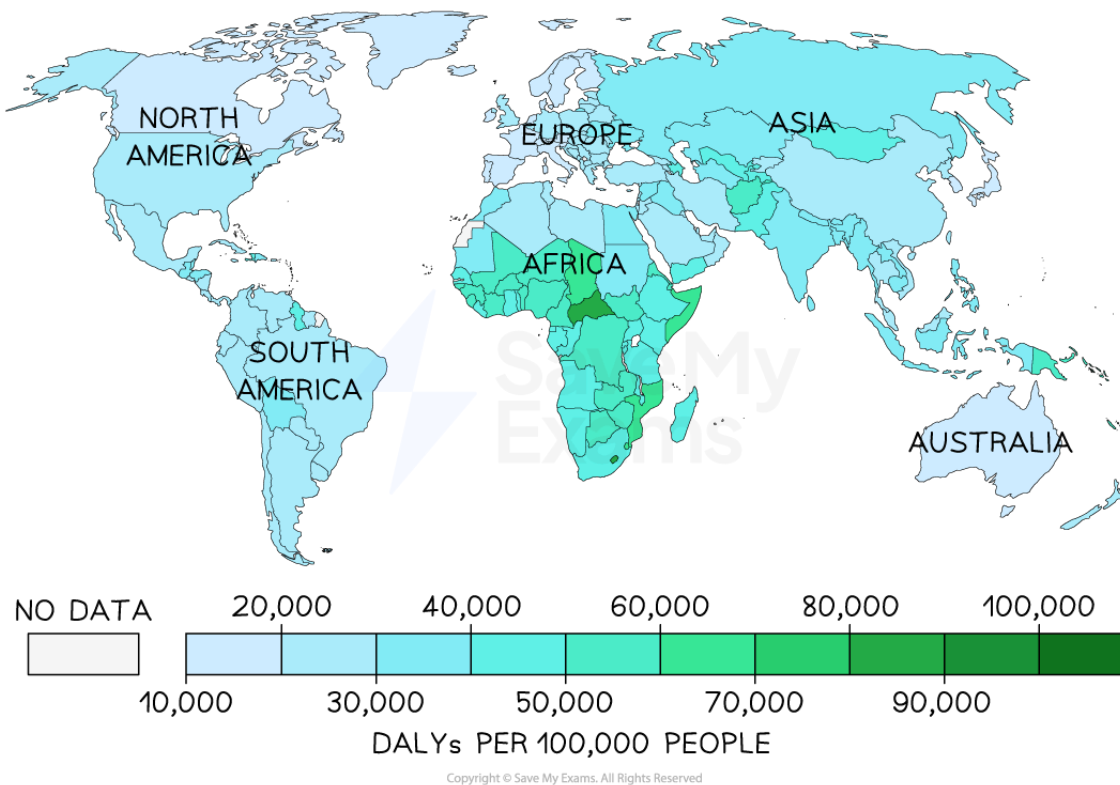
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Implications of a Global Ageing Population

Implications of a global ageing population for disease burden

- The **disease burden** is how much strain a health issue places on the population:
 - The disease burden = morbidity + mortality
 - It is measured using Disability-Adjusted Life Years (DALYS)
 - Higher DALYS indicate a higher disease burden

Burden of disease in 2019, per 100,000 people



Burden of disease in 2019, per 100,000 people

- Life expectancy is rising, predominantly in HICs. However, it is also rising in LICs as they develop
- As **life expectancy** rises, more people reach old age
- In many countries, **birth rates** are also decreasing:
 - **Rising life expectancy** and **decreasing birth rates** leads to an **ageing population**
- In many countries with an ageing population, a large proportion of the population is older, e.g. Japan or Germany
- If there are more older people, there are more old-age-related **diseases**
- These include **degenerative** diseases like dementia or arthritis, as well as heart conditions and diabetes:
 - This puts a **strain** on healthcare systems

- There will be a greater **demand** for workers and infrastructure
- More **resources** go towards this sector of healthcare, leaving other sectors behind
- This produces a disease burden as a result of ageing populations



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