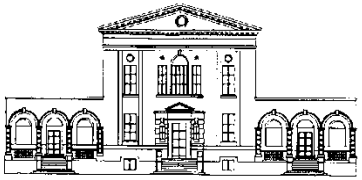
Global Burden of Hepatitis: prospect for the future



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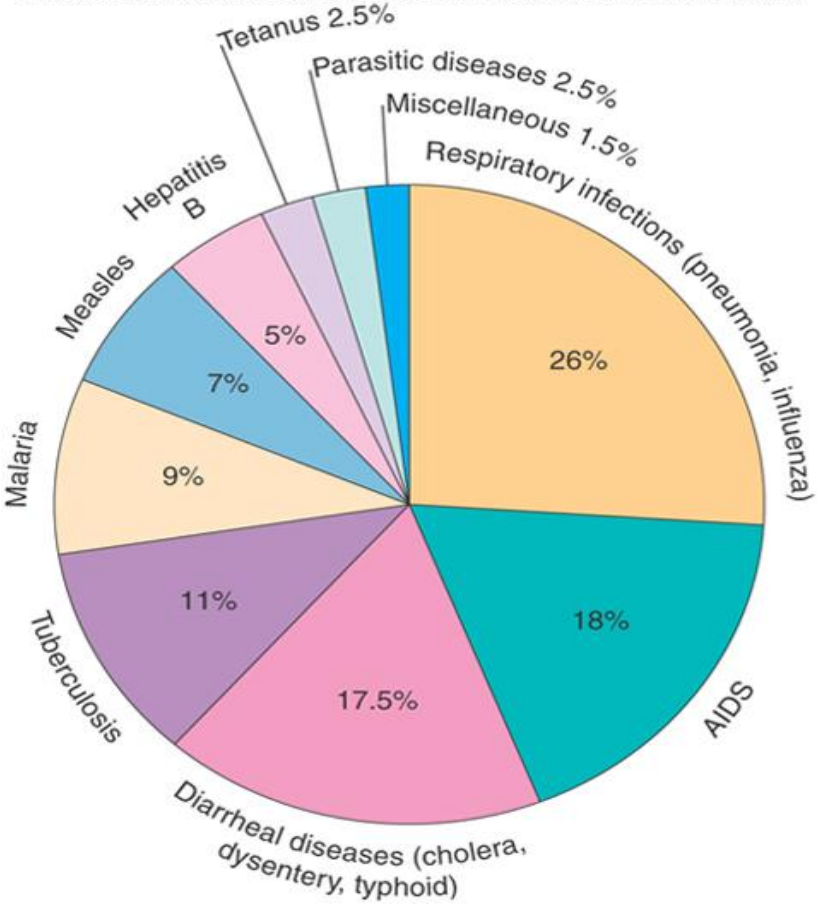
World Health Organization

WHO Collaborating Center for clinical care, diagnosis, response and training on Highly Infectious Diseases



Worldwide infectious disease statistics

Depicts the 10 most common infectious causes of disease

Leading Causes of Infectious Disease Deaths Worldwide

Disease	Est. Deaths per Year
Lower respiratory tract infections	~4.2 million
Diarrheal diseases	~2.2 million
HIV/AIDS	~2.0 million
Tuberculosis	~1.5 million
Hepatitis viruses	~1 million
Hepatitis B virus	~620,000
Hepatitis C virus	~366,000
Malaria	~900,000
Pertussis	~295,000
Neonatal tetanus	~213,000
Measles	~197,000

Steven Wiersma. WHO 2009; UNICEF; Perz et al, J. Hepatol, 2006

DALYs are useful for policymakers to:

-assess ranking priorities for research and intervention,

-estimate the need of investments,

-to evaluate efficacy of low, medium or high cost interventions

DALYs are useful for policymakers

Are DALYs the best method to evaluate impact of ID?

