Literature review summary: “How effective are community health workers?”

October 2012
INTRODUCTION

• This document is the summary of a literature review that John Hopkins University prepared on the topic of: “How effective are community health workers?”

• Information is complemented by information and a framework on CHW effectiveness that the MDG Health Alliance prepared with Dalberg Global Development Advisors.

• This piece of work is meant to complement the extensive CHW review carried out by Bhutta and colleagues under the auspices of the WHO and GHWA in 2010.

• The full academic references and information is available in the original publication on the literature review and can be obtained from Henry Perry at JHU or Phyllis Heydt at the MDG Health Alliance.
WHY THERE ARE CHWs?

In response to a need that cannot be addressed through the existing systems . . .

“Preventable deaths” ~7.6m children under 5 dying each year

Under5 deaths by cause, in %

- Neonatal: 40%
- Pneumonia: 14%
- Malaria: 10%
- Diarrhea: 7%
- Injury: 6%
- AIDS: 2%
- Other: 21%

“HRH crisis”

million, doctors/nurses/midwives – Africa region

1.4 0.6 0.8

Shortage for Africa and Asia estimated at 4m workers

Ranges of outlook

Overall
- Usually women
- From the community
- Often first and only point of care

Training
- 3 weeks (e.g., India) to 2 years (e.g., HEW)

Salary
- Paid (salary or incentives) to not paid at all
- Full-time workers to just a few hours per week

Coverage
- 1:600 (e.g., Nepal) to 1:1,200 (Pakistan)

No formal professional or paraprofessional certificate

. . . many countries have established different forms of Community Health Workers

SOURCE: Literature review JHU: “How effective are community health workers”

## CHW MODELS OVER TIME

<table>
<thead>
<tr>
<th>1970s</th>
<th>1980s</th>
<th>1990s and 2000s</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>1972</strong>: 1 million barefoot doctors in China</td>
<td><strong>Large-scale programs develop</strong></td>
<td><strong>2005</strong>: Start of ASHA program (India)</td>
</tr>
<tr>
<td><strong>1975</strong>: WHO book on “Health by the People”</td>
<td></td>
<td><strong>2004</strong>: Start of Health Extension Worker Program (Ethiopia)</td>
</tr>
<tr>
<td><strong>1978</strong>: Declaration of Alma Ata: Achievement of Health for All by 2000 through primary care (including CHWs as applicable)</td>
<td></td>
<td><strong>1992</strong>: Start of Lady Health Worker program (Pakistan)</td>
</tr>
</tbody>
</table>

### End 1980s/early 1990s:
Existing programs facing challenges
- Less financing and political commitment (financial crises, questions about effectiveness)
- Emergence of vertical programs
- Many programs discontinued

### Key programs

**Bangladesh**
- **Mid 70s**: Family Welfare Assistants
- **1972**: 1 million barefoot doctors in China
- **1975**: WHO book on “Health by the People”
- **1978**: Declaration of Alma Ata: Achievement of Health for All by 2000 through primary care (including CHWs as applicable)
- **1979**: Large-scale programs develop
- **1997**: 30,000 CHWs

**Brazil**
- **1987**: Special Service for Public Health Program
- **1988**: Female Community Health Volunteer Program

**Nepal**
- **1987**: Special Service for Public Health Program
- **1988**: Female Community Health Volunteer Program

**Today**:
- **Bangladesh**: 80,000 CHWS
- **Brazil**: 222,000 CHWS
- **Nepal**: 40,000 CHWS

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**SOURCE**: Literature review JHU: “How effective are community health workers”
## CHW Effectiveness: Strong Evidence for a Significant Reduction in Child Mortality

