Burden of diseases

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Objectives

01 Define"Burden of Disease"

02 Discuss the importance of the concept of Burden of Disease

03 Describe measures of Burden of Disease

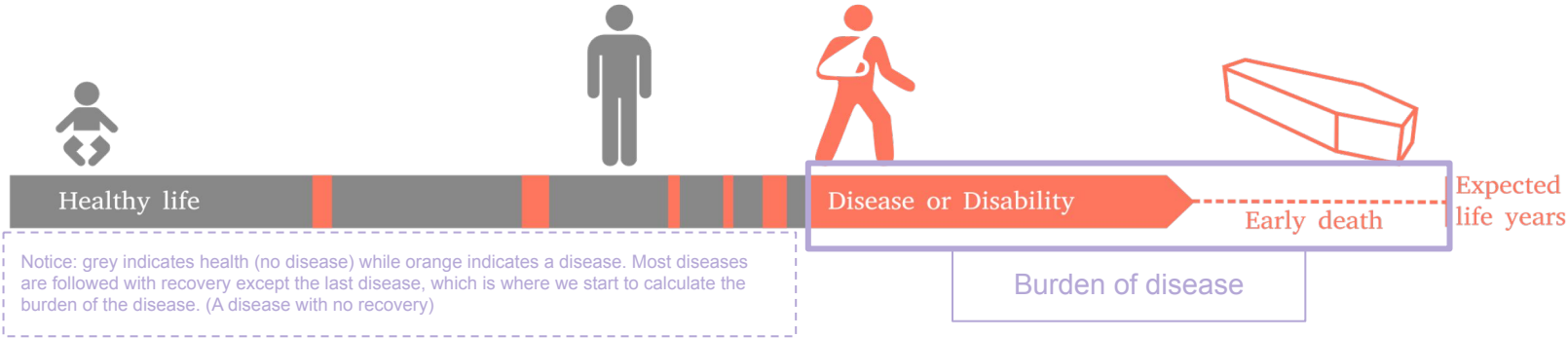
04 Discuss the Global Burden of Disease (GBD)

05 Discuss Saudi Arabia's Burden of Disease

1- Defining “Burden of disease”

- The term burden of disease generally describes the total, cumulative consequences of a defined disease or a range of harmful diseases in a community. These consequences include health, social aspects, and costs to society.
- The “gap” between an ideal situation, where everyone lives free of disease and disability, and the accumulated current “health status”, is defined as the burden of disease

  (if a 45 y/o started having chronic disease while he was expected to live up to 70, we lost 25 years).
  If a person with a chronic disease / disability lived t or exceed the expected age, then there is no burden, but we will still calculate YLD with no YLL (read again after learning DALY)



Notice: grey indicates health (no disease) while orange indicates a disease. Most diseases are followed with recovery except the last disease, which is where we start to calculate the burden of the disease. (A disease with no recovery)

2- Why should we care about the “Burden of Disease”?

- Burden of disease studies provide a consistent and comprehensive framework to address some fundamental questions on **how early death and ill-health affect the nation’s population**:
- Understanding which diseases and injuries pose the **greatest threat** to population health and well-being helps public health practitioners and policy-makers evaluate how to **use limited resources for maximum benefit**. They can plan interventions and deliver services to enhance prevention, improve disease outcomes, and reduce health inequalities

1. What diseases cause the largest population health loss and how much do they contribute to health inequalities, nationally and sub nationally?
2. Which risk factors are the strongest contributors to disease and death?
3. How is the impact of different diseases evolving over time?
4. And how does it compare between different regions/countries?

3- How is “Burden of Disease” measured?

