



Burden of disease



DALYs & QALYs

OSMOSIS.org

COST of illness



Incidence

Prevalence

death / cure



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Health Outcome

•In health economics, the term ‘**outcome**’ is used to describe the **result** of a **health care intervention** weighted by a value assigned to that result. i.e.:

Complete recovery, **incomplete recovery**
(**chronic**) or **disability**, or **death**.

How Disease Holds **US** back

Burden Of Disease عبء المرض

- **Abnormal condition affecting the body**
- Pain, Dysfunction, Stress, Social Problem & Death
- Infectious and non-infectious causes

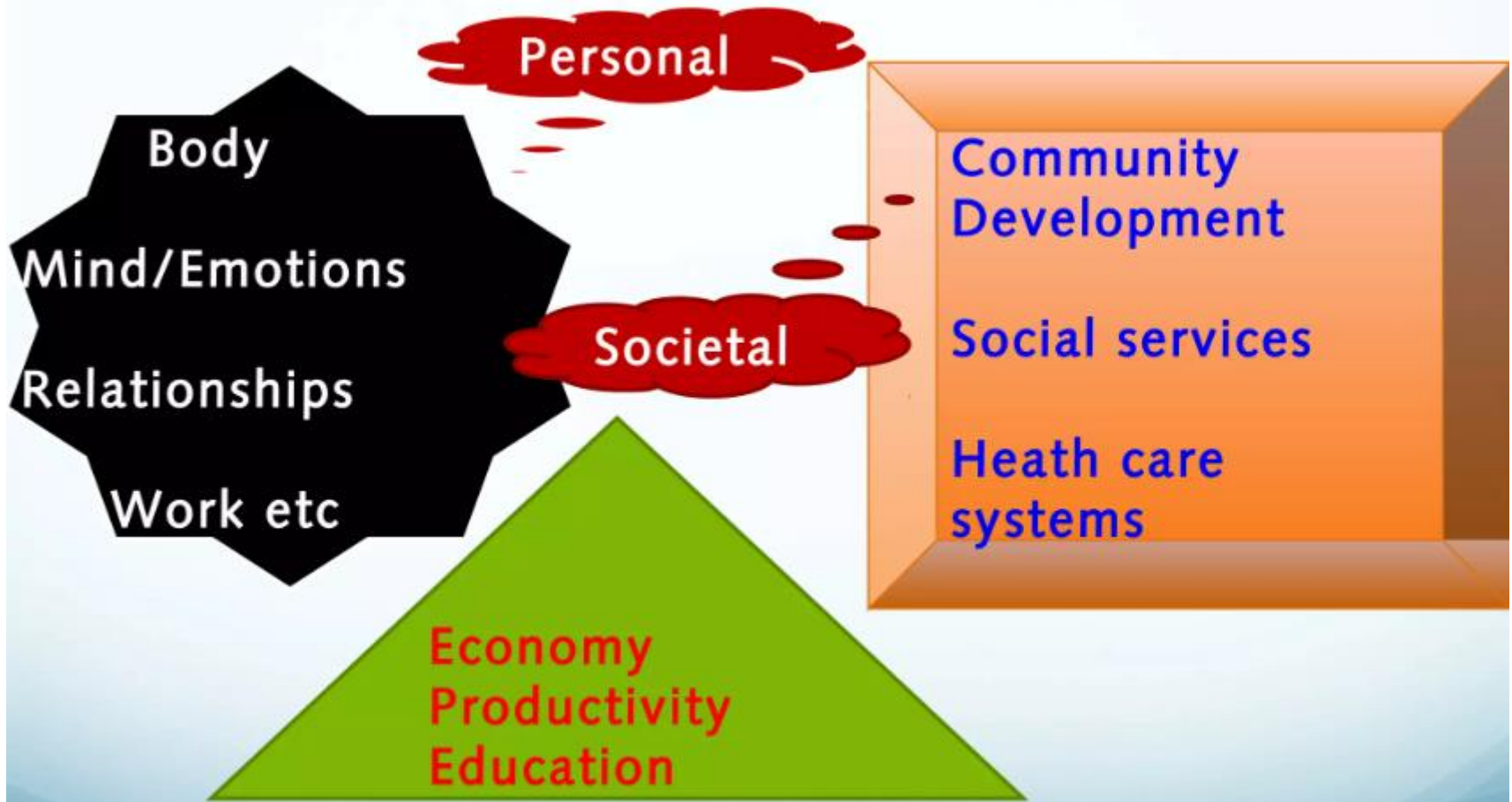
Global burden of disease (GBD)

■ **GBD** is a comprehensive **regional** and **global** **assessment** of mortality and disability from **diseases**, **injuries** and **risk factors**.