### MDG 4

**Area**

<table>
<thead>
<tr>
<th>Area</th>
<th>Reduction in Mortality, U5 %</th>
<th>Other relevant outcomes/comments</th>
</tr>
</thead>
</table>
| Community case management of pneumonia | All children[^2] **24**<br>Children with disease **36** | • Cost per death prevented as low as $2.64[^3]  
• Recent study shows a reduction as high as 70%[^4]  |
| Diarrhea treatment | n/a | • ORS may reduce mortality up to 93%[^10]  
• Zinc is estimated to reduce diarrhea mortality by 23%[^12]  
• BRAC Bangladesh increased ORS coverage up to 81% through CHWs/Oral Rehydration Extension Program Worker[^9]  |
| Community case treatment of malaria[^6] | All children **40**<br>Children with disease **60**<br>Severe malaria **53** | • In recent Madagascar trial with RDTs, 98% of all childhood cases were cured[^7]  |
| Home-based newborn care | | • Includes range of services: Umbilical cord care, initiation of breast feeding etc.[^6]  
• Participatory women’s groups facilitated through CHWs have shown ~30% reduction in neonatal mortality[^5]  |
| Stillbirths[^1] | | |

### MDG 5

**Area**

<table>
<thead>
<tr>
<th>Area</th>
<th>Reduction in Mortality, U5 %</th>
<th>Other relevant outcomes/comments</th>
</tr>
</thead>
</table>
| Training of TBAs | n/a | • Strong evidence that CHW can effectively provide family planning services (including injectibles)  
• In Afghanistan, CPR increased by 24-27% after CHWs provided services[^11]  |
| Maternal mortality[^1] | **23** | |
| Family planning | n/a | |

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**SOURCE:** Literature review JHU: “How effective are community health workers”
WITHIN MDG 6 MOST EVIDENCE SUPPORTING MALARIA IMPACT ON CHILDREN AND COST-EFFECTIVENESS OF COMMUNITY-BASED DOTS TREATMENT

CHW role/effectiveness

**HIV/AIDS**
- WHO recommends that 115 of 313 tasks for prevention and treatment of HIV can be carried out by CHWs¹
- CHWs clearly essential in service delivery for HIV/AIDS
- Little evidence of impact on MDG target or mortality²

**Malaria**
- 40–60% reduction in U5 mortality through CHW community case management²

**TB**
- CHWs are playing a central role in TB programs, particularly in Directly Observed Therapy, Short-Course (DOTS)
- Highly cost effective - 35% lower than cost of facility-based treatment³,⁴,⁵ (Tanzania, Ethiopia, Bangladesh)

1 WHO on task shifting (2008); 2 Sazawal S (2003); 3 Wandwalo E (2005); 4 Islam MA (2002); 5 Datiko DG (2010)
2 Also true for other areas

SOURCE: Literature review JHU: “How effective are community health workers”
EVIDENCE ON COST-EFFECTIVENESS OF OVERALL CHW MODELS LACKING

<table>
<thead>
<tr>
<th>CHW supported interventions</th>
<th>Cost per DALY, $</th>
<th>Cost per death averted, $</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO(^1)</td>
<td>“Cost effectiveness” n/a</td>
<td>5,086–6,461</td>
</tr>
<tr>
<td>Breastfeeding</td>
<td>930(^4)</td>
<td></td>
</tr>
<tr>
<td>Vitamin A distribution</td>
<td>2(^3)</td>
<td>56(^3)–237(^{13})</td>
</tr>
<tr>
<td>Management of malnutrition</td>
<td>53(^5)</td>
<td>327–1,760(^5)</td>
</tr>
<tr>
<td>Comm. case mgt. of pneumonia</td>
<td>20–200(^2)</td>
<td>3(^6)</td>
</tr>
<tr>
<td>Malaria ITNs</td>
<td>11–17(^8)</td>
<td>100–301(^7)</td>
</tr>
<tr>
<td>Participatory women’s groups to improve birth outcomes</td>
<td>83–263(^9),(^{10,11})</td>
<td>3,422(^9),(^{10,11})</td>
</tr>
<tr>
<td>Home-based new-born care (India)</td>
<td>45–275(^2),(^{11})</td>
<td>150(^{12})</td>
</tr>
<tr>
<td>PMTCT</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