There are two main approaches to measuring burden of disease: **Important**

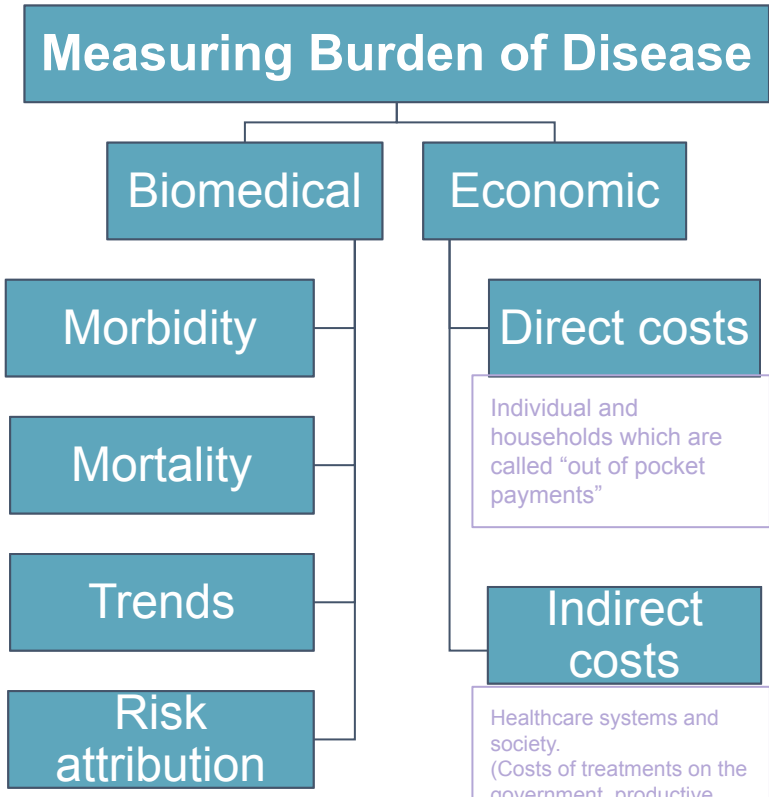
1- Biomedical:

- Assesses the **impact of disease** and disability on bodies, from the onset of illness to the outcome: sickness or disability, recovery, or death. (Cohort study or use available data)
- Assesses the **potential of medical interventions** to alter the course of diseases and future disability and illness.
  - (Such as hepatitis C treatments, even tho its expensive)
  - Other examples: masks, quarantines, and vaccine during covid19

Information is gathered about how diseases and interventions affect individuals, and these data are combined to create an overall picture of the health of the population.

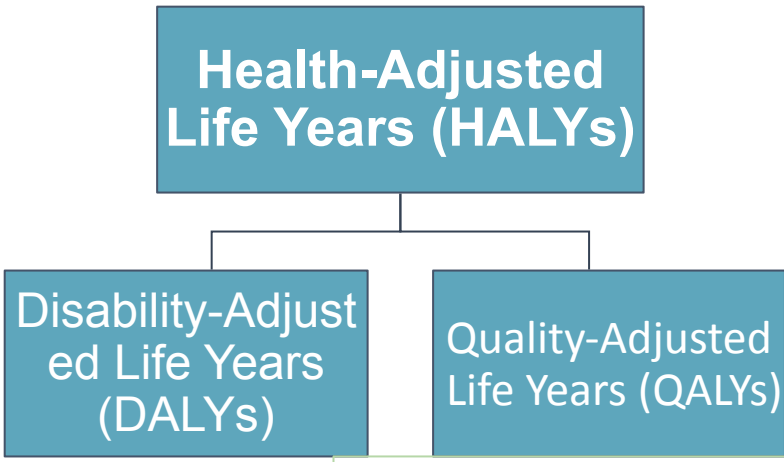
2-Economic:

- It focuses on the **financial costs** of illnesses for individuals, households, healthcare systems, and societies.



Typical Biomedical Measures of Burden of Disease

- HALYs, DALYs and QALYs are types of population health summary measures. They can be estimated at international, national or local levels to:
  - **Compare** population health across communities and over time
  - Provide a picture of which diseases, injuries, and risk factors **contribute the most to poor health** in a specific population
  - **Assess** which information or sources of information are **missing**, uncertain, or of low quality (discover gaps in the data)
- Measures of HALYs, including DALYs and QALYs, are normally presented by age, sex and geographical region.(risk factors).



