Epidemiology and Primary Health Care 30 years after Alma Ata

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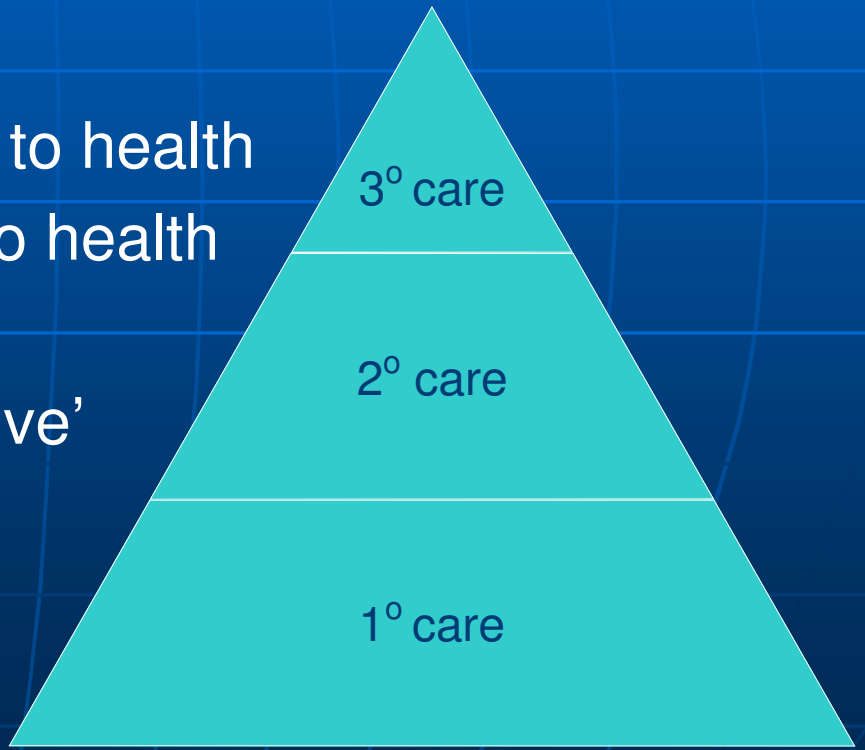
Goals and aspirations of Alma Ata

- Reduction of inequities
- Participation in health by users and communities
- High quality and effective care
- Increased coverage / access
- Appropriate health care, including referral systems
- Intersectoral action

PHC: a complex story

Multiple interpretations:

- A philosophy
- A level of health care
- An intersectoral approach to health
- A participatory approach to health
- Contestation between ‘selective’ and ‘comprehensive’ approaches

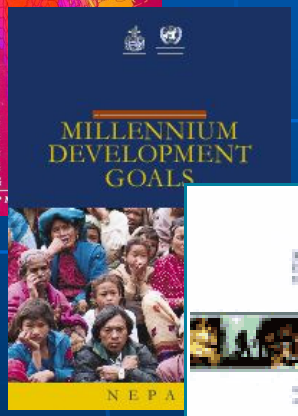


Global strategies for health

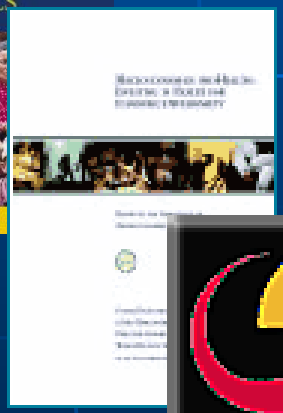
1978 Alma Ata – Comprehensive PHC – HFA 2000

1982 UNICEF Child Survival Revolution – Selective PHC

1993 WB WDR'93 Minimum Essential Health Interventions

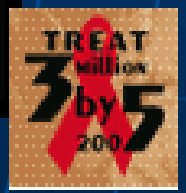


2000 UN Millennium Development Goals



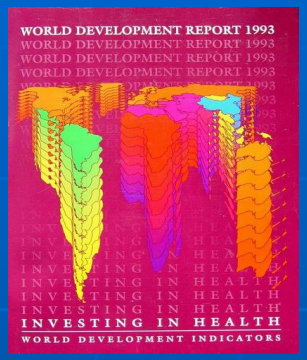
2001 Commission on Macroeconomics and Health

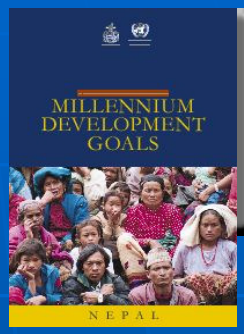
2002 Global Fund for AIDS, TB, Malaria



2003 3 Million on ARVs by 2005

Global health strategies





	1978	1982	1993	2000	2002	2003
Strategy	C-PHC	S-PHC	Reforms & Minimum Packages			Scaling-up
Content	Broad					Narrow
Orientation	Horizontal					Vertical
Time Frame	Longer					Shorter
Actors	WHO	UNICEF	WB WHO SWAp's PRSP's		GAVI GFATM,	

Source: Adapted from Don de Savigny, with permission

Why is there resurgent interest in PHC ?

- Persistent and in some cases widening inequalities
- Faltering progress towards MDGs
- Human resource crisis
- Growing evidence of effective strategies
- Challenge of chronic diseases
- Profusion of vertical programmes
- Experience of scaling up PHC in some countries
- Advocacy by NGOs

PHC brings together the population and individual perspectives

The roles of epidemiology in PHC:

- Determining health needs
- Assessing inequities
- Evaluating interventions
- Studying organisation and delivery strategies
- Monitoring coverage and impacts on population health

‘The marriage of primary care and epidemiology’ Julian Tudor Hart J.R.C.P London 1974

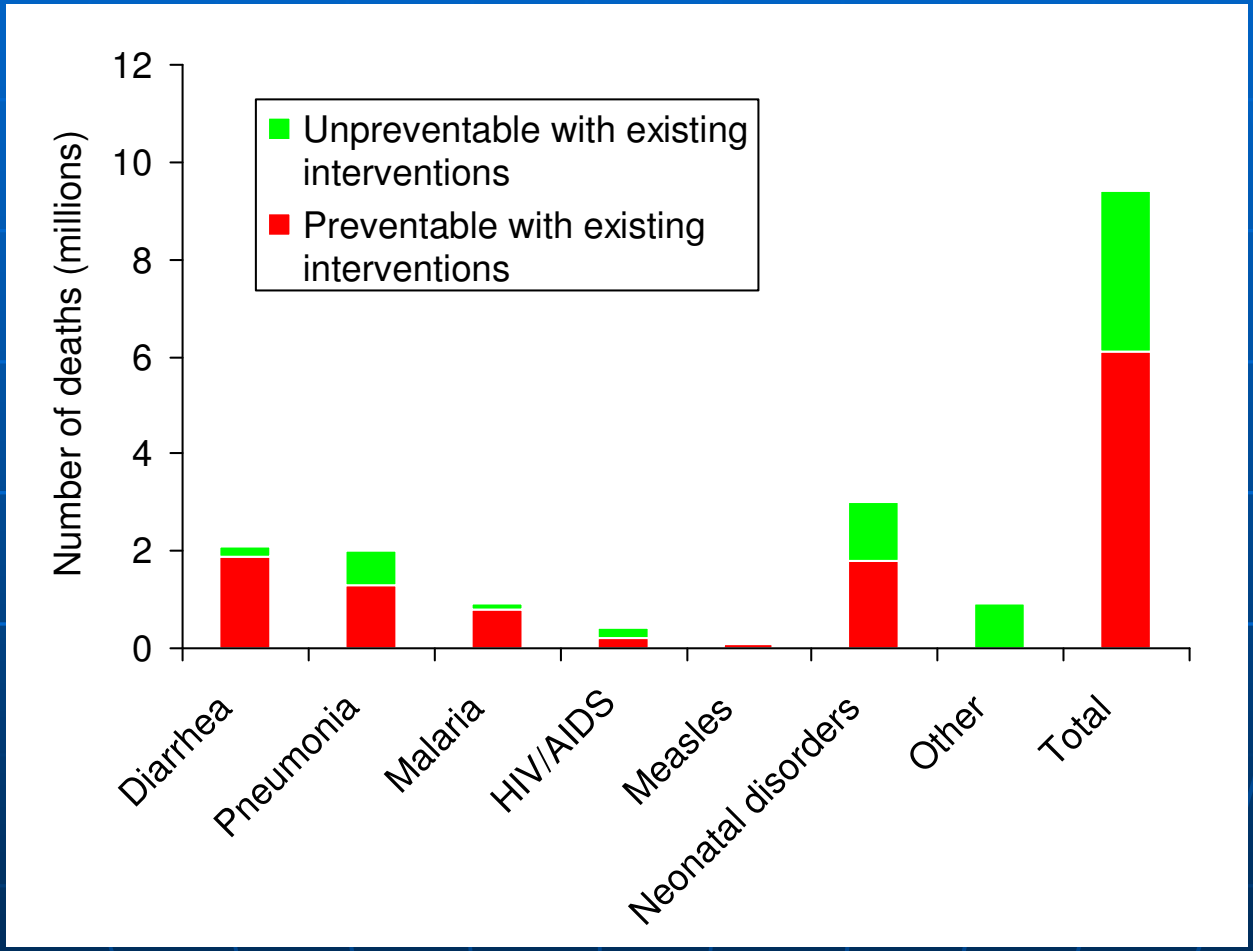
- An epidemiologically trained primary care doctor in a Welsh mining community
- Based on his work on hypertension detection and treatment
- ‘Planned and structured anticipatory care of defined populations …….with a human face’