- There have been no evaluations of the cost-effectiveness of large-scale CHW programs
- Existing research just looks at individual interventions

\(^1\) WHO-CHOICE; 2 Jamison DT (2006); 3 Fiedler JL (2008); 4 Laxminarayan R (2006); 5 Bachmann MO (2009); 6 Bang AT (1990); 7 Hutton G (2009); 8 Breman JG (2006); 9 Manandhar DS (2004); 10 Borghi J (2005); 11 Morrison J (2005); 12 Bang AT (2005); 13 Loevinsohn BP (1997)

SOURCE: Literature review JHU: “How effective are community health workers"
### FACTORS THAT DRIVE THE EFFECTIVENESS OF CHW PROGRAMS

#### Role:

**Child Health**
- Behavior change and health promotion
- Identification of danger signs
- Treatment and referral for pneumonia, malaria, diarrhea

**Maternal Health**
- Ensure 4 ANC visits
- With appropriate training: provide iron/folate supplements
- Support institutional deliveries
- Promote and distribute family planning supplies

#### Effectiveness:

- Distribution
- Training
- Remuneration & incentives
- Supplies
- Supervision & support

#### Enablers:

- Political will
- Links to health systems & infrastructure
- Financing & planning
- Policy & regulation
- Community awareness + support
- Data systems & mHealth

### SOURCE: Team
# REQUIREMENTS TO BUILD AN EFFECTIVE CHW MODEL

<table>
<thead>
<tr>
<th>Role</th>
<th>Effectiveness</th>
<th>Enablers</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Required</strong></td>
<td></td>
<td><strong>Political will</strong></td>
</tr>
<tr>
<td>• Well designed and clear</td>
<td></td>
<td>• Ownership of national CHW program to ensure long-term effectiveness</td>
</tr>
<tr>
<td>• Limited to high-priority tasks and not overburdening CHWs</td>
<td></td>
<td>• Recognition that CHW models are long-term</td>
</tr>
<tr>
<td><strong>Distribution</strong></td>
<td>• Adequate coverage and distribution</td>
<td><strong>Links to health systems</strong></td>
</tr>
<tr>
<td>• Appropriate pre-service training</td>
<td></td>
<td>• Formal role in the health system</td>
</tr>
<tr>
<td>• Continuing in service education</td>
<td></td>
<td>• Partnerships with other cadres</td>
</tr>
<tr>
<td>• Regular checking of knowledge</td>
<td></td>
<td>• Professional growth and career advancement for CHWs</td>
</tr>
<tr>
<td><strong>Remuneration and incentives</strong></td>
<td>• Wages/salaries commensurate with the workload and time spent</td>
<td><strong>Financing &amp; planning</strong></td>
</tr>
<tr>
<td>• Incentives/performance-based pay</td>
<td></td>
<td>• Financial support for training and engagement in planning etc at all levels (in particular decentralized levels)</td>
</tr>
<tr>
<td>• Non-financial incentives</td>
<td></td>
<td><strong>Policy &amp; regulation</strong></td>
</tr>
<tr>
<td><strong>Supplies</strong></td>
<td>• Appropriate and adequate supplies</td>
<td>• Adequate policy and regulatory framework</td>
</tr>
<tr>
<td><strong>Supervision and support</strong></td>
<td>• Supervisory systems where supervisors are responsible for no more than 20–25 CHWS</td>
<td>• Policy support for community case management (CCM)</td>
</tr>
<tr>
<td>• Special training for supervisors</td>
<td></td>
<td><strong>Community awareness &amp; support</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Communities are involved in selection and support of CHWs</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Data systems + mHealth</strong></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Systematic monitoring and evaluation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Use of mobile technology</td>
</tr>
</tbody>
</table>

**SOURCE:** Literature review JHU: “How effective are community health workers”
The Overall Status of Evidence

**Effectiveness**

- In spite of growing enthusiasm for expanding CHW programs (also evidenced by the Earth Institute's report calling for 1 million new CHWs in Africa), knowledge of the effectiveness of large scale CHW programs remains limited.