Dr note : (no need to know calculations, but very important to just understand the principles, concept and definitions)

EXTRA:
Where do we collect data to calculate the burden?
-National survey, usually a cross sectional study, which is only during a certain period of time only.
-Surveillance, a never ending data collection, always updated
-Interrupted multiple surveys, which are surveys that are done frequently (multiple times a week/months/year)

3- How is “Burden of Disease” measured?

Very important

Disability-Adjusted Life Years (DALYs)

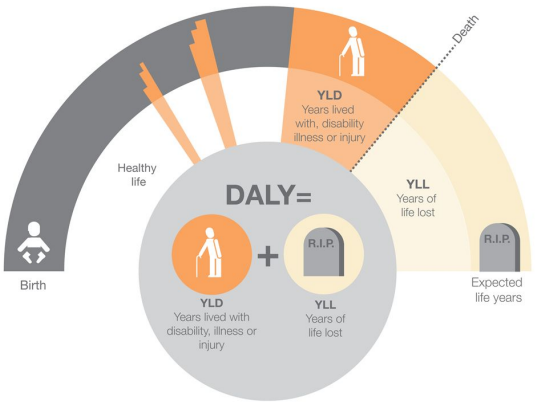
DALYs measure the difference between the current state of population health and an ideal situation where everyone reaches the age of standard life expectancy in perfect health.

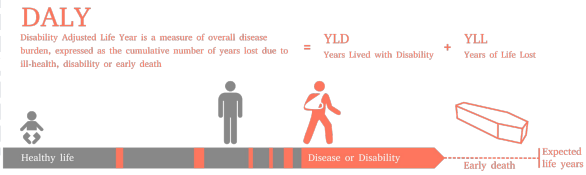
DALYs are based on an assumption that “time” is the most appropriate gauge of burden of disease: the greater the time lived with a disability, or with the disabling results of an illness, or the more time lost due to premature death, the greater the burden of disease is considered to be.

Disability-adjusted life years are an absolute measure used to compare disease burden in populations.

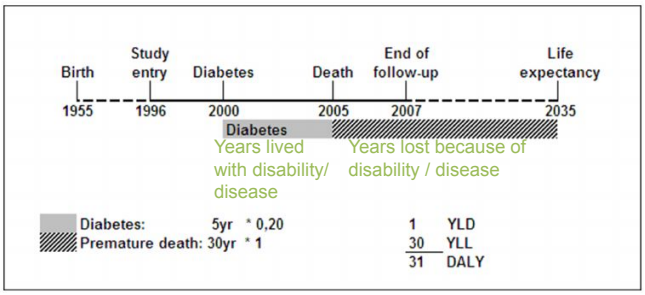
The goal is to minimize the “bad” of gaps in health, keeping the values of DALYs as close to 0 as possible.

DALYs use **disability** weights **(0 = perfect health and 1 = death)** which are generated through consultations with clinicians, experts or community.