■ It provide a **full picture** of which diseases, injuries and risk factors contribute the most to poor health in a specific population, including:

- Identification of the most important health problems and
- Whether they are getting better or worse over time.

EFFECTS OF BOD



Aim

- Cost of illness or burden of illness studies aim to assess the overall economic effects of illness and disease on individuals, the health service, the economy and society.
- They serve as points of reference for economic analyses مرجعية للتحليلات الاقتصادية and are useful in highlighting the impact that illnesses and diseases have on **health services and societies**.
- ‘Cost of illness’ studies provide suitable evidence in determining whether more resources should be devoted تخصص to a given disease.

Data collection tool: Medical Outcomes Study Questionnaire Short Form

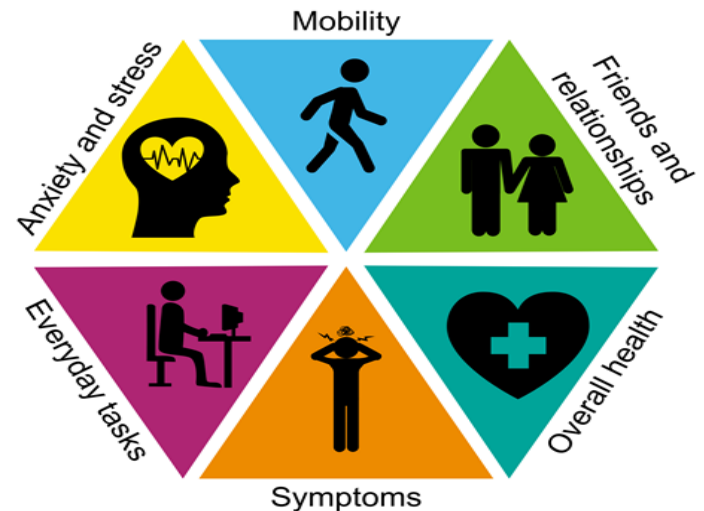
SF-36 Questionnaire, a patient self-reporting data collection tool for routine monitoring and assessment of care outcomes in adult patients.

A paired comparison questionnaire on statements related to the illness and the health outcome (result) which ranges between :

- **Perfect** health = **0**,
- **0.3** = common results for long term **chronic** diseases, to
- **Disability** = **1**

Quality of life (QOL)

- QOL is the general well-being of individuals and societies, outlining negative and positive features of life, and people expectations for a good life.
- QOL contributes to one's subjective well-being - is called life satisfaction.