- This is in part due to the fact that assessing the effectiveness of health programs on the health of populations in general is a challenging methodological task – and CHWs have to be looked at as part of a larger system.

- Up to now there have been no evaluations that the authors are aware of that have assessed the cost-effectiveness of large-scale CHW programs.

- The existing research, however, includes evidence on the cost and benefit of implementing individual interventions provided by CHWs.

- Nonetheless the limited cost-effectiveness evidence it is quite clear that CHWs can deliver highly cost-effective interventions of various types.

**Cost-Effectiveness**

- Areas where evidence is particularly weak:
  - View/voice of CHWs
  - Evidence and drivers of effectiveness for large-scale CHW programs and what it takes to scale-up

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**SOURCE:** Literature review JHU: “How effective are community health workers”
EFFECTIVENESS: CHW-BASED TREATMENT CAN REDUCE PNEUMONIA MORTALITY IN UNDER-5’S BY UP TO 70%, BUT GAPS IN COVERAGE REMAIN

Context

• Globally, pneumonia is the leading cause of under-5 mortality, responsible for 18 percent of deaths¹

Role of CHWs

• Overall, studies suggest that community case management (CCM) can reduce pneumonia-related mortality by up to 70%²

• Until recently, the global consensus was that severe pneumonia should not be treated by CHWs but rather referred to a facility

• However, a recent RCT showed CHWs to be just as effective as formal facilities – in part because 30% of patients never actually sought referral care at the facility³

Current state

• The WHO and UNICEF have now endorsed training and supporting CHWs to diagnose and treat childhood pneumonia⁴

• However, there are still significant gaps in national policies:

Annual pneumonia child deaths/year, by country policies on CCM⁵
(Million deaths/year; 35 countries surveyed)

Permissive policy and CCM implemented
Permissive policy but CCM not implemented
No permissive policy but CCM implemented
No permissive policy and CCM not implemented
No information
Total

1.7
0.2
0.3
1.1
0.1

Mostly Nigeria

India (CCM only implemented in 4% of districts), DRC (5%), and Pakistan (60%)

EFFECTIVENESS: BRAC HAS SUCCESSFULLY LEVERAGED CHWs IN BANGLADESH TO REACH 81% COVERAGE OF ORS FOR DIARRHEA

Context

• Diarrhea is the second leading cause of under-5 mortality globally, accounting for 15% of deaths\(^1\)
• Treatment using oral rehydration salts (ORS) could reduce diarrhea mortality by up to 93%\(^2\)
• However, in developing countries, only 32% of children under 5 receive ORS, and this proportion has remained static for a decade\(^3\)

Evidence from the experience of Bangladesh\(^4\)\(^-\)\(^6\)

• In Bangladesh, the NGO BRAC used CHWs to carry out a campaign to reduce diarrhea mortality during 1980-90
• BRAC trained 1,200 CHWs to visit 12.5 million households nationwide to, in turn, train women on how to make and administer homemade ORS
• ORS usage skyrocketed and has continued to grow; Bangladesh now has the highest percentage in the developing world of childhood diarrhea cases treated with ORS

% diarrhea cases in Bangladesh treated with ORS

<table>
<thead>
<tr>
<th>Targeted BRAC campaign: 1980-90</th>
<th>Continuing work by BRAC and other NGOs</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980s</td>
<td>1%</td>
</tr>
<tr>
<td>1993</td>
<td>40%</td>
</tr>
<tr>
<td>2011</td>
<td>81%</td>
</tr>
</tbody>
</table>

COST-EFFECTIVENESS: DESPITE A LACK OF DATA, THERE ARE GROUNDS TO BELIEVE CHW PROGRAMS DELIVER EXCELLENT VALUE

Some studies suggest that CHW programs may be highly cost effective . . .