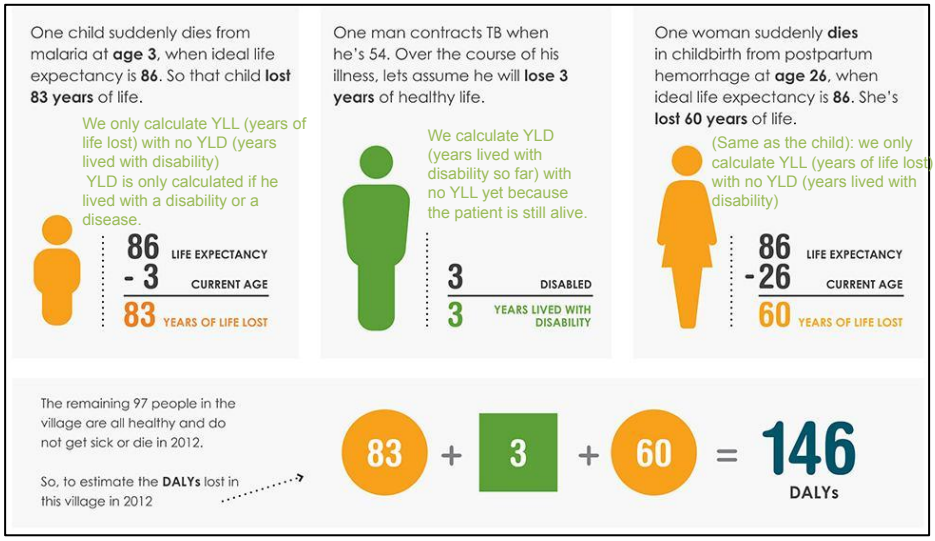




One DALY represents the loss of **the equivalent of one year of full health**. DALYs for a disease or health condition are the sum of the years of life lost to due to premature mortality (YLLs) and the years lived with a disability (YLDs) due to prevalent cases of the disease or health condition in a population.



LET’S SAY THERE IS A VILLAGE OF 100 PEOPLE IN 2012



DALY: A measure that combines years of life lost due to premature mortality and years of life lost due to time lived with disability

3- How is “Burden of Disease” measured?

Quality-Adjusted Life Years (QALYs)

QALYs measure both the **quantity** and the **quality** of life lived.

They are typically used to analyze the **cost-effectiveness** of clinical (or public health) interventions.

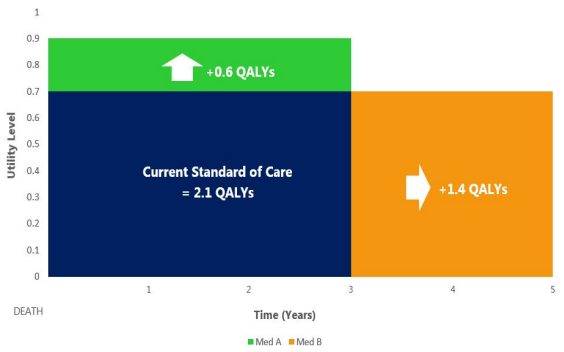
For example, QALYs can compare an intervention that helps prolong life but has serious side effects (such as permanent disability caused by radiation or chemotherapy for cancer), with an intervention that improves the quality of life without prolonging it (such as palliative pain management).

The goal is to maximize the “good” of quality of life.

QALYs use **utility** weights **(0 = death and 1 = perfect health)** generated through techniques such as standard gamble (asking respondents to assess which health states are more valuable to them).

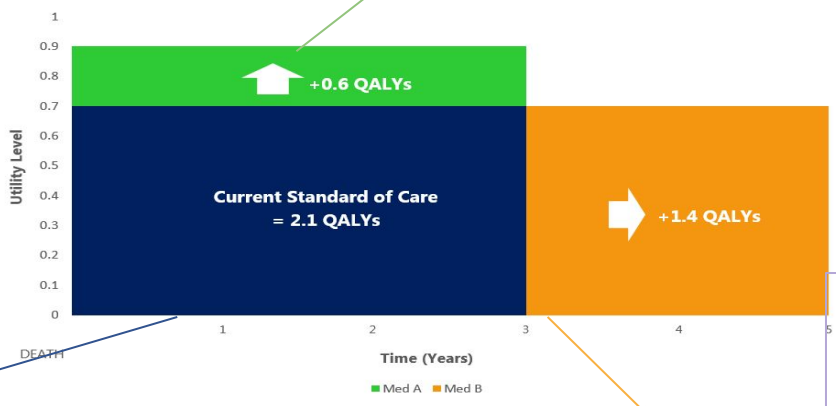
DR.not important

Notice! It is the opposite of DALY DALY: 0=health 1= disease



Years of Life x Utility Value = #QALYs

If that person takes a new medicine (Med A) whereby his/her utility level increases to 0.9, that person will now have 2.7 QALYS. Therefore, the benefit of the new medicine will be counted as 0.6 QALYs as this is the increase over the current standard of care.
(3 Years of Life x 0.2 Additional Utility Level = 0.6 QALYs)