Different approaches to categorising disease burden

- Broad cause approach - communicable, non - communicable diseases and injuries

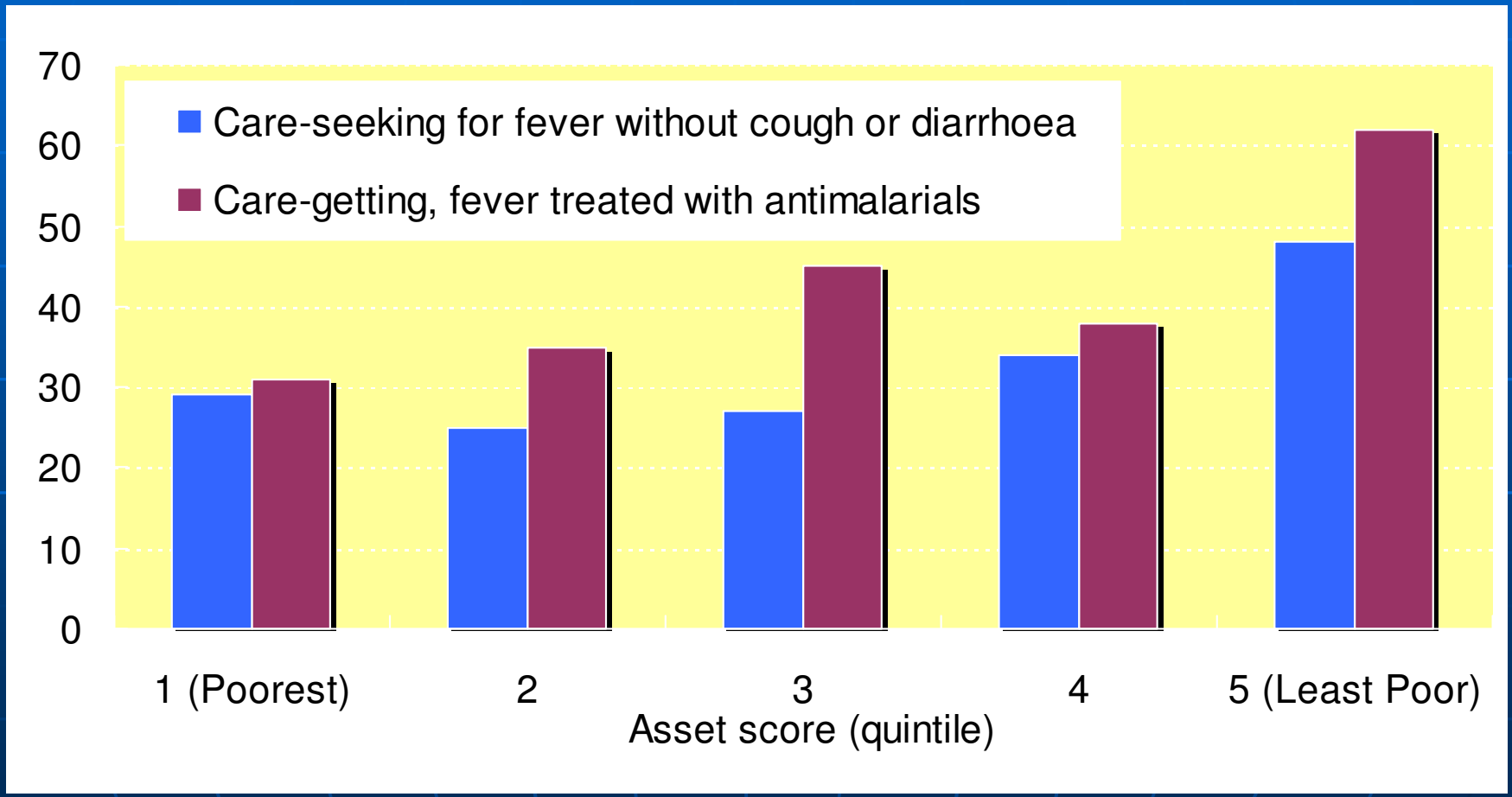
- Care needs approach may be useful for planning PHC and shows e.g. that 77 % DALYS lost in under 5 s in Sub Saharan Africa due to acute conditions and 86% of DALYS lost in the >5 s due to chronic conditions (Setel, Saker, Unwin et al Am J Pub Health 2004)

Full use of existing interventions would dramatically cut child deaths



Reprinted from The Lancet, 362, Jones G, Steketee RW, Black RE, Bhutta ZA, Morris SS, The Bellagio Child Survival Study Group, How many child deaths can we prevent this year?, 65-71, Copyright 2003, with permission from Elsevier

Local inequalities in care for malaria in Tanzania



Four districts combined: 2-week morbidity history in children <5y (MCE-TZ 1999)

Source: Joanna Armstrong Schellenberg et al. (2002)

Which child health interventions can be delivered in community settings?

- interventions to **promote healthy behaviours** e.g. exclusive breast feeding
- **preventive interventions** e.g. insecticide-treated nets for malaria and micronutrients
- **treatment interventions** e.g. case management of childhood illnesses such as malaria, pneumonia and neonatal sepsis
- **active involvement and empowerment of communities** through activities of CHWs e.g. through changing health beliefs and advocating for improved access to health and other services.

Haines, Sanders et al, Lancet, 2007, 369, 2121-2131

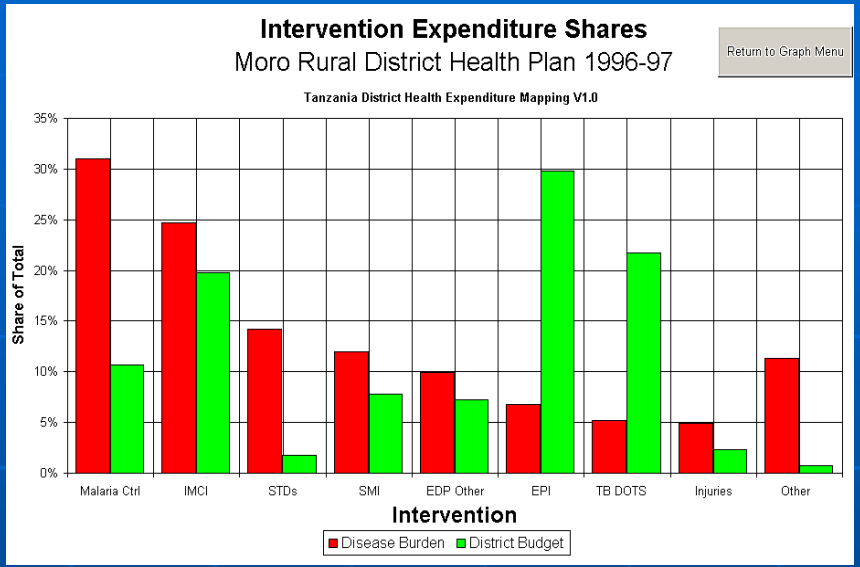
PHC interventions to prevent child deaths

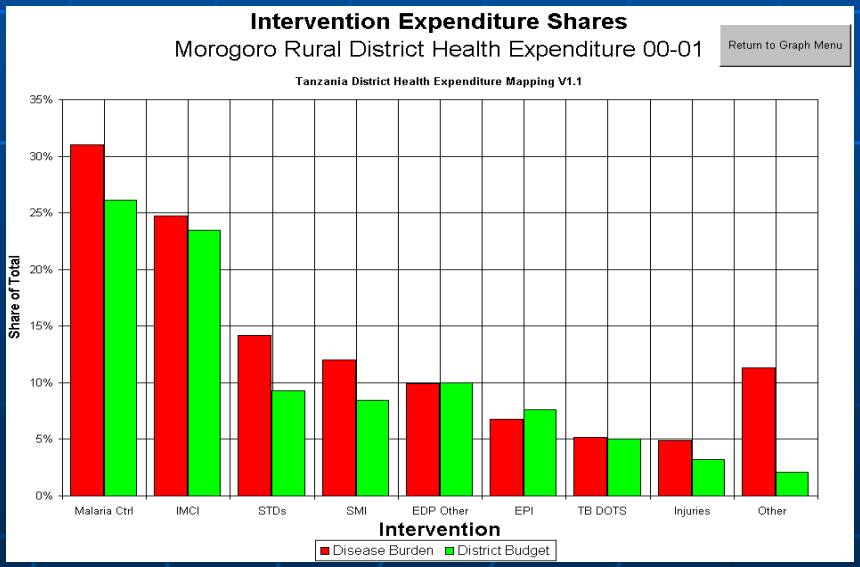
Bhutta et al Lancet 2008

- 25 interventions for which evidence of effect, cost effectiveness and plausibility is sufficient for use in PHC either universally or in some situations.
- If implemented at 99% coverage in Uganda could prevent 45% neonatal and 79% postneonatal child deaths

Improving performance at the district level

- An example from Tanzania
- Provided tools for district level decision makers to influence resource allocation
- Linked burden of disease data with expenditure on interventions
- Showed improved match between disease burden and district budget

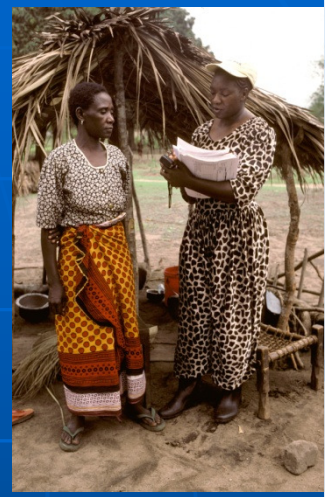


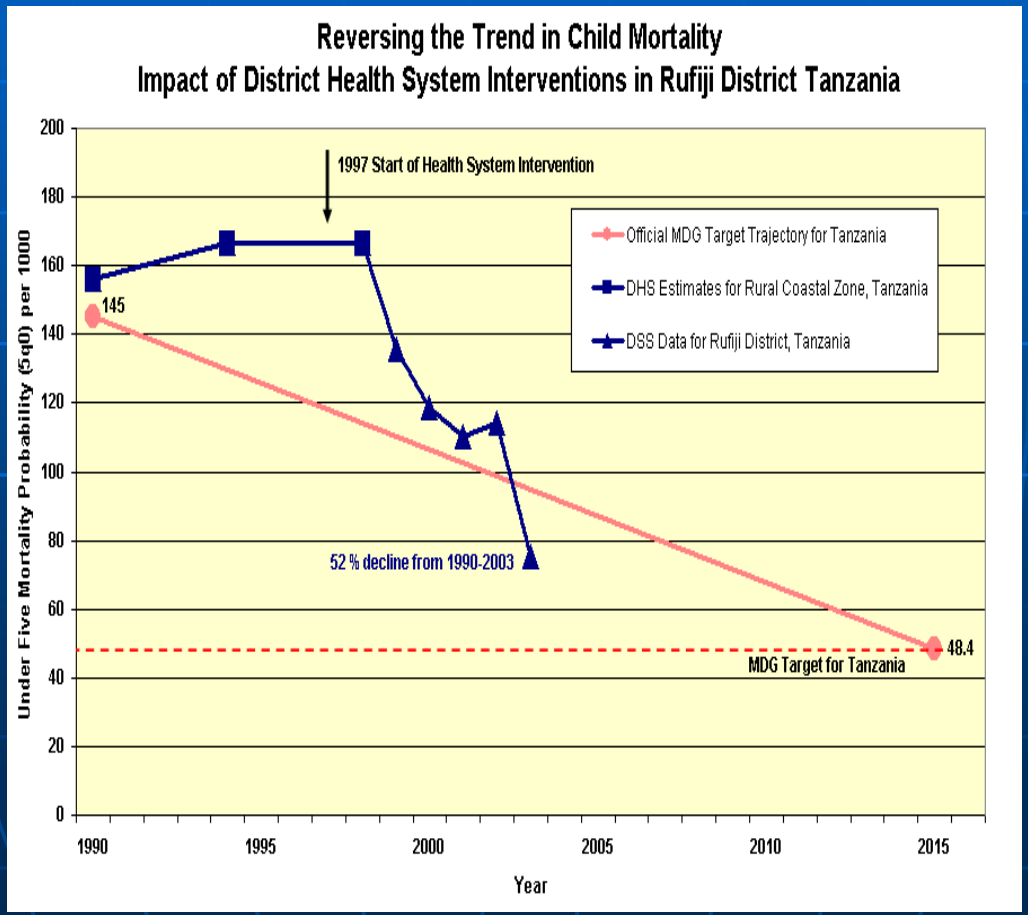


Source: Don de Savigny with permission

Tanzania Essential Health Interventions Project (TEHIP)