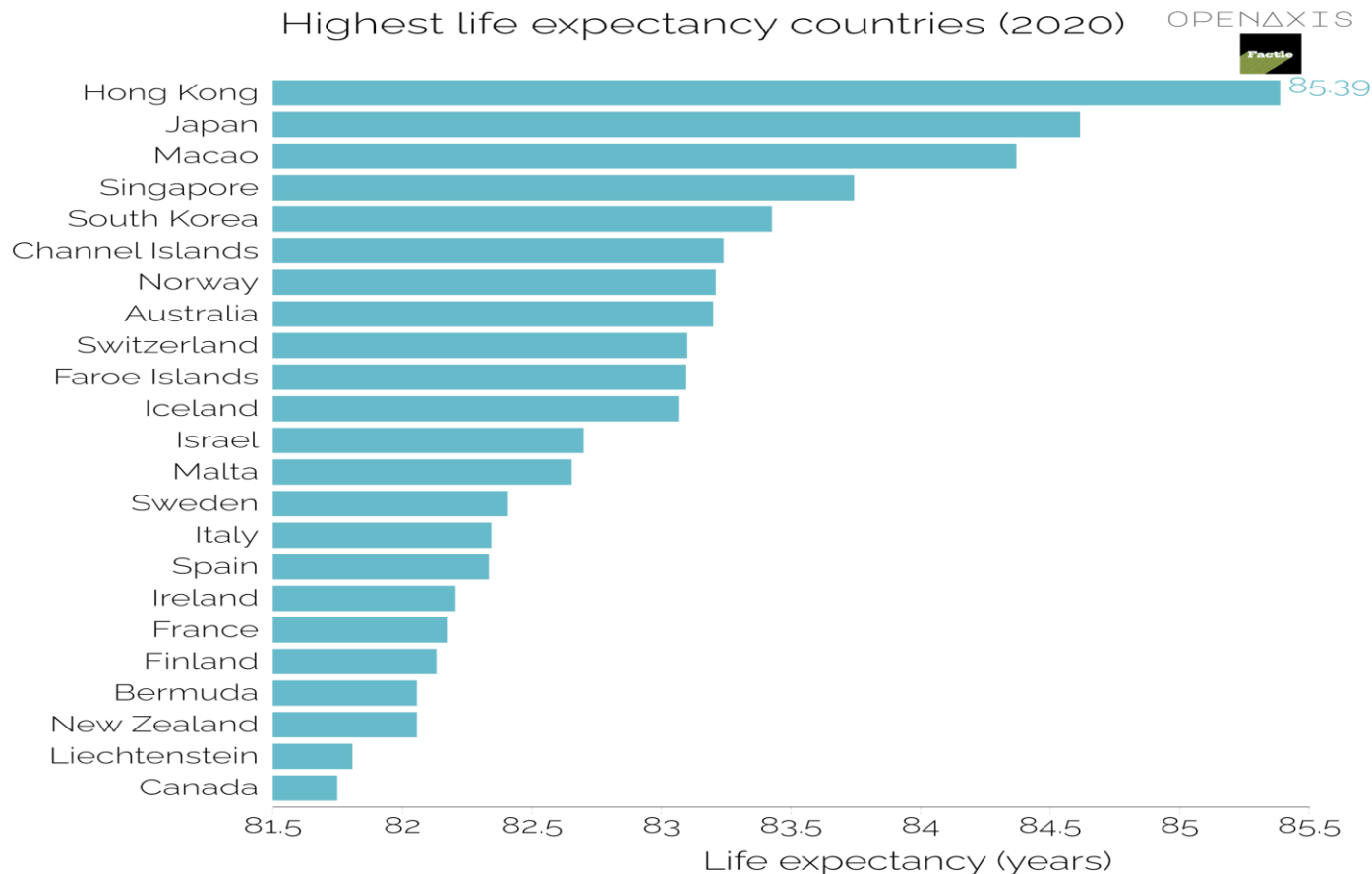
- QOL includes physical health, family, education, employment, wealth, safety, security, religious beliefs, and the environment.
- Health related QOL is an evaluation of QOL and its relationship with health.
- QOL should not be confused with the concept of standard of living, which is based on income.





Life expectancy

- LE is the expected number of years of life remaining at a given age based on the year of their birth, or their current age.



- There are **great variations** in life expectancy between different parts of the world, mostly caused by differences in :