DALYs are useful for policymakers

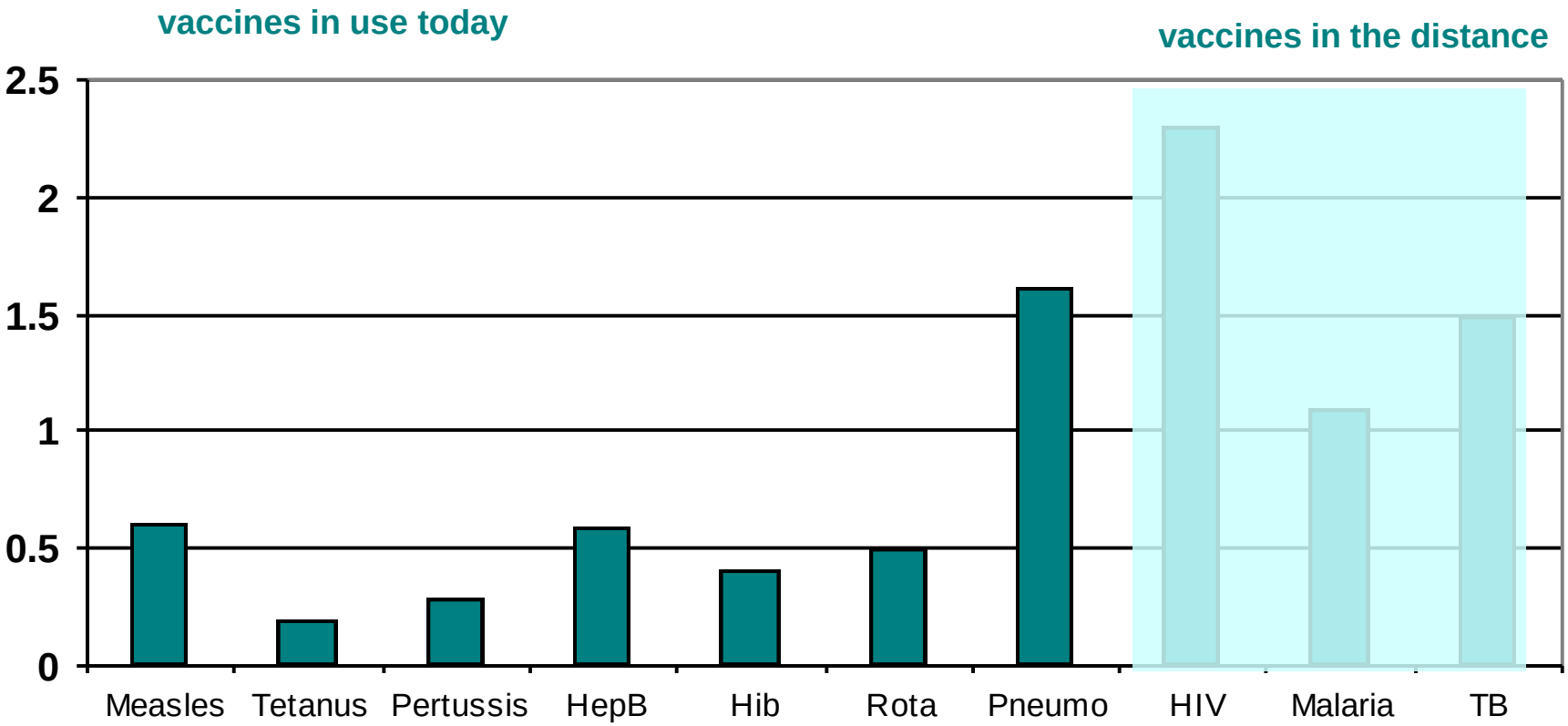
Are DALYs the best method to evaluate impact of ID?

Are DALYs useful to analyze the ID determinats ?

Deaths from some vaccine preventable IDs

4.3 million deaths per year

6+ million deaths from AIDS, TB, malaria



Modified from Ruth Levine,Center Global Dev Washington

IDs and Economic development

Health and hygiene promotion αs economic development

Lower infant mortality rates & higher economic growth

WHO estimates: 10 year increase in average life expectancy at birth translates into a rise of 0.3 – 0.4% in economic growth per year

Deaths from/associated with Infectious Diseases are just an indicator of the Burden

B&C Hepatitis viruses Infections

Hepatitis B and C

Long latency period to development of HCC (Hepatocellular Carcinoma) 20-30 years

Mechanism is probably due to chronic inflammatory response

Global Burden—Hepatitis B Virus Infection

- Estimated ~ 2 billion people infected with HBV
- >350 million have chronic HBV infection
- ~ 88% of the world's population live in areas where the prevalence of chronic HBV infection is high (>8% HBsAg +) or moderate (2-7% HBsAg +)
- Estimated ~620000 HBV-related deaths yearly
- ~ 93% of deaths were the result of chronic infection