Research for more effective health systems

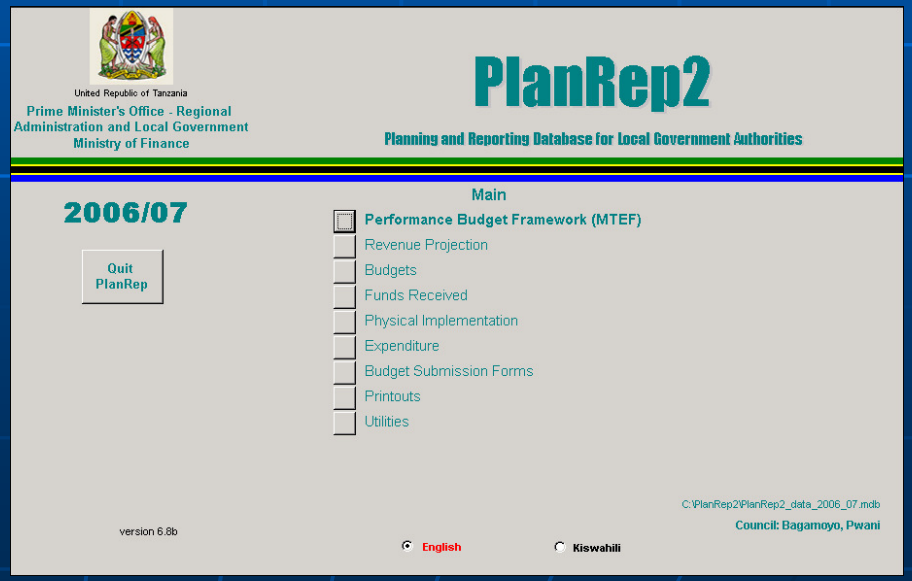


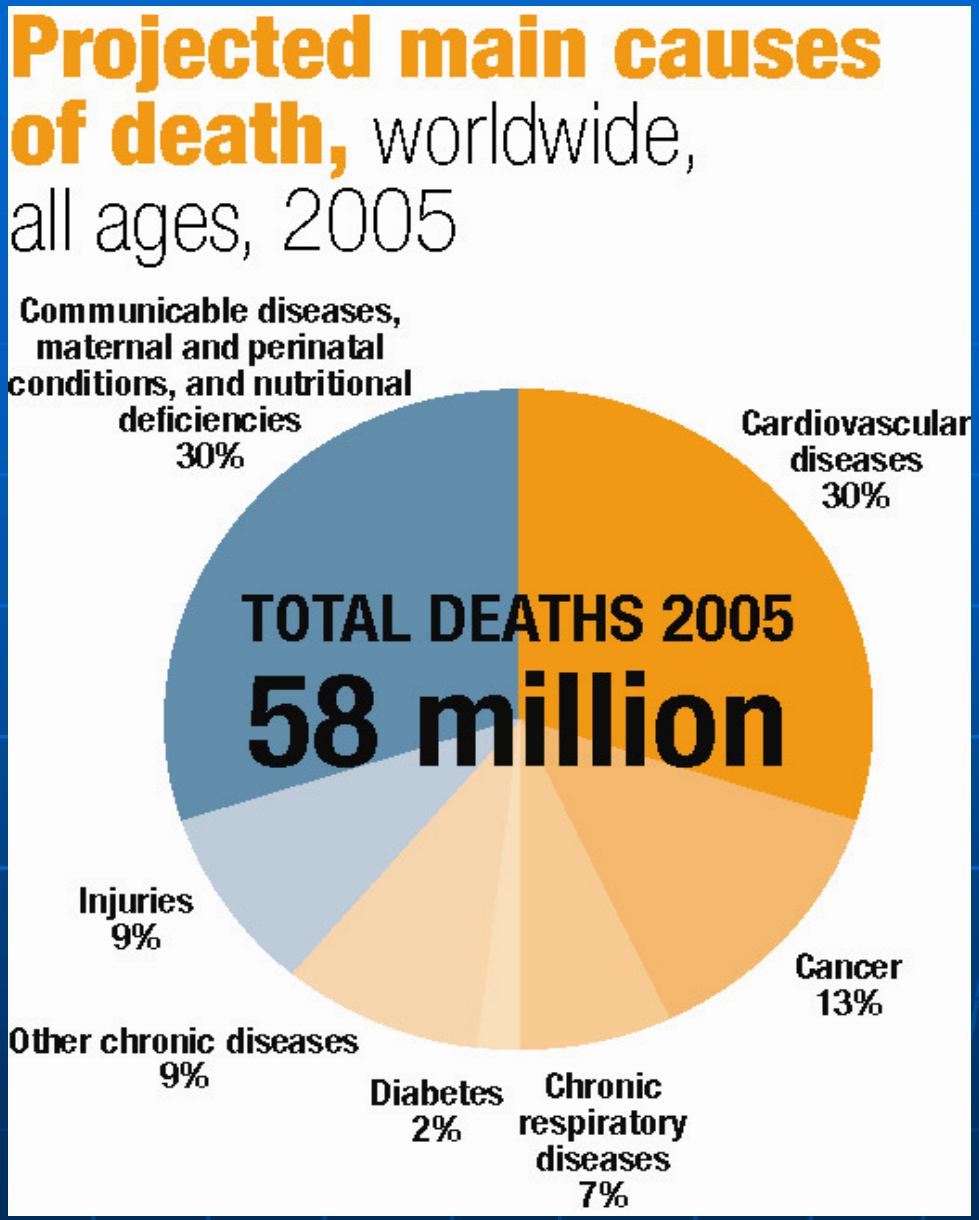


Source: Don de Savigny with permission

PlanRep: a multi-sectoral tool for performance budgeting

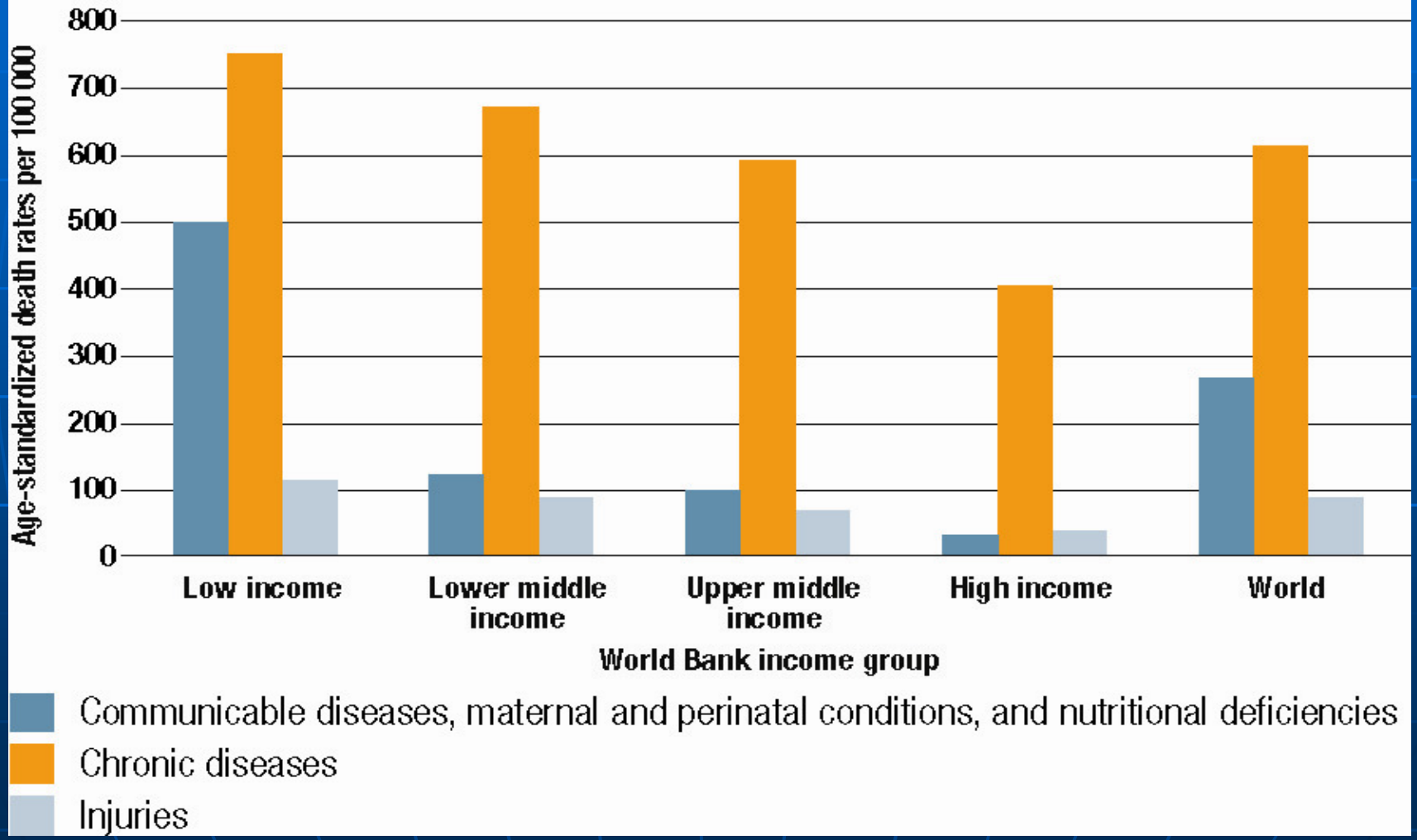
- National budget and expenditure databases for all districts and sectors
- Links health expenditures to:
  - poverty reduction strategy
  - government financial codes
  - burden of disease
  - health interventions
  - health systems support
  - MOH guidelines
  - Priorities and MDGs
- Graphical interface