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Country</th>
<th>Relative cost of CHWs vs facility (equiv. outcome)</th>
<th>Total CHWs</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB treatment (e.g. DOTS)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethiopia</td>
<td>-62%</td>
<td>30,190</td>
<td>30,190</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>-33%</td>
<td>78,000</td>
<td>78,000</td>
</tr>
<tr>
<td>Pakistan</td>
<td>-45%</td>
<td>92,957</td>
<td>92,957</td>
</tr>
<tr>
<td>Tanzania</td>
<td>-37%</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Vaccinations</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Malaria IPTc</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ghana</td>
<td>-11%</td>
<td>4,502</td>
<td>4,502</td>
</tr>
<tr>
<td>Home mgmt. of malaria</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Zambia</td>
<td>-31%</td>
<td>3,762</td>
<td>3,762</td>
</tr>
</tbody>
</table>

. . . though the overall evidence base for the cost-effectiveness of CHWs is weak

“Services provided by CHWs are expected to be more appropriate to the health needs of populations than those of clinic-based services [and] to be less expensive… However, there is a dearth of data… to confirm these views.” (Lehman and Sanders, 2007)

“There are few analyses of the cost-effectiveness of community health worker programmes… probably due to lack of information and difficulties in measuring outcomes” (Earth Institute, 2011)

COST-EFFECTIVENESS: FOR EXAMPLE, A RANDOMIZED TRIAL IN ETHIOPIA PROVIDES COMPELLING SUPPORT FOR CHWS

Experiment
A community randomized trial compared the cost per successfully treated TB patient between health facility workers and Health Extension Workers (HEWs) in Ethiopia.

HEWs had higher treatment success rates than health facility workers... and at significantly reduced cost per successfully treated patient.

<table>
<thead>
<tr>
<th>Category</th>
<th>Health Facility</th>
<th>HEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>TB treatment success rate</td>
<td>83.1%</td>
<td>89.3%</td>
</tr>
<tr>
<td>Difference in success rates was statistically significant with over 98% confidence</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Each existing cost category declined in the HEW treatment model, and the overall model cost 62% less.

Costs (USD 2007)

- Total
  - HEW: 117
  - Health Facility: 61

- Program
  - HEW: 41
  - Health Facility: 24

- TB patient
  - HEW: 21
  - Health Facility: 8

- Care giver
  - HEW: 9
  - Health Facility: 3

Sources: Datiko & Lindtjørn. “Cost and Cost-Effectiveness of Smear-Positive Tuberculosis Treatment by Health Extension Workers in Southern Ethiopia: A Community Randomized Trial” PLoS One 2010
COST-EFFECTIVENESS: SEARCH IN INDIA FOUND CHW-BASED NEONATAL CARE TO COST ONLY $7 PER DALY Averted

Context
The Society for Education, Action, and Research (SEARCH), an NGO in India, conducted a 10-year field study on CHW-based support for neonatal care in a rural district of Maharashtra, India.

Intervention package
Outcomes were compared between intervention and control areas with ~40,000 people each. The home-based neonatal care intervention package included:

• Selection and training of CHWs
• Health education for mothers
• CHW-attended deliveries
• Repeated CHW home visits during neonatal period
• Diagnosis & treatment of neonates with sepsis
• Referral of severely ill children to the formal health system

Current state
Villages receiving CHW care had a 2.5x drop in neonatal mortality rate...

...at a remarkably low $7 per disability-adjusted life year (DALY) averted

Home-based neonatal care
- Zinc fortification
- Zinc supplementation
- Pneumonia case management
- Oral rehydration therapy
- Vitamin A fortification
- Vitamin A supplementation
- Growth monitoring & supplementary food