Steven Wiersma. WHO 2009

Hepatitis B Disease Burden

Region	Percent Global Deaths
AFRO	11%
AMRO	2%
EMRO	3%
EURO	8%
SEARO	23%
WPRO	52%
Global	**100%**

Steven Wiersma. WHO 2009

Bridging from Cirrhosis/HCC to Hepatitis

- Major drivers of HBV/HCV burden are cirrhosis/HCC
- 57% of cirrhosis attributable to either HBV or HCV
  - 30% of cirrhosis was attributable to HBV
  - 27% of cirrhosis was attributable to HCV
- 78% of HCC attributable to HBV or HCV
  - 53% of HCC was attributable to HBV
  - 25% of HCC was attributable to HCV
- About 450,000 deaths due to HBV and HCV cirrosis
- More than 450,000 deaths due to HBV and HCV liver cancer

Steven Wiersma. WHO 2009

Risk factors For Progression of Fibrosis and HCC

- Alcohol
- Older age
- Males
- Metabolic syndrome
- Marijuana
- Coffee intake decrease progression of fibrosis
- Viral: HIV or HCV co-infection

Other Risk Factors for Progression

- HIV/HCV co-infection: Increase risk of fibrosis for untreated HIV patients
  - Consider treatment at higher CD4 count than HCV monoinfected patients
- HBV/HCV co-infection:
  - Increase risk of fibrosis (Hepatology 2010;51:759-66)
  - Increased risk of HCC
- Coffee decrease fibrosis progression
  - Fibrosis: Hepatology 2010;51:201-9
  - HCC: Hepatology 2008;48:129-36

Difficulties in Treating HCV

- Many patients are difficult to reach
- Many have medical or psychiatric contraindications
- Bottom line: > 50% of HCV infected patients will be difficult to treat even with universal health care and addition of newer medications

Hepatitis C: Disease Burden

Estimated 170 million infected

- ~ 130 million **chronically**
- ~ 3-4 million new infections a year
- 1 in 3 woman and 1 in 2 men will **develop cirrhosis** and/or Liver **Cancer**
- Responsible for 50-76% of **ALL** liver cancer cases
- Responsible for 2/3 of **ALL** liver transplants in the developed world

Steven Wiersma. WHO 2009

Incidence of New HCV Infections

- Developed Nations:
  - Incidence of new HCV infection is falling
- Emerging nations:
  - Incidence of HCV is likely unchanged

HCV: Modes of Transmission

- Contaminated Needles
  - Injection drug use: Accounts or > 90% of new infections ???
  - Unsafe medical procedures: Developing world
- Transfusion/Organ transplant before 1992
- Perinatal: < 5%; 15%-20% with HIV
- Other less certain: tattooing, snorting cocaine, sharing tooth brushes/razors, body piercing, sexual, incarceration

Institute of Medicine: 2010

- Hepatitis and Liver Cancer: A National Strategy for Prevention and Control of Hepatitis B and C
- Lack of Provider knowledge about HCV
- Lack of patient awareness of risk factors
- Inadequate resources for surveillance, management and treatment of HCV

Projected Prevalence of Chronic HCV, Cirrhosis, and Complications Over 4 Decades

	2000	2010	2020	2030	2040
HCV infection	2,940,678	2,870,391	2,681,556	2,433,709	2,177,089
Cirrhosis	472,103	720,807	858,788	879,747	828,134
Decompensated cirrhosis	65,294	103,117	134,743	146,408	142,732
Hepatocellular carcinoma	7,271	11,185	13,183	13,390	12,528
Liver-related death	13,000	27,732	36,483	39,875	39,064

Davis GL et al. *Liver Transpl*. 2003;9:331-338. Projecting future complications of chronic hepatitis C in the United States. Davis GL, Albright JE, Cook SF, Rosenberg DM. *Liver Transpl*. 2003 Apr;9(4):331-8. Copyright 2003. Reproduced with permission of John Wiey & Sons, Inc. Slide Courtesy of Joanne Imperial Stanford University

Urgent needs

- globally-coordinated research and development effort to devise and implement cost-effective approaches to data collection and analysis in poor countries that is targeted to their health development needs, and
- that can routinely yield comparable information of sufficient quality to establish how disease and risk factor burden is changing in populations.

"I'll have an ounce of prevention."