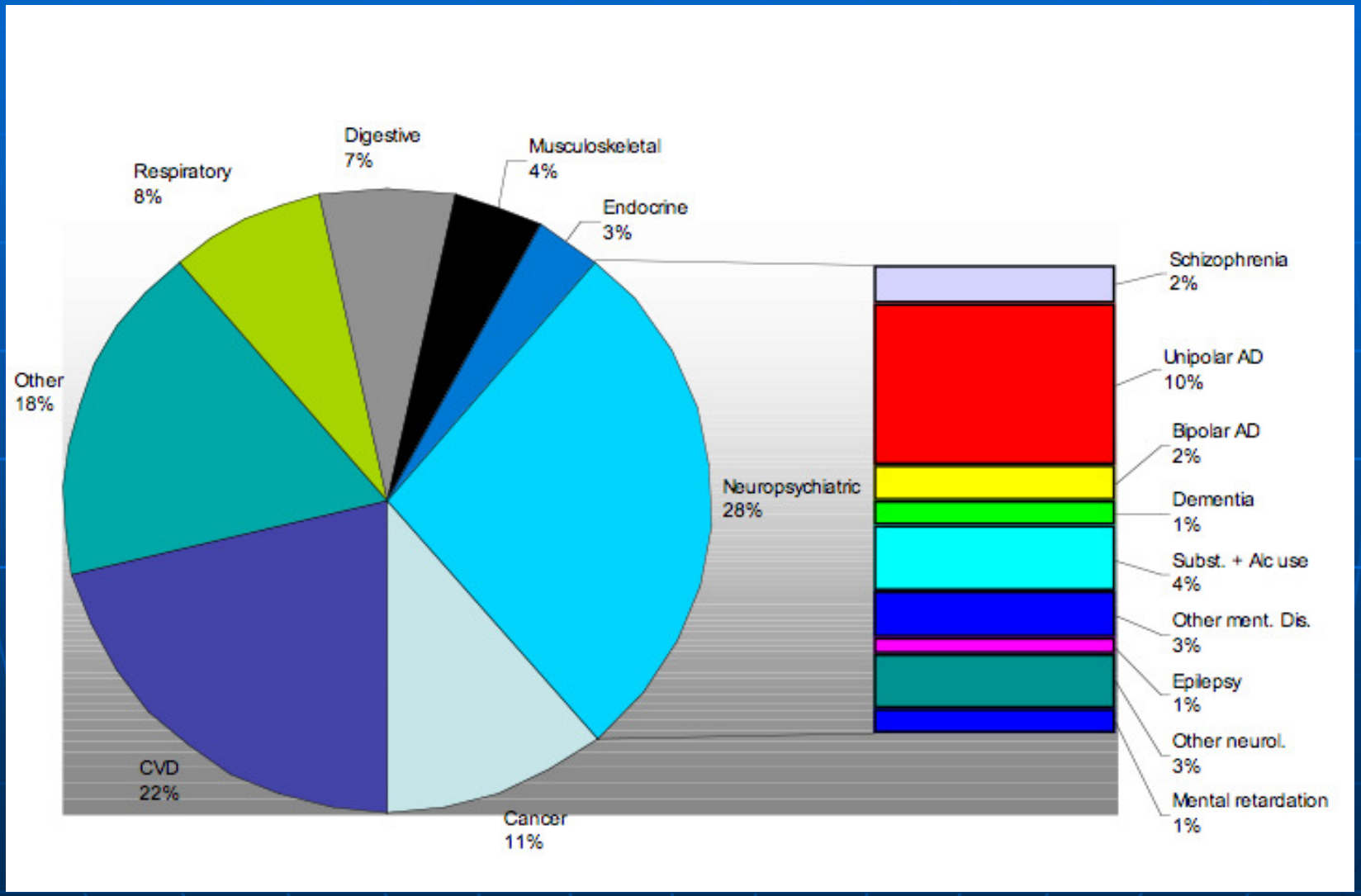
Source: WHO Global Report: Preventing Chronic Diseases: a vital investment, 2005.
http://www.who.int/chp/chronic_disease_report/en/index.html

Projected main causes of death by World Bank income group, all ages, 2005

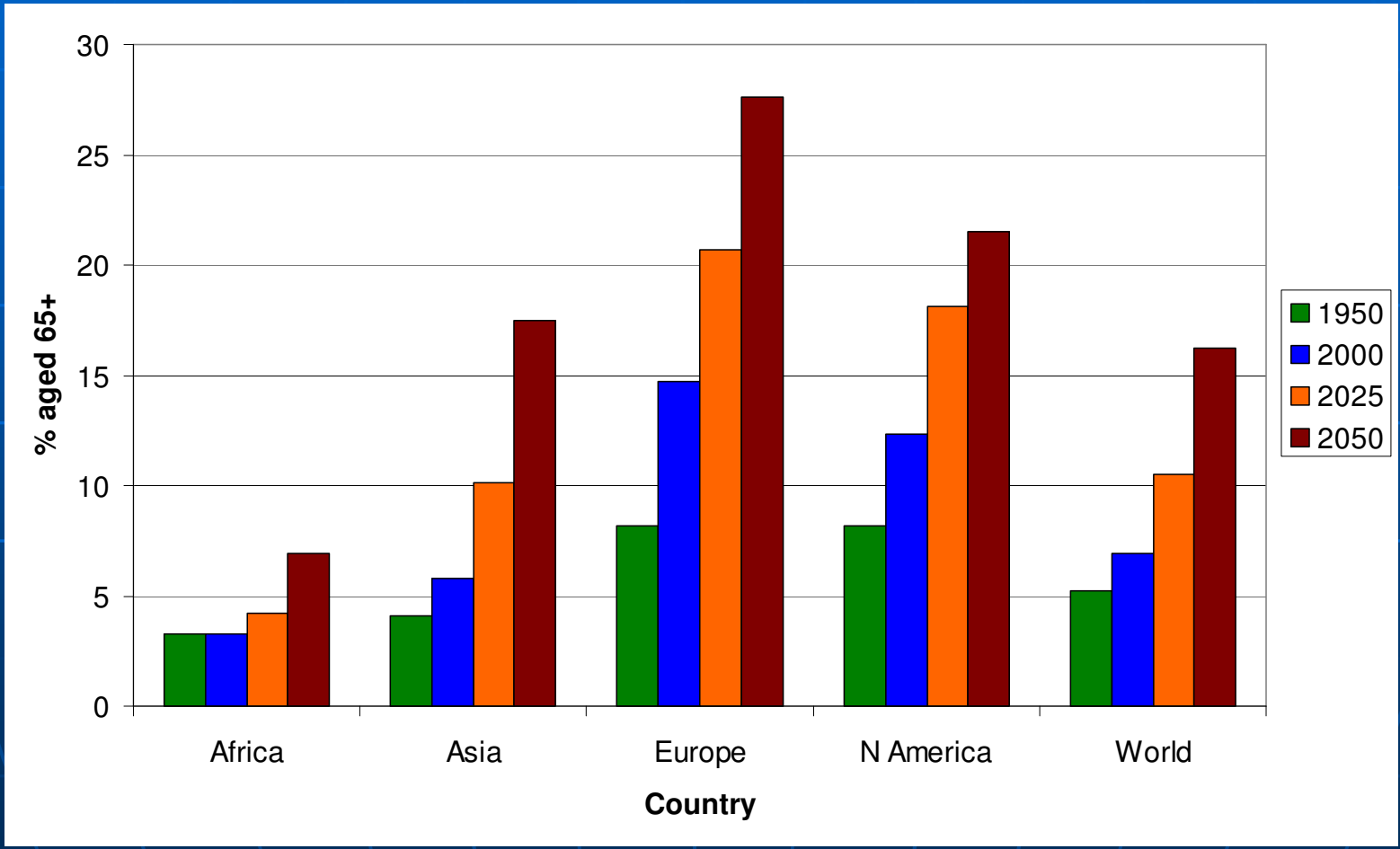


Source: WHO Global Report: Preventing Chronic Diseases: a vital investment, 2005.
http://www.who.int/chp/chronic_disease_report/en/index.html