Med A: No change in life expectancy but high quality of life

Med B:Prolonged life but low quality (side effects)

If a person lives for 3 years with a disease and the current standard of care for that disease means he/she lives with a utility level of 0.7, that person will have 2.1 QALYs.
(3 Years of Life x 0.7 Utility Value = 2.1 QALYs)

Similarly, if a new medicine (Med B) prolongs the patient’s life by 2 years, at a utility level of 0.7, the new medicine will provide the person with 1.4 additional QALYs.
(2 Years of Additional Life x 0.7 Utility Value = 1.4 QALYs)

3- How is “Burden of Disease” measured?

- Assessing burden of disease involves grappling with fundamental questions about the **“worth” of a human** life as well as the value of **quality versus quantity of life**:

1 Whether **dying** prematurely from a disease is more “**burdensome**” than living for years with poor health or disability

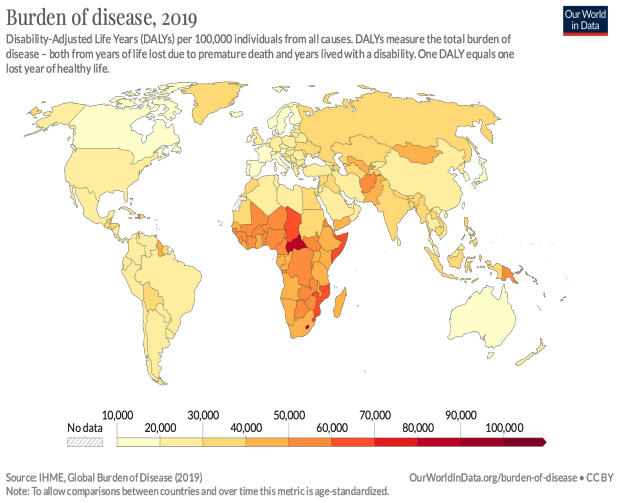
2 Whether **living with a disease** is more **costly** than dying from it, in terms of health care expenditures

3 How to find a **balance** between life-saving treatments for a few people and interventions that provide modest benefits to a large number of people.