➤ **Gender** ; **females** have **higher** LE than males

➤ **public health services**

➤ **medical care**

➤ **Lifestyle** factors or behavior

➤ **Culture**

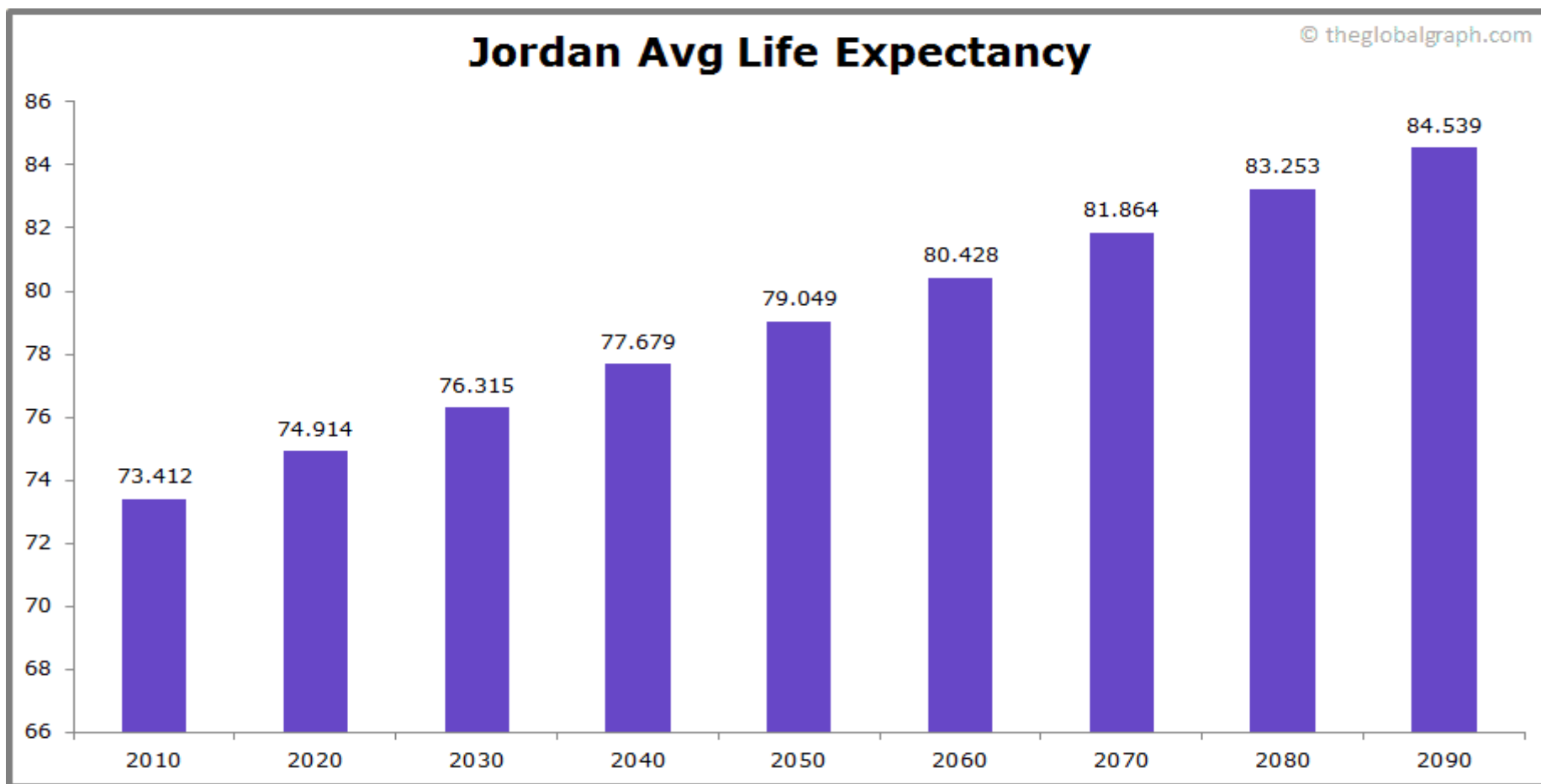
➤ **Education**

➤ **Socioeconomic** status

➤ **standard of living**

➤ **Emerging diseases**; AIDS, cancer

The current life expectancy for **Jordan** in 2023 is 75.01 years, a 0.18% increase from 2022.



Life expectancy is one of the factors in **measuring** the **Human Development Index**, and country development; regarding:

- ❑ health and **medical services**,
- ❑ **Education**
- ❑ **Socioeconomic** status
- ❑ **physical quality** of life

What Is the Human Development Index (HDI)

A statistic developed and compiled by the United Nations to measure various countries' levels of social and economic development.

How to calculate

Approach 1

Track a group of people born a **given year**, many **decades ago**, and observe the exact date in which each one of them **died**. Then, we could estimate this **cohort's life expectancy** by simply calculating the average of the ages of all members when they died.

