





Why do we need to measure the health of a population

Well presented data can provide stimulus for action (CSDH 2008; ch16)

Evidence of effectiveness of intervention to reduce burden of disease at population level

Everyone should count (Setel 2010)

Barts and The London

Place	Life expectancy at birth
United Kingdom, Scotland, Glasgow (Calton) ^b	54
India	62
United States, Washington DC (black) ^c	63
Philippines	64
Lithuaniaª	65
Poland ²	71
Mexico ^a	72
United States ^a	75
Cuba ²	75
United Kingdom [*]	77







Sources of data

Census

Civil registration systems Hospital records Primary Care records Health Care Organisations Notifications Health Surveys Registers e.g. Cancer registry

Barts and The London







Birth registration Industrialised countries 98% of births registered Sub-Saraharan Africa 45% birth registered No civil registration Or Divid registration not working effectively











Using data sources

- · Who is included
- What was the original purpose
 - Social construction of the data
- Quality and monitoring of data
- Consistency between sources
 - Data collection methods
 - Definitions and analysis

Barts and The London





Male life expectancy, betwee inequities, selected countries	n- and within-country	
Place	Life expectancy at birth	
United Kingdom, Scotland, Glasgow (Calton) ^b	54	
Indiaª	62	
United States, Washington DC (black) ^c	63	
Philippines*	64	
Lithuaniaª	65	
Polanda	71	
Mexico ^a	72	
United States ^a	75	
Cubaª	75	
United Kingdom ^a	77	



Infant mortality

Ratio of deaths under 1 year to all livebirths Does not require long terms follow up of babies Does not measure adults

WHO uses

Civil registration Sample registration system Demographic surveillance surveys

Barts and The London

www.smd.qmul.ac.uk

Life expectancy

Expected (average) number of year of life remaining Based on current age specific death rates

Life expectancy at birth - Can be influenced by high infant mortality

Life expectancy at 20 (CSDH fig 2.5) Used to illustrate effect of educational attainment on life expectancy during adult life











Is this a lot of deaths?		
Country	Deaths in 2005-1010	
India	48,783,000	
Japan	5,558,0000	
UK	2,905,000	
Zimbabwe	949,000	
List factors which mi	ght affect these numbers	
Barts and The London School of Medicine and Dentistry	www.smd.qmul.a	

Death rates			
Country	Deaths in 2005- 1010	Death rate per 1000 per year	
Zimbabwe	949,000	15.1	
UK	2,905,000	9.5	
Japan	5,558,000	8.8	
India	48,783,000	8.3	
Barts and The Lo	ndon	www.smd.qmul.	











Death rates			
Country	Death rate per 1000 per year	Infant mortality per 1000	
Zimbabwe	15.1	59	
India	8.3	53	
UK	9.5	5	
Japan	8.8	3	
Japan arts and The Lo	8.8 Indon	3 www.smd.q	







	Death rates				
C	Country	Death rate per 1000 per year	Infant mortality per 1000	Life expectancy at birth	
J	Japan	8.8	3	79	
ι	JK	9.5	5	77	
h	ndia	8.3	53	63	
Z	Zimbabwe	15.1	59	47	
by Ba	arts and The Lo of of Medicine and Dentistry	ndon		www.smd.qmu	ıl.a











Comparability

- Less deprived areas tend to have more men in older age groups
- More deprived areas have greater proportion of men at all ages 40
- Would expect crude death rate to be lower in deprived areas

Barts and The London

www.smd.qmul.ac.uk

Taking age into account

- Direct standardisation
 - Uses rates from population of interest and apply to standard population
- Indirect standardisation
 - Uses rates from reference population and calculates expected number of deaths

Barts and The London

D	irect standar	disation
Males UK 2010		
Age	Death rate per 1000	
15–19	0.3	
20-24	0.5	
25-29	0.6	
30–34	0.8	
35–39	1.2	
40-44	1.7	
45–49	2.5	
50-54	3.9	
55–59	6.2	
60–64	9.7	
Barts and The	London	www.smd.qmul.ac.uk







Direct standardisation				
		7000x0.3/1000=	21	
Males UK 20	10			
4.75	Death rate/	Number in Standard	Expected number of	
Age 15_19	0.3	2000	2 1	
20-24	0.5	7000	3.5	
25-29	0.6	7000	4.2	
30–34	0.8	7000	5.6	
35–39	1.2	7000	8.4	
40-44	1.7	7000	11.9	
45–49	2.5	7000	17.5	
50-54	3.9	7000	27.3	
55–59	6.2	6000	37.2	
60–64	9.7	5000	48.5	
Barts and The	London		www.smd.qmul.ac.u	















Rates are known for population as a whole in each age/sex band and applied to sample population to get number of deaths expected.

Standardised Mortality Ratio = Actual number /expected number x100

Barts and The London

Indirect standardisation

Examples Tower Hamlets SMR=128 Kensington and Chelsea=77

100 - same as UK population

A Barts and The London

www.smd.qmul.ac.uk

Problems estimating death rates, cause specific and life expectancyCivil registration data unavailable/incomplete

- Civil registration data unavailable/incomplete/unavailable
 Survey data incomplete/unavailable
- Data may be out of date
- Difficult to capture epidemics/war without civil registration
- Data may not be accessible
- UN and WHO use best available and statistical modelling

http://www.who.int/gho/publications/world_health_statistics/EN_WHS2012_Full.pdf http://www.who.int/healthinfo/statistics/mortality_life_tables/en/index.html

🗘 Barts and The London



Malaria data sources

- Outpatients numbers attending with probable and unconfirmed malaria
- Proportion of cases confirmed
- Probability that patients attends healthcare facility with fever survey
- Number of slides tested and positivity rate

Barts and The London

www.smd.qmul.ac.uk

Malaria death estimation

- Assumes case fatality rate is same for consulters and non-consulters 0.3% outside Africa
- Assumes consultation with fever (at government facility) is same whether or not malaria
- But treatment generally successful so case fatality rate likely to be lower with treatment

W Barts and The London

www.smd.qmul.ac.uk

Summary

- · Civil registration best way of assessing mortality
- Infant mortality and life expectancy independent on population structure
- Standardised rates are weighted average of age/sex specific death rates
- Standardised rates allow for differences in age/sex of populations wishing to compare but values depend on reference population
- Information sources vary between countries
- Modelling assumptions may introduce bias

Derts and The London