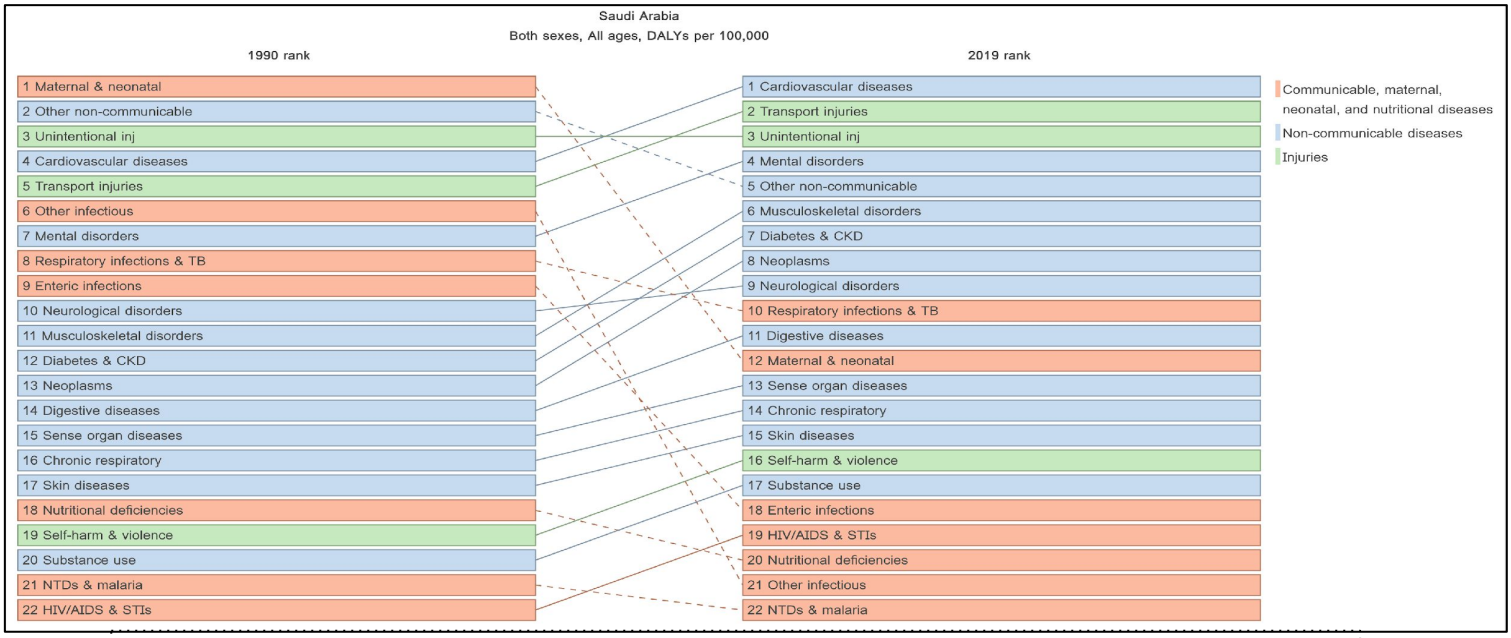
4- Global Burden of Disease (GBD)

- In the 1990s, the World Health Organization (WHO), in co-operation with Harvard University and the World bank, developed a methodological concept to quantify the global burden of disease; this was based to a large extent on statistical measurement of the disability-adjusted life year (DALY).

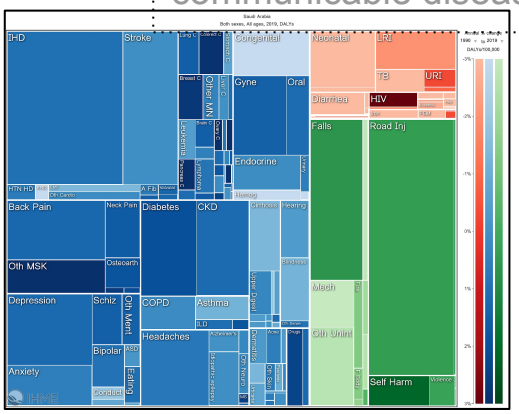
- Today it is published by both the researchers at the Institute of Health Metrics and Evaluation (IHME) and the ‘Disease Burden Unit’ at the World Health Organization (WHO), which was created in 1998. The IHME continues the work that was started in the early 1990s and publishes the Global Burden of Disease study.

