Epidemiology and Primary Health Care 30 years after Alma Ata

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London School of Hygiene and Tropical Medicine
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

<table>
<thead>
<tr>
<th>Strategy</th>
<th>C-PHC</th>
<th>S-PHC</th>
<th>Reforms &amp; Minimum Packages</th>
<th>Scaling-up</th>
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</thead>
<tbody>
<tr>
<td>Content</td>
<td>Broad</td>
<td>Narrow</td>
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<tr>
<td>Orientation</td>
<td>Horizontal</td>
<td>Vertical</td>
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<tr>
<td>Time Frame</td>
<td>Longer</td>
<td>Shorter</td>
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<td>Actors</td>
<td>WHO</td>
<td>UNICEF</td>
<td>WB WHO SWAp’s PRSP’s</td>
<td>GAVI GFATM,</td>
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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
Projected main causes of death, worldwide, all ages, 2005

- Cardiovascular diseases: 30%
- Communicable diseases, maternal and perinatal conditions, and nutritional deficiencies: 30%
- Injuries: 9%
- Chronic respiratory diseases: 7%
- Other chronic diseases: 9%
- Cancer: 13%
- Diabetes: 2%

TOTAL DEATHS 2005: 58 million

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

Proportion of DALYs of NCDs

- CVD: 22%
- Cancer: 11%
- Neuropsychiatric: 28%
- Other: 18%
- Respiratory: 8%
- Digestive: 7%
- Musculoskeletal: 4%
- Endocrine: 3%

Diseases:
- Schizophrenia: 2%
- Unipolar AD: 10%
- Bipolar AD: 2%
- Dementia: 1%
- Subst. + Acute: 4%
- Other ment. Di. 3%
- Epilepsy: 1%
- Other neurol.: 3%
- Mental retardation: 1%
% of population aged 65 and over, World Regions, 1950-2050

Prevalence estimates of diabetes, 2025

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

Estimated median annual drug costs (wide range)

- Aspirin 75 mg $ 1.59
- Enalapril 10 mg $ 3.00
- Hydrochlorothiazide 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

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

<table>
<thead>
<tr>
<th></th>
<th>Interventions</th>
<th>Level of evidence</th>
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<tbody>
<tr>
<td>Depressive disorders</td>
<td>Generic antidepressants; brief psychotherapies</td>
<td>RCTs in several countries</td>
</tr>
<tr>
<td>Hazardous alcohol use</td>
<td>Brief counselling</td>
<td>Cochrane SR, WHO multi-centre RCT</td>
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**Cost-effective interventions for chronic, non-communicable diseases in low- and middle-income countries that could be delivered in PHC**

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<th>Interventions</th>
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<tr>
<td>Tobacco use</td>
<td>Brief counselling and cessation advice and follow-up, nicotine-replacement therapy</td>
</tr>
<tr>
<td>High risk of cardiovascular disease</td>
<td>Multi-drug regimen and health promotion advice</td>
</tr>
<tr>
<td>Impaired glucose tolerance</td>
<td>Risk-factor modification through lifestyle intervention or metformin</td>
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</table>

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”

- 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


- **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


<table>
<thead>
<tr>
<th>Constraint</th>
<th>Disease-specific Response</th>
<th>Health System Response</th>
</tr>
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<tbody>
<tr>
<td>Patients’ inability to pay</td>
<td>Price reductions for specific diseases</td>
<td>Risk-pooling strategies</td>
</tr>
<tr>
<td>Poorly skilled staff</td>
<td>Training on specific diseases</td>
<td>Revising curricula</td>
</tr>
<tr>
<td>Poorly motivated staff</td>
<td>Financial incentives for delivering priority services</td>
<td>Reviewing salary structures and promotion procedures</td>
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</table>
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

- 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
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


- 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

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)

<table>
<thead>
<tr>
<th>RCT 30 Villages</th>
<th>Group Therapy</th>
<th>Major depression</th>
<th>82% v/s 45% (p&lt;.001)</th>
</tr>
</thead>
</table>

![Image of lay health workers delivering group therapy](image-url)
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


- Community based pneumonia management in children reduces mortality

- 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

<table>
<thead>
<tr>
<th>Study or sub-category</th>
<th>RR (fixed) 95% CI</th>
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<tbody>
<tr>
<td>Baqui 2008</td>
<td>0.63 [0.50, 0.79]</td>
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<tr>
<td>Bhutta et al 2008</td>
<td>0.72 [0.52, 1.00]</td>
<td></td>
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<tr>
<td>Darmstadt 2005</td>
<td>0.52 [0.36, 0.75]</td>
<td></td>
</tr>
<tr>
<td>Jokhio et al 2005</td>
<td>0.70 [0.53, 0.93]</td>
<td></td>
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<tr>
<td>Manandhar 2004</td>
<td>0.71 [0.54, 0.94]</td>
<td></td>
</tr>
<tr>
<td><strong>Total (95% CI)</strong></td>
<td><strong>0.66 [0.58, 0.75]</strong></td>
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Test for heterogeneity: Chi² = 2.55, df = 4 (P = 0.64), I² = 0%

Test for overall effect: Z = 6.41 (P < 0.00001)

Lady HealthWorker programme in Pakistan - An example of Scaling up

- ~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)

- Ghana: 44% (HST) & 76% (ComDT)
- Kenya: 47% (HST) & 88% (ComDT)
The Brazilian experience - PSF (Family health programme)


- 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
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
- 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
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.
Acknowledgements

Thanks to many colleagues


Shabbar Jaffer, Liam Smeeth