Approach 2

- Track members of a group of individuals born in a given **year** and predict the average age-at-death for them using a combination of **observed mortality rates for past years** and **projections التوقعات about mortality rates for future years.**
- This approach leads to what is known as 'cohort life expectancy'. By definition, the cohort life expectancy takes into account observed and projected improvements in mortality for the cohort throughout its lifetime.

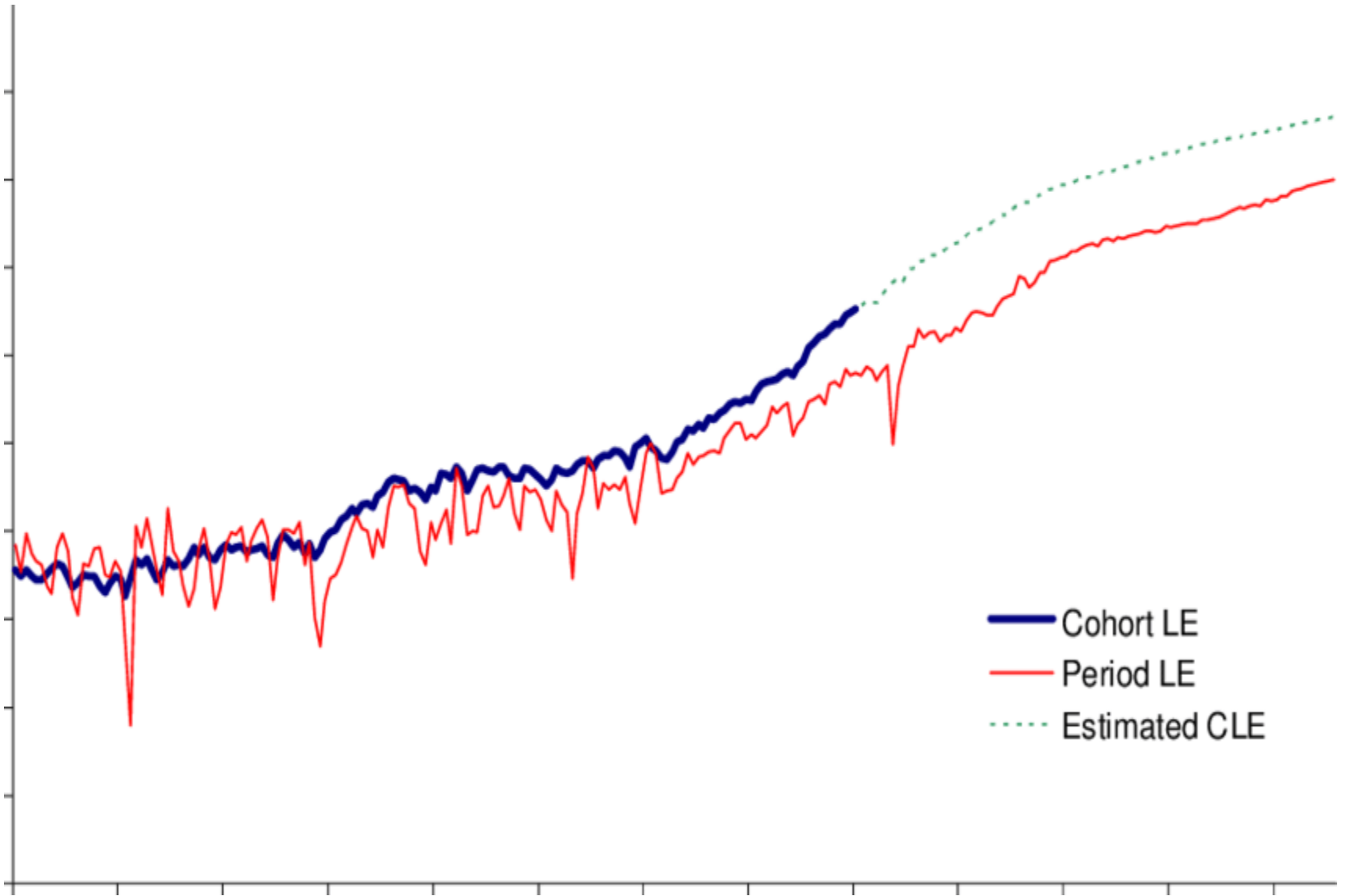
Approach 3

- Estimating the average length of life for a hypothetical cohort افتراضية مجموعة assumed to be exposed, from birth through death, to the mortality rates observed at a given year.
- This approach leads to what is known as 'period life expectancy' and is the definition used by most international organizations, including the UN and the World Bank

NOTE

Period life expectancy estimates do not take into account how mortality rates are changing and instead only look at the mortality pattern at one point in time.