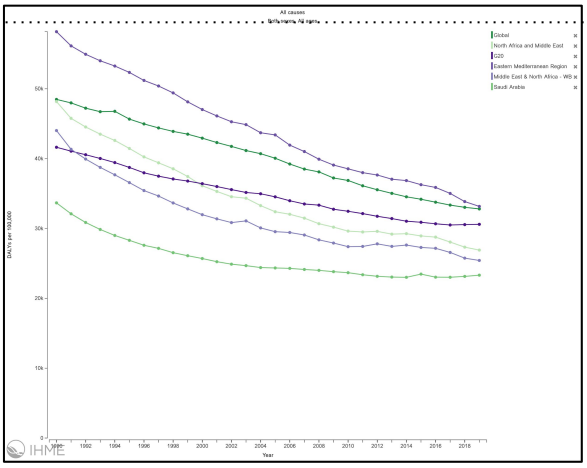


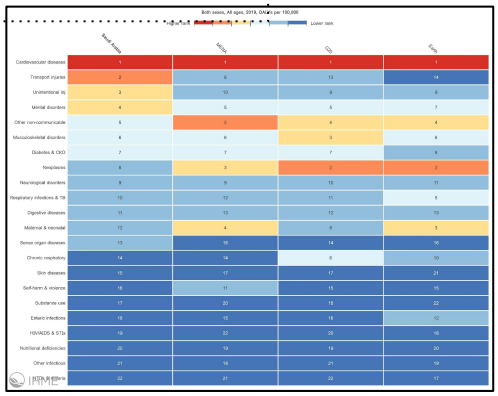
5- Burden of Disease in Saudi Arabia



EXTRA: Notice:
in 1990 → High communicable diseases
in 2019 → increase in non-communicable diseases + decrease in communicable disease







In conclusion :

- Burden of disease is a complex idea, and it rests on a foundation of complex mathematical calculations.
- Burden of disease measures are often presented as “objective,” but decisions about what and how to measure are influenced by social values.

Summary

DALYs	QALYs
DALYs measure the difference between the current state of population health and an ideal situation where everyone reaches the age of standard life expectancy in perfect health.	QALYs measure both the quantity and the quality of life lived.
DALYs are based on an assumption that "**time**" is the most appropriate gauge of burden of disease: the greater the time lived with a disability, or with the disabling results of an illness, or the more time lost due to premature death, the greater the burden of disease is considered to be.	They are typically used to analyze the **cost-effectiveness** of clinical (or public health) interventions.
Disability-adjusted life years are an absolute measure used to compare disease burden in populations.	For example, QALYs can compare an intervention that helps prolong life but has serious side effects (such as permanent disability caused by radiation or chemotherapy for cancer), with an intervention that improves the quality of life without prolonging it (such as palliative pain management).
The goal is to minimize the "bad" of gaps in health, keeping the values of DALYs as close to 0 as possible.	The goal is to maximize the "good" of quality of life.
DALYs use **disability** weights **(0 = perfect health and 1 = death)** which are generated through consultations with clinicians, experts or community.	QALYs use **utility** weights **(0 = death and 1 = perfect health)** generated through techniques such as standard gamble (asking respondents to assess which health states are more valuable to them).
Not very imp DALY = YLL (years of life lost) + YLD (years of disability) YLD = Disability value x Year with disability	Not very imp QALY = Years of life x Utility value

Practice Questions

Q1: If death by certain disease declined but the prevalence increased. What does that mean?

A. Decrease burden of healthcare cost	B. Decreased awareness	C. Increase burden of healthcare cost	D. More children are born with this disease

Q2: What is the sum of the years of life lost to due to premature mortality and the years lived with a disability (YLDs) due to prevalent cases of the disease or health condition in a population?

A. Quality adjusted life years	B. Years of life lost	C. Years lived with disability	D. Disability adjusted life years

Q3: What is the measure of health outcomes pertaining to disease burden and is used to assess the value of medical interventions?

A. Health adjusted life years	B. Quality adjusted life years	C. Disability adjusted life years	D. Years lived with disability

Q4: What is the total, cumulative consequences of a defined disease or a range of harmful diseases in a community?

A. Burden of disease	B. Health adjusted life years	C. Years of life lost	D. Disability adjusted life years

Q5: Which approach to measure burden of disease that assesses the impact of diabetes on a elderly that will result in death?

A. Economic	B. Utility weight	C. Biomedical	D. Life expectancy

Q6: What are the biomedical measures of burden of disease?

A. Health adjusted life years	B. Quality adjusted life years	C. Disability adjusted life years	D. All of the above

Answer 1-C 2-D 3- B 4- A 5- C 6-D

Thanks to all leaders and members from team 439 and team 441🤍🤍

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