Proportion of DALYs of NCDs

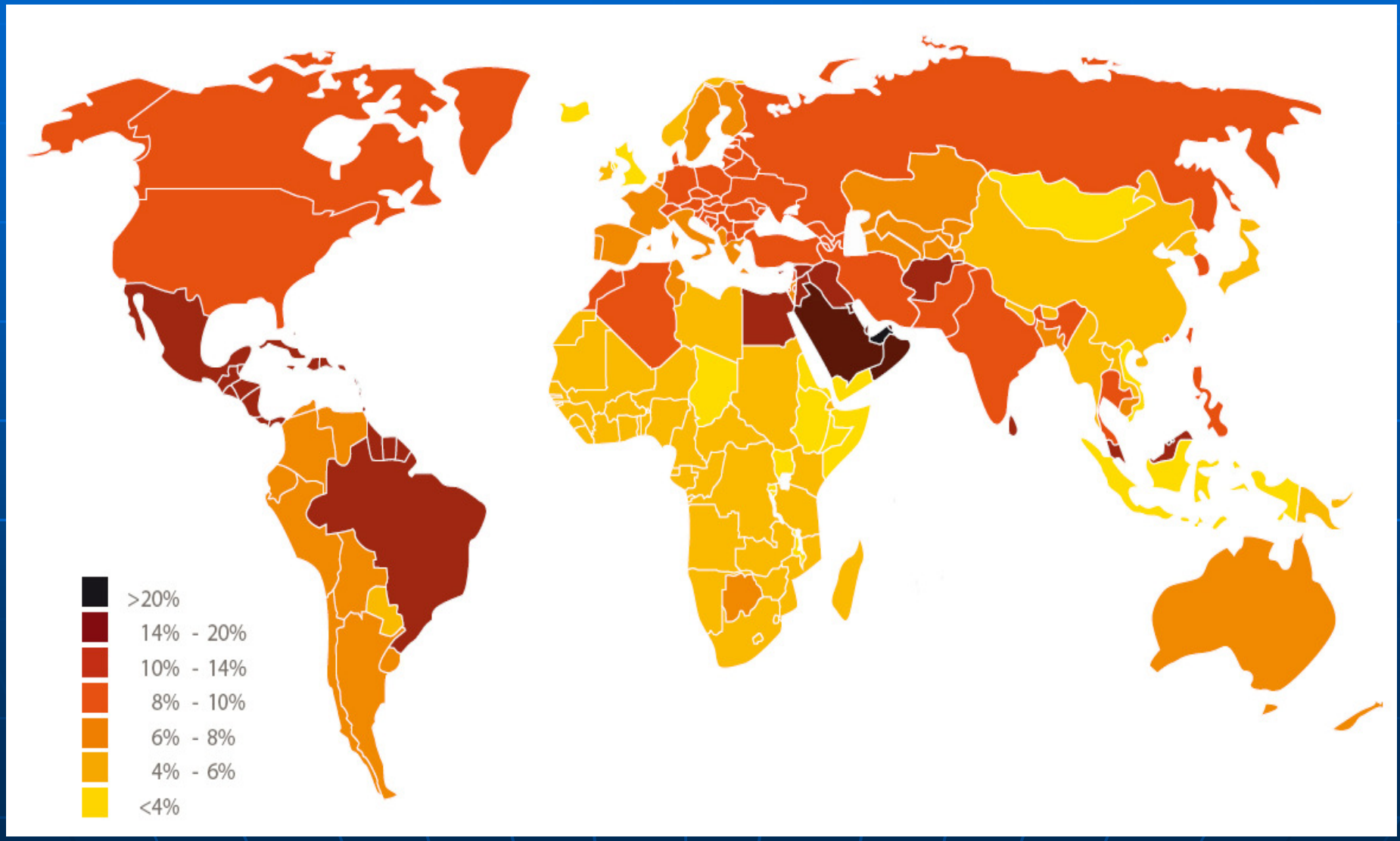


% of population aged 65 and over, World Regions, 1950-2050



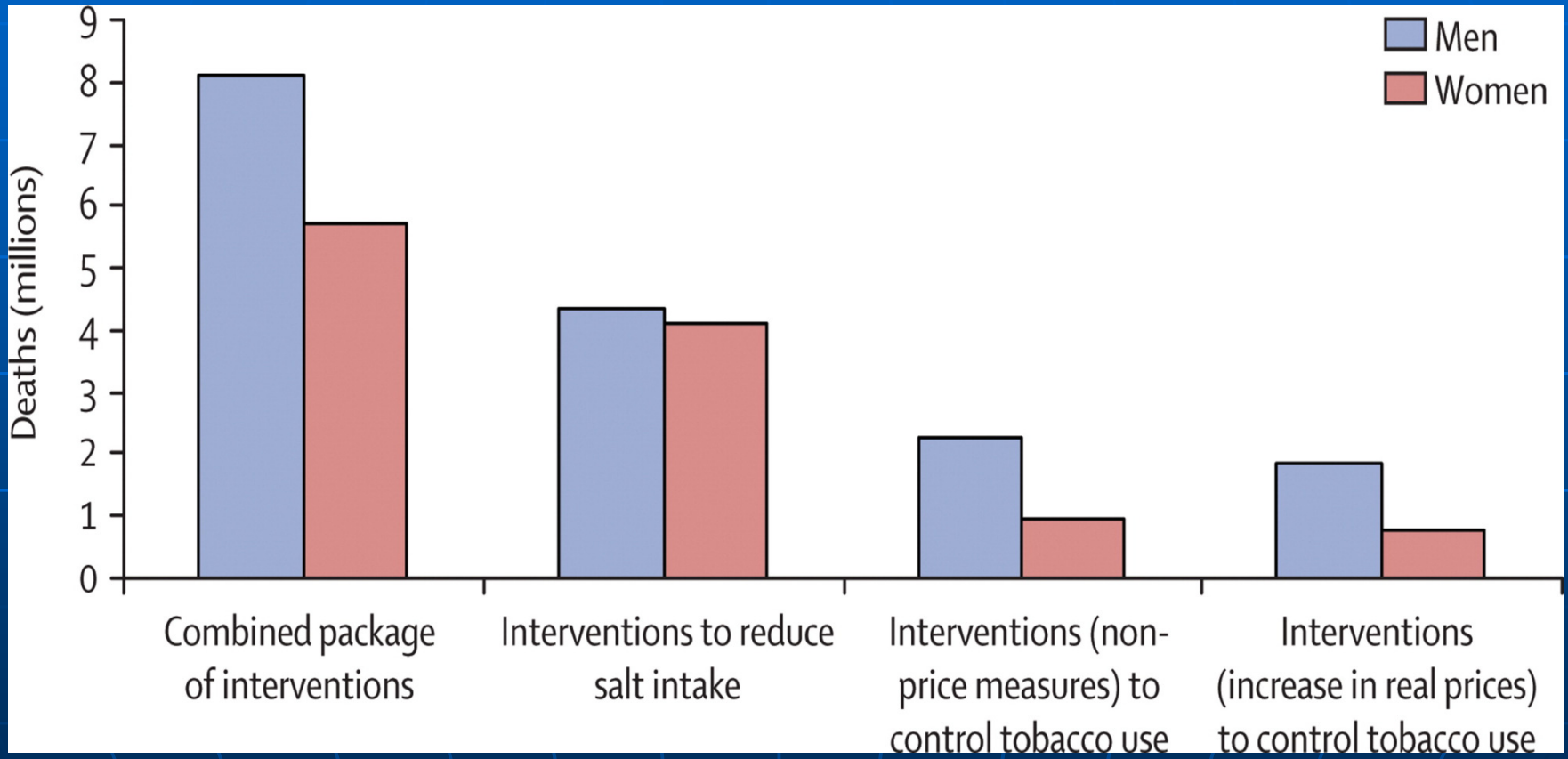
Source: Data from Population Division of the Department of Economic and Social Affairs of the United Nations Secretariat, *World Population Prospects: The 2006 Revision* and *World Urbanization Prospects: The 2005 Revision*, http://esa.un.org/unpp, (2006 based projections, medium variant).

Prevalence estimates of diabetes, 2025



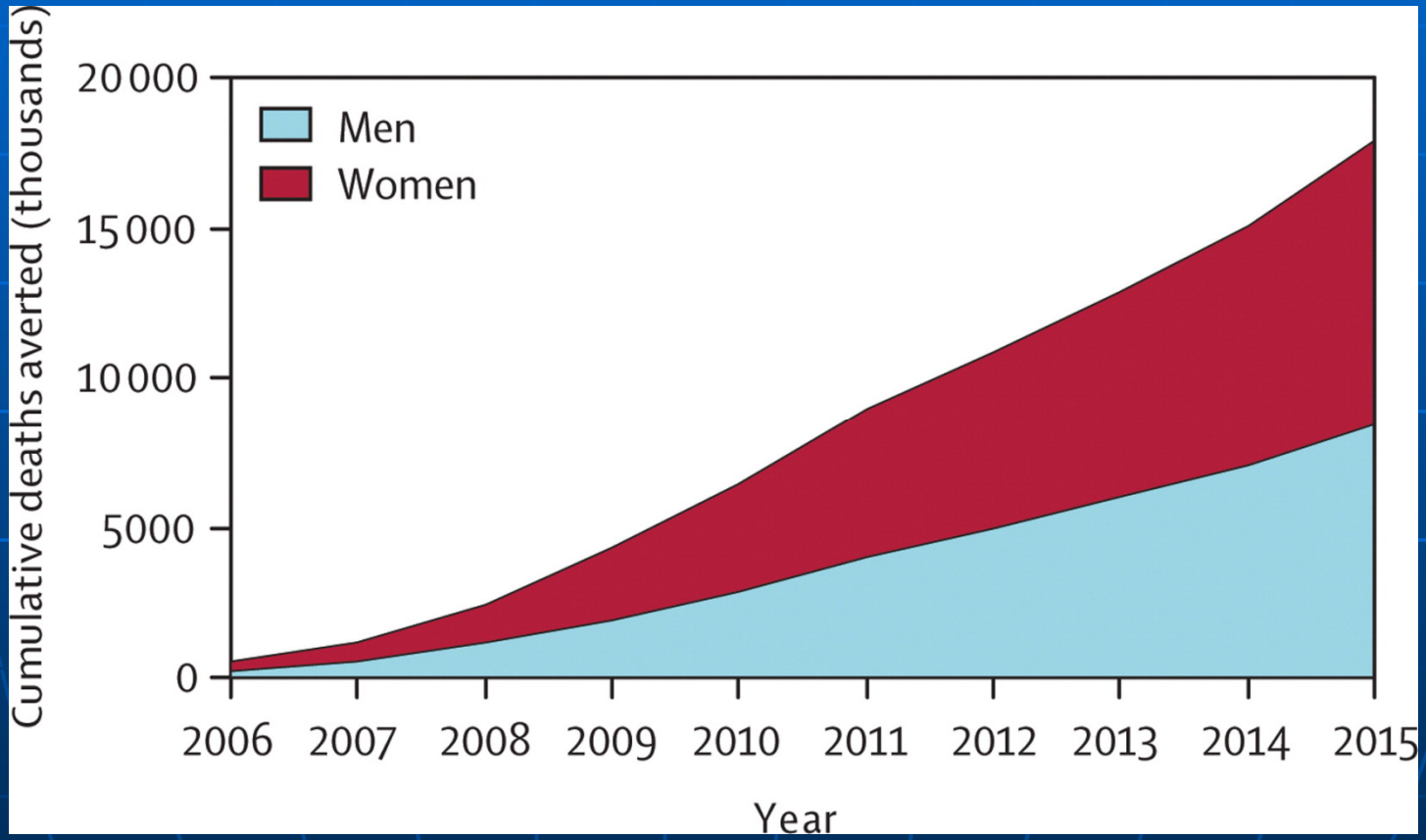
Source: Diabetes Atlas, third edition © International Diabetes Foundation, 2006

Deaths averted by population-level interventions for tobacco and salt intake in 23 countries (2006–15)



Reprinted from The Lancet, 370, Asaria P, Chisholm D, Mathers C, Ezzati M, Beaglehole R, Chronic disease prevention: health effects and financial costs of strategies to reduce salt intake and control tobacco use , 2044-2053 , Copyright 2008, with permission from Elsevier

Deaths averted with a multidrug regimen for the prevention of cardiovascular disease, 2006–15



Reprinted from The Lancet, 370, Lim SL, Gaziano TA, Gakidou E, Reddy KS, Farzadfar F, Lozano R, Rodgers A, Prevention of cardiovascular disease in high-risk individuals in low-income and middle-income countries: health effects and costs , 2054-2062, Copyright 2008, with permission from Elsevier

Estimated median annual drug costs (wide range)

- Aspirin 75 mg $ 1.59
- Enalapril 10 mg $ 3.00
- Hydrochorothiazide 25 mg $ 1.10
- Atenolol 50 mg $ 3.65
- Lovastatin $38.00

- Using lowest buyer prices reduces cost by 74%

- Scaling up cost <1% to >15% of health expenditure for 23 high burden countries

Source: http://erc.msh.org/dmpguide/pdf/DrugPriceGuide_2007_en.pdf

Current care of common mental disorders

- >95% of those who seek care do so in primary health/ general medical sector, typically for physical complaints such as fatigue, aches and pains, gynecological complaints etc
- >95% do not receive evidence based treatments
- Increase in chronicity, disability, health care costs

Cost-effective interventions for chronic, non-communicable diseases in low- and middle-income countries that could be delivered in PHC

	Interventions	Level of evidence
Depressive disorders	Generic antidepressants; brief psychotherapies	RCTs in several countries
Hazardous alcohol use	Brief counselling	Cochrane SR, WHO multi-centre RCT

Source: Beaglehole R, Epping-Jordan J, Patel V, Chopra M, Ebrahim S, Kidd M, Haines A. Lancet 2008

Cost-effective interventions for chronic, non-communicable diseases in low- and middle-income countries that could be delivered in PHC

	Interventions	Level of evidence
Tobacco use	Brief counselling and cessation advice and follow-up, nicotine-replacement therapy	Cochrane SRs
High risk of cardiovascular disease	Multi-drug regimen and health promotion advice	RCTs of components of multi-drug regimen and SRs
Impaired glucose tolerance	Risk-factor modification through lifestyle intervention or metformin	RCTs

Source: Beaglehole R, Epping-Jordan J, Patel V, Chopra M, Ebrahim S, Kidd M, Haines A. Lancet 2008

What does chronic disease management cost if scaled up to national levels?