Because of this, period life expectancy figures are usually different to cohort life expectancy figures.



**There are a number of approaches and indicators
used to assess the burden of illness**

Prevalence

Impact of disease on resources

DALYs and QALYs

Approach 1

The prevalence of a disease is used to estimate the costs for that disease during a period of time
(Direct and Indirect costs)

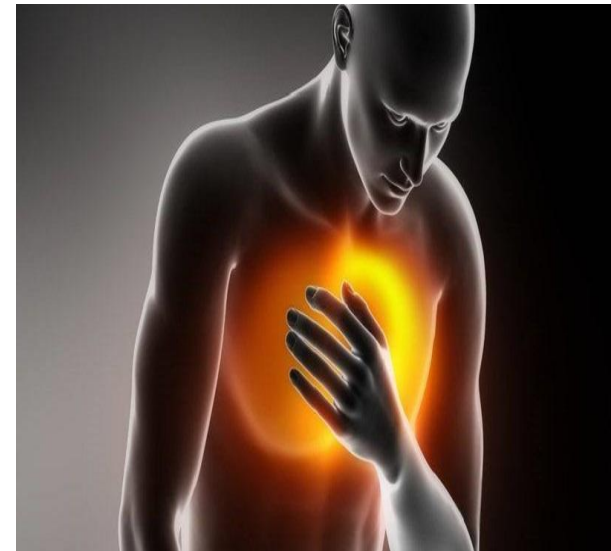
Prevalence is a measure of the burden of disease in a population in a given location and at a particular time, as represented in a count of the number of people affected, which is required to plan appropriately for their health care needs.

Example

The cost of coronary artery disease in the UK was estimated by using the number of prevalent cases and data relating to mortality, morbidity and health service utilization. +

In addition, a societal perspective was employed by including both direct and productivity costs.

The direct health care costs were estimated at £1.8 billion and the productivity costs of the disease were estimated at £6.7 billion.



Another example is taken from the condition **asthma**
and its management.

In a study, it was estimated that **5.1 million people** of all ages and social backgrounds were being treated for asthma in the UK (including 1.4 million children under 16 years of age) at a total **annual cost** to the UK health care system of **over £850 million.**

However, it is not the costs directly related to treatment that contribute the largest proportion to overall cost, but rather the **costs of inappropriate treatments and non-compliance** عدم الالتزام بالعلاج that result in **suboptimal control** تحكم ضعيف بالمرض and an **excessive number of attacks** resulting in **hospitalizations**.



Approach 2

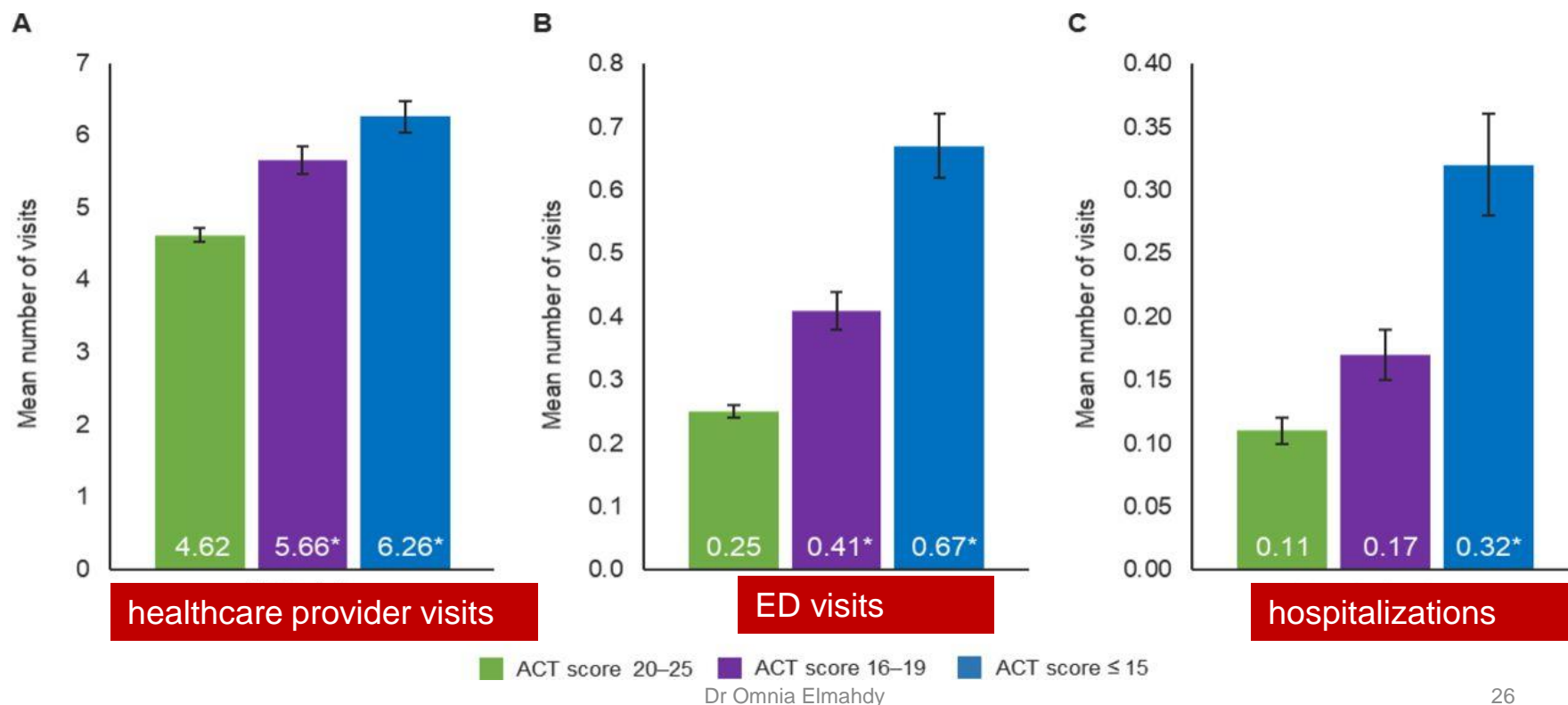
Another method employed has been to calculate the impact of disease on resources

(Cost of **appointment time**, cost of **GPs time** for the illness, cost of **resources utilized** for the illness)

It was estimated that primary care management of patients with chronic pain accounts for **4.6 million appointments** per year in the UK, equivalent to **793 whole-time GPs**, at a **total cost** of around **£69 million**

Example

- In a US study (2016) on 7820 eligible asthma adult patients, well-controlled asthma (Asthma Control Test, ACT score 20–25) compared with partly controlled (ACT score 16–19) or poorly controlled asthma (ACT score ≤ 15)



Approach 3

The WHO approach to estimating the **burden of disease** is to calculate the impact of illness on disability-adjusted life years (DALYs) and quality-adjusted life years (QALYs)