- "36 million deaths from chronic diseases could be postponed by public health and primary care in the next 10 years at a cost of US$1.50 per person per year"
  - Beaglehole, Ebrahim, Reddy et al, Lancet 2008
- Mental disorders (4 adult disorders): US$2 per capita in low income to 3-4$ in lower middle income countries
  - Lancet GMH series, 2007

Scaling-up access to effective interventions: the vertical-horizontal debate

- Vertical programmes focus on a single disease e.g. smallpox eradication. *May be useful when the system is weak?*

- Horizontal (integrated) approach - 'Bringing together common functions to solve common problems…. developing a commitment to shared vision and goals and using common technologies and resources to achieve these goals'. WHO 1996 abridged.

Problems of multiple vertical programmes - examples

Travis P, Bennett S, Haines A, et al. Overcoming health-systems constraints to achieve the Millennium Development Goals. Lancet 2004; 364: 900-06

- Distortion - Better paid workers for specific diseases weaken other programmes
- Distraction - Multiple forms and bureaucracies
- Duplication - Parallel drug supply systems
- Disruption - Uncoordinated training programmes - a major cause of staff absence

Disease-Specific & Health System Responses - a comparison

Travis P, Bennett S, Haines A, et al. Overcoming health-systems constraints to achieve the Millennium Development Goals. Lancet 2004; 364: 900-06

Constraint	Disease-specific Response	Health System Response
Patients' inability to pay	Price reductions for specific diseases	Risk-pooling strategies
Poorly skilled staff	Training on specific diseases	Revising curricula
Poorly motivated staff	Financial incentives for delivering priority services	Reviewing salary structures and promotion procedures

Integrated approaches to chronic disease management

Source: http://hab.hrsa.gov/tools/primarycareguide/images/PCGfig1_1.gif

Supporting the delivery of PHC-overview of relevant systematic reviews

Lewin S, Lavis J, Oxman A, Haines A et al. Lancet 2008

- 20 priority systematic reviews from 2 large SR databases covering governance, financial and delivery arrangements and implementation strategies relevant to PHC and Low/Middle Income Countries
- Of the 733 studies, 114 (16%) in LMICs

Financial arrangements -- User fees

Lagarde M and Palmer N 2006

User fees decrease demand for health care, although the evidence is of low quality (17 studies, only 2 RCTs) .

The removal of user fees may, however have unintended adverse consequences -

e.g. increased demands for unnecessary services; or be replaced by informal fees and must be planned with care.

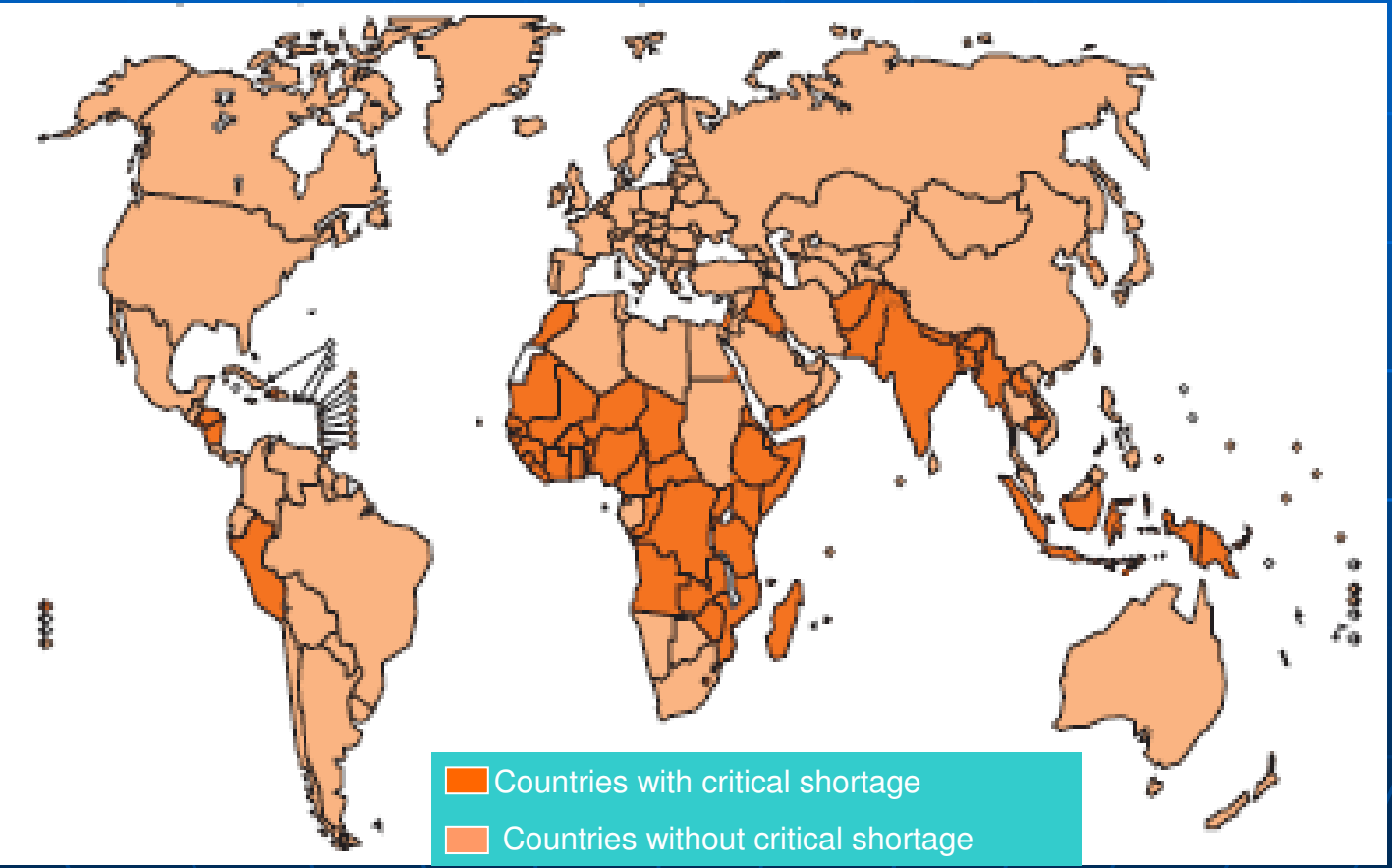
Conditional cash transfers

Lagarde M, Haines A, Palmer N JAMA 2007

- Payments conditional on attendance for preventive activities intended to improve health and break the vicious cycle of poverty.
- Systematic review found studies of 6 Conditional cash transfer programmes (4 RCTs), moderate quality
- PHC settings, 5 in Latin America,
- Increase the use of preventive services but have mixed effects on objectively measured health outcomes.
- Require a functioning health system.

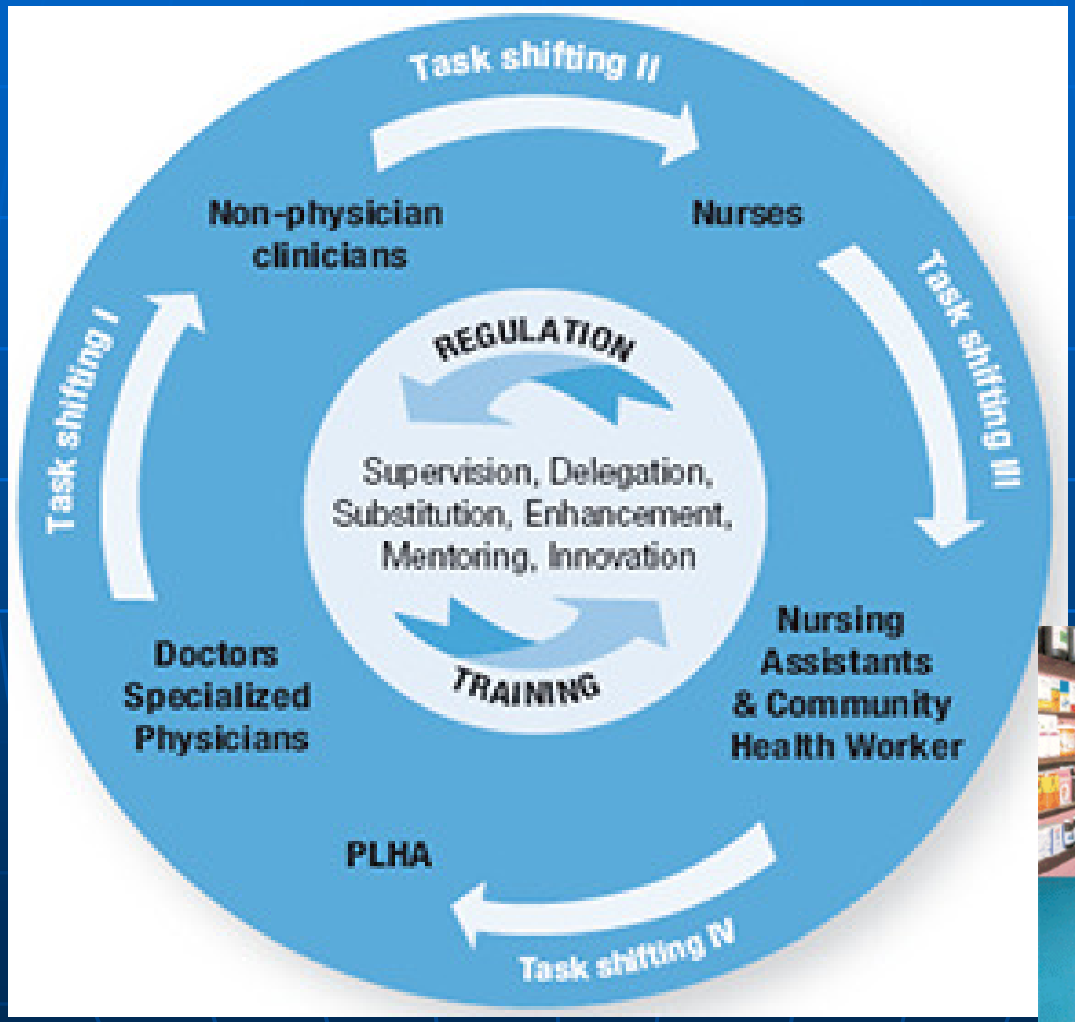
57 Countries with a critical shortage of 2.4 million health service providers (doctors, nurses, midwives)

Africa has 25 % of the world's disease burden and 1.3% of the providers



Data source: World Health Organization. *Global Atlas of the Health Workforce* (http://www.who.int/globalatlas/default.asp)

Task shifting to scale up chronic disease management



Source: http://www.hrhresourcecenter.org/task_shifting

Delivery of Antiretroviral therapy in PHC settings

- Growing experience of delivery in PHC centres and home-based delivery e.g. Zambia, Uganda, South Africa and Malawi
- Essential to improve access and adherence
- Potential to improve prevention
- Public health approach uses standardised regimens, little or no lab monitoring
- Three essential elements –regular drugs, good adherence and follow up

Home-based care

- Prospective cohort study of home-based HIV care in rural Uganda
- 95 % reduction in mortality after ART and co-trimoxazole introduction in HIV + adults ;
- 81% reduction in mortality of their uninfected children and
- 93% reduction in orphanhood (Mermin et al Lancet 2008)
- No routine visits after initial enrolment,
- Weekly home visits by trained lay providers who: provided medicines, checked symptoms and adherence

- Cluster randomised trial underway comparing facility based and home-based care in, Jinja, Uganda

  Shabbar Jaffar pers.comm. 2008,

Lay health workers delivering group Interpersonal therapy for depression in rural Uganda

(Bolton et al, JAMA 2005, 2007)

RCT 30 Villages	Group Therapy	Major depression	82% v/s 45% (p<.001)

Lady Health Workers using CBT to treat postnatal depression in rural Pakistan

(Rahman et al, Lancet 2008)

- Cluster RCT
- @1 year 27 % mothers depressed in intervention vs. 59% in control group. ($p<0.0001$)
- Increased immunisation, contraception, and play frequency with infants

Growing evidence that Community Health workers can improve some health outcomes in children

Haines A, Sanders D, Lehmann U, et al. Lancet 2007.

- Community based pneumonia management in children reduces mortality

  (Winch PJ, Leban K,et al Health Policy Plan. 2002. Sazawal S, Black RE. Lancet Infect Dis. 2003.)

- Home-based neonatal care and management of sepsis reduced neonatal mortality by ~50 % in rural India

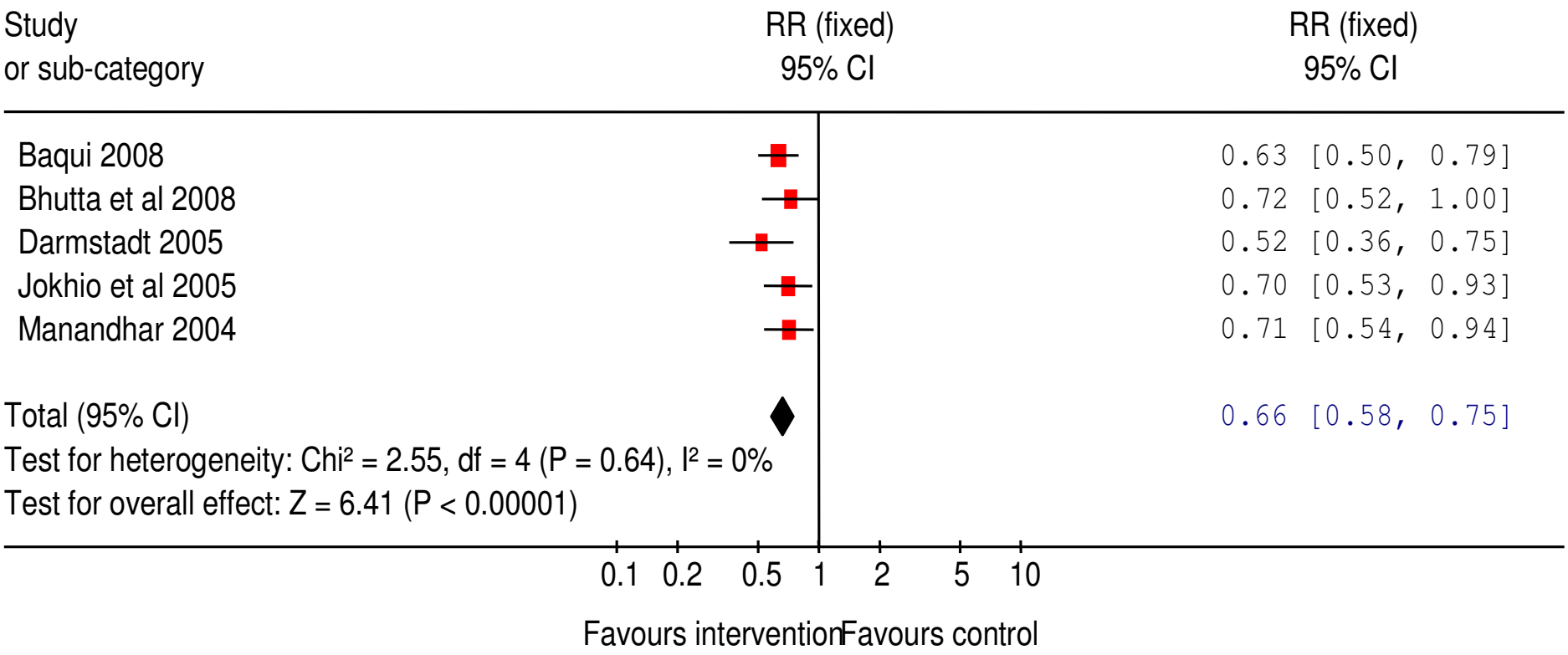
  (Bang AT, Bang RA, Baitule SB, et al. Lancet 1999.)

- Systematic review of 48 RCTs-- lay health workers improve immunization uptake, breastfeeding and outcomes for malaria and ARI's in children

  (Lewin et al 2006)

- *Can performance be maintained at scale?*

Impact of community based strategies on neonatal mortality



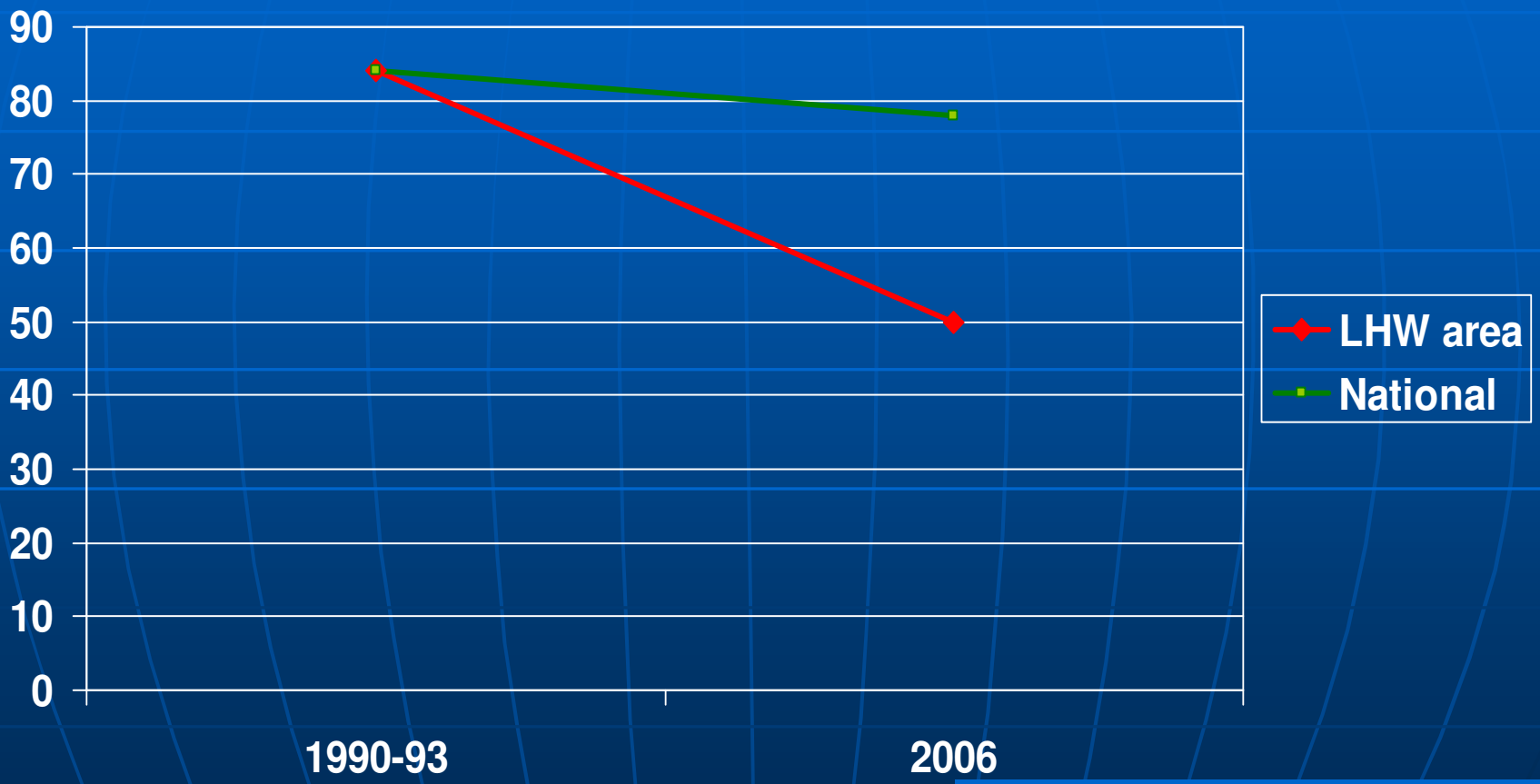
Source: Bhutta ZA, Ali S, Cousens S, Ali TM, Haider BA, Rizvi A, Okong P, Bhutta SZ, Black RE. Interventions to address maternal, newborn and child health: What difference can integrated primary health care strategies make?. Lancet 2008

Lady HealthWorker programme in Pakistan - An example of Scaling up

Bhutta ZA, Memon ZA, Soofi S et al. Bull World Health Organ. 2008;.