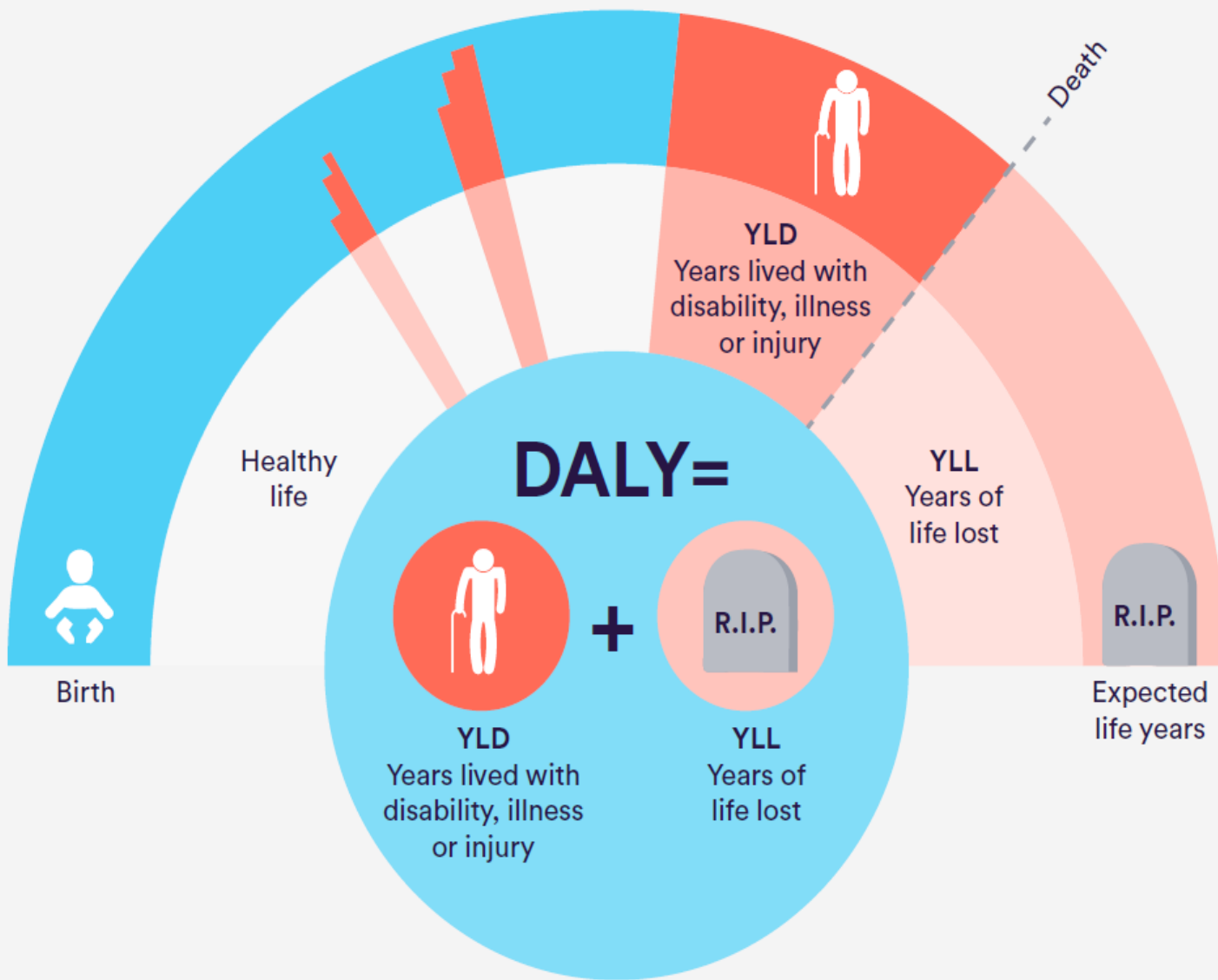
DALY

Standardized quantitative measure of the BOD

$$\text{DALY} = \text{MORTALITY} + \text{MORBIDITY}$$

(Years of life lost due to premature death)

(The measure of all non fatal disease effects such as illness episodes Or chronic disability)



(Disability Adjusted Life Years)

DALYs is for quantifying the burden of disease from mortality and morbidity

It can be used of as a measurement of the gap between current health status and an ideal health situation where the entire population lives to an advanced age, free of disease and disability.

Disability-Adjusted Life Years (DALYs)

DALY

Disability Adjusted Life Years measure the overall burden of disease, expressed as the cumulative number of years lost due to ill-health, disability or early death.

$$= \text{YLD} + \text{YLL}$$

Years Lived with Disability + Years Life Lost



Source : Wiki Commons

QALY (Quality Adjusted Life Years)

- A **quality-adjusted life-year (QALY)** takes into account both the quantity and quality of life generated by healthcare interventions.
- It is the arithmetic product of life expectancy and a measure of the quality of the remaining life-years.

Quality adjusted life-years (QALYs) = Area under the curve