- ~100,000 trained for 6 months and supervised
- 200 families each
- Support breast feeding and immunisation
- Prevent and treat illnesses e.g. ARI, malaria, diarrhoea
- Family planning
- Refer
- Reduced perinatal mortality
- Weaknesses – low salary, poor career prospects and logistics

Comparison of Infant Mortality Rate

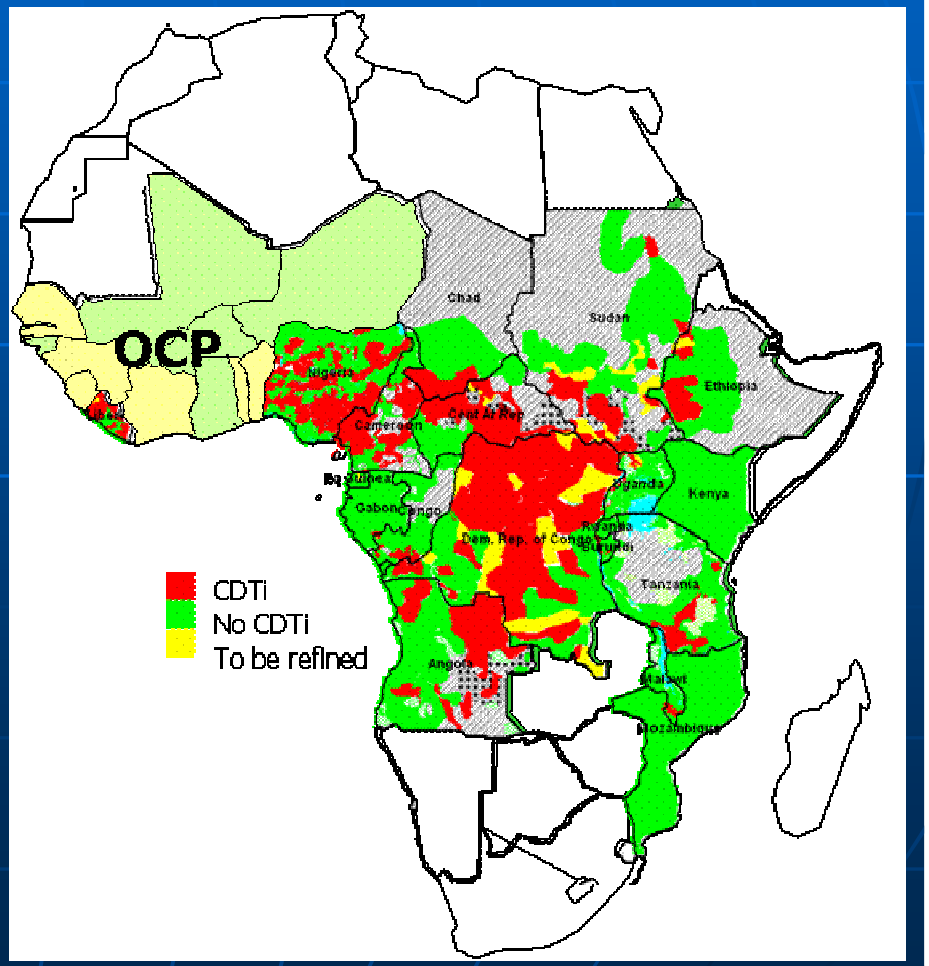


Source: NP on PHC&FP, Annual progress report 2006

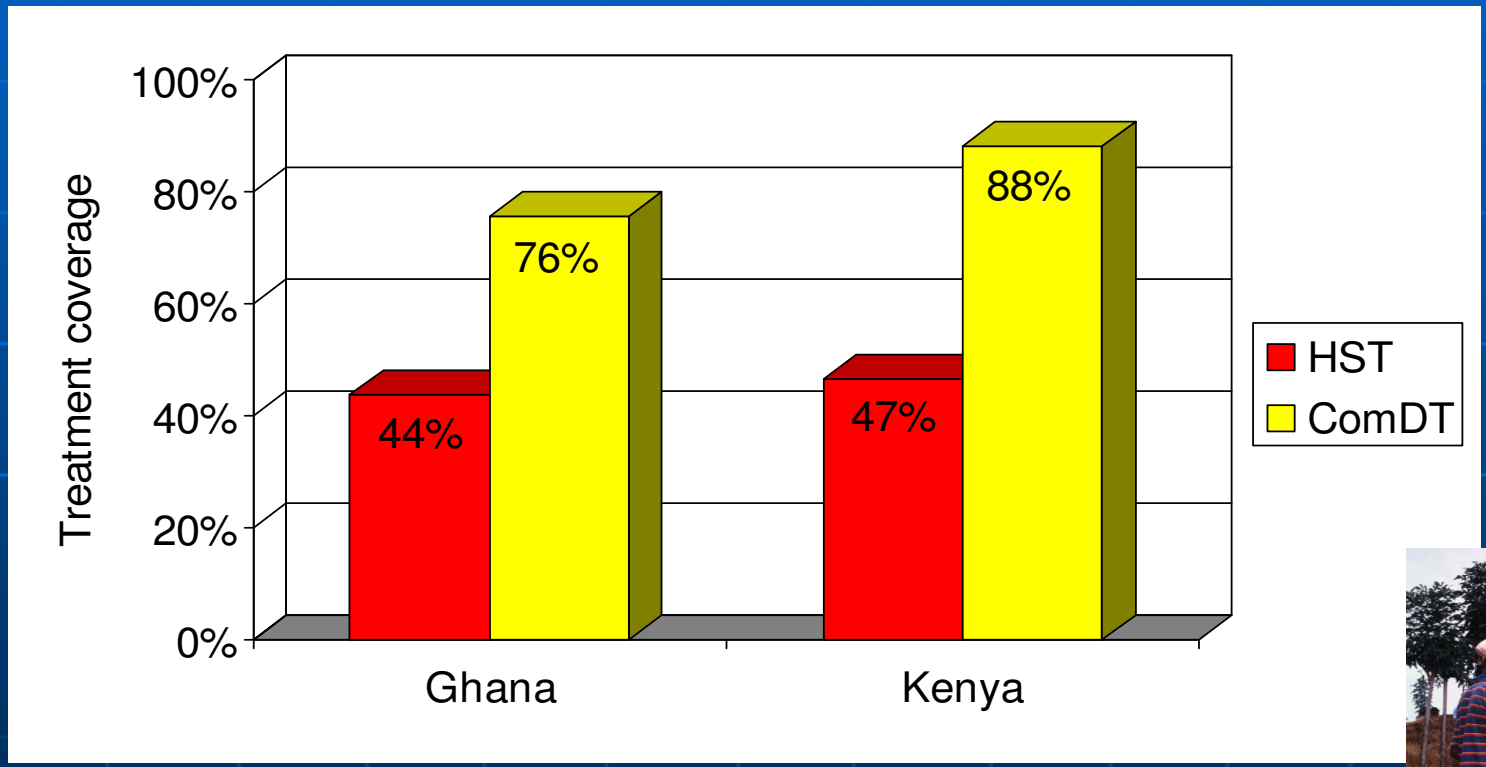
Can a vertical programme strengthen a health system? African Programme for Onchocerciasis Control

Community-directed treatment with ivermectin in APOC countries

- > 100,000 communities total population of 60 million
- 100 million to be covered by 2010
- Extended to cover prevention and home treatment of malaria



Ivermectin treatment coverage by Community Directed Treatment and by the regular health services (HST)



The Brazilian experience - PSF (Family health programme)

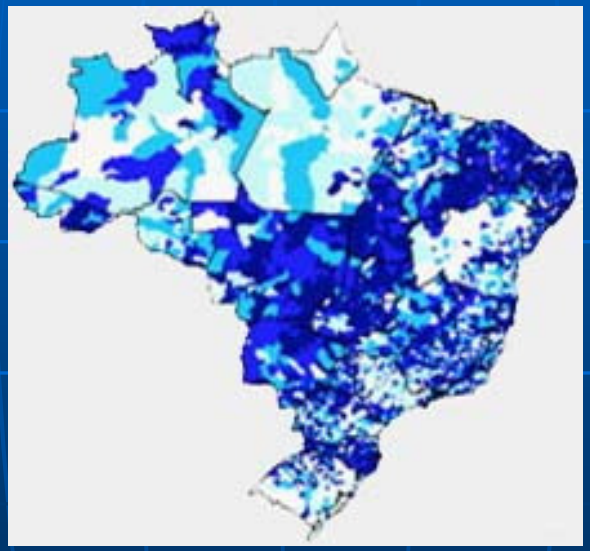
Macinko J, Guanais FC, de Fátima M, et al. Evaluation of the impact of the Family Health Program on infant mortality in Brazil, 1990-2002. J Epidemiol Community Health. 2006; 60: 13-9

- PHC teams-physician, nurse, CHWs
- Defined populations ~3500
- Data from 27 Brazilian states from 1990–2002 shows each 10% increase in coverage was associated with a 4.5% decrease in IMR, controlling for all other health determinants ($p<0.01$).
- Reduced inequities. Juraci Cesar PhD thesis

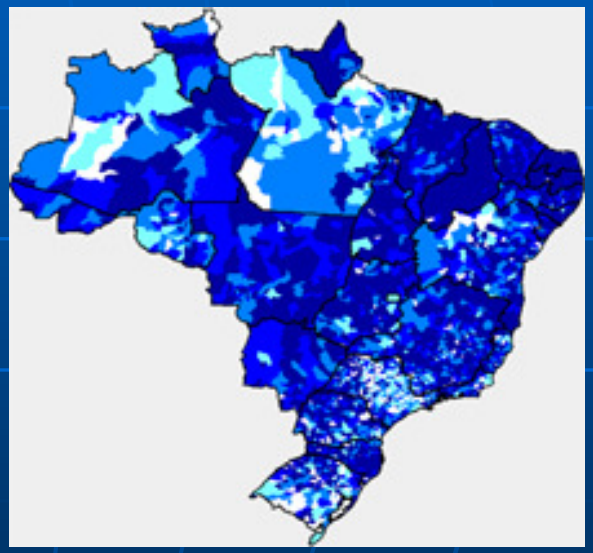
Evolução da Implantação das Equipes Saúde da Família
BRASIL - 1998 - ABRIL/2008

http://dtr2004.saude.gov.br/dab/abnumeros.php#mapas

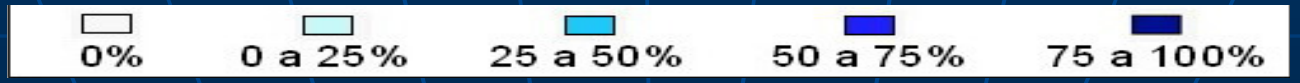
1998



2003



2008



Important questions about PHC remain

- Emphasis on health care rather than health-how to integrate intersectoral action?
- How to address marginalised populations?
- What is the role of PHC in chronic disease prevention and management in an ageing population?
- How to scale up and sustain high quality PHC in different settings?

Primary Care data as a resource for epidemiology

- E.g. GP Research Database Databasehttp://www.gprd.com/_docs/Database-4.pdf
- Data available since 1987
- 3.5 million patients registered with UK family doctors, 5.5% of UK population
- 39 million patient years of high quality data
- Simplified governance and access
- ~600 peer reviewed publications

Research includes

- Drug safety/pharmacovigilance
- Vaccine safety – lack of association between autism and MMR vaccine (Smeeth et al Lancet 2006)
- Causal epidemiology - association between respiratory infections and MI (Smeeth et al NEJM)
- Environmental epidemiology - association between air pollution and allergic rhinitis consultations (Hajat, Haines et al 2003)
- Health services research

PHC and epidemiology - an enduring relationship

- Effective PHC combines the population and individual perspectives
- Epidemiological approaches can generate the evidence on disease burden, effective interventions, organisational and delivery strategies and the impacts of scaling up
- Epidemiological insights can reconcile the reality of limited resources with the comprehensive vision of Alma Ata by indicating the appropriate priorities for a particular setting in a changing world

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- Shabbar Jaffer , Liam Smeeth