Monitoring health and population dynamics in low- and middle-income countries

Health and Demographic Surveillance Systems (HDSSs)

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Executive Director

INTREC, Accra, Ghana; 19 March 2013
International Network for the Demographic Evaluation of Populations and Their Health in low- and middle-income countries
Dateline…

- **1998** – Founding meeting in Dar es Salaam; Bellagio
  - Co-ordinating committee constituted
- **2002**
  - First core support grants from Rockefeller Foundation, Wellcome Trust, Sida and the World Bank
  - First Executive Director appointed *(Fred Binka)*
- **2006**
  - First major project grant - **$17M** awarded to INDEPTH directly
- **2007**
  - Second Executive Director appointed *(Osman Sankoh)*
- **2008**
  - Second major project grant - **$28.6M** awarded to INDEPTH directly
- **2010** – External Evaluation (led by Sida on behalf of all funders)
Dateline…

- 2011
  - President of Mozambique guest of honour at Maputo ISC
  
• In October, 2011
  
Venue: Joaquim Chissano
  
Sponsors the financial contribution of: DANIDA, EU, Gates Foundation, Save the Children (UK), Sida/GLOBFORSK, Swiss TPH, Wellcome Trust

INDEPTH Network
- Better Health Information for Better Health
Current Funders of Network Activities

- Sida - core support
- Hewlett Foundation - core and project
- Gates Foundation - core and project
- Wellcome Trust - core and project
- DANIDA/SSI - project
- IDRC - project
- WHO/HMN - project
- Rockefeller Foundation - project
- EU/Umea/SSI/Heidelberg - project
- Doris Duke - project
- Ministry of Health, Ghana
What is INDEPTH Network?
The data challenges...

- Reliable demographic and health data lacking in most low- and middle-income countries
  - Births, deaths, causes of death not always registered
  - Health facility data only provide partial picture
Sankoh and Byass

The INDEPTH Network: filling vital gaps in global epidemiology

*International Journal of Epidemiology 2012;41:579–588*

**Figure 1** Countries of the world classified by PubMed citations for (‘epidemiology’ and <country>) per 1000 population, also showing the location of 43 HDSS site members of the INDEPTH Network (white dots)
HDSS – A viable solution

• Health and Demographic Surveillance System (HDSS) - provides a fuller picture
• HDSS collects data from whole communities over time
  o Monitors new health threats
  o Tracks population changes
  o Assesses health and policy interventions
The three main HDSS subjects

Homestead / Compound

Residential Unit

Household

Individual

part of / resident at

resident at

member of
Prospective monitoring of demographic and health events

- Intervention trials (randomised)
- Capturing episodes of disease and hospital admission
- Verbal autopsy for cause of death
- Measure characteristics of environment or household members (e.g. SES, vaccines, HIV, nutrition)

INDEPTH Network
Problem: The core system is complex, requiring several thousand lines of code.
## Explaining differences in health outcomes

<table>
<thead>
<tr>
<th>Level</th>
<th>Variable</th>
<th>Coverage (n=41 HDSSs)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Individual</td>
<td>Education</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>- highest level completed</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marital status</td>
<td>90%</td>
</tr>
<tr>
<td></td>
<td>Migration</td>
<td>88%</td>
</tr>
<tr>
<td></td>
<td>- reason for migration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Employment</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- currently employed</td>
<td>56%</td>
</tr>
<tr>
<td></td>
<td>- occupational category</td>
<td>71%</td>
</tr>
<tr>
<td>Family / Household</td>
<td>Household relationships</td>
<td>85%</td>
</tr>
<tr>
<td></td>
<td>- to household head</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- mother-child</td>
<td>93%</td>
</tr>
<tr>
<td></td>
<td>Economic status</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- household assets</td>
<td>83%</td>
</tr>
<tr>
<td></td>
<td>Food security</td>
<td>41%</td>
</tr>
<tr>
<td>Community</td>
<td>Spatial position</td>
<td>78%</td>
</tr>
<tr>
<td></td>
<td>- geocoded households, service access</td>
<td></td>
</tr>
</tbody>
</table>
Model B: Retrospective recall (the DHS, etc.)

- Time #1: Sample population
- Time #2: Onset of reproductive risk
- Births & childhood deaths recalled over time (women of reproductive age)

Main limitation: Memory bias
Over 3,200,000 people under surveillance

Currently 47 HDSSs in 21 countries
33 in Africa
12 in Asia
2 in Oceania

New HDSS sites...
China, Malaysia, DRC, Zambia, Angola, Madagascar, Gabon, Mali, Sierra Leone, Rwanda.

Low- and Middle-Income Countries with INDEPTH member centres
Running Health and Demographic Surveillance Systems (HDSSs)
In Ghana

Navrongo: 1993
...to support research on the determinants of morbidity, mortality and fertility in Ghana’s northern regions

Kintampo, 2003,
..to conduct public health research and develop health research capacity...

Dodowa, 2005
To take part in identifying and carrying out priority research to help address policy, planning and implementation needs of the GHS.

INDEPTH Network
- BETTER HEALTH INFORMATION FOR BETTER HEALTH POLICY
What INDEPTH does...

1. Support and strengthen the ability of INDEPTH centres to conduct longitudinal health and demographic studies in defined populations.
2. Facilitate the translation of INDEPTH findings to maximise impact on policy and practice.
3. Facilitate and support research capability strengthening relevant to INDEPTH activities.
4. Stimulate and co-ordinate multi-centre applications to research funding bodies for specific research activities.
Scientific Vision of INDEPTH

...generate robust scientific knowledge that can guide evidence-based health and social policies and interventions at local, national, and international levels.

➡️ Global Health
Scientific Programme

• What are the dynamics of demographic and epidemiological transitions?
  o Incl. mortality trends, life expectancy, risk factors, cause-of-death, fertility trends, population composition
  o differences by age and sex, social group, rural / urban, among the poor

• What drives these changes?
  o What is comparable or different across settings?

• Who is most vulnerable or resilient?
  o At what ages - childhood, adolescence, working-age, older people - shaped by which risk factors and social conditions?

How best to apply findings to evaluations, interventions, policy?
Stepping stones to a vital statistics system

- **Full registration**: Complete coverage of the population
- **Sample registration**: Representative of the population (e.g., sample registration system, sample vital registration with verbal autopsy)
- **Sentinel registration**: Not representative of the population (e.g., urban/rural demographic surveillance sites)

Increasing coverage of civil registration over time

Source: Health Metrics Network
The INDEPTH core business...

**Scientific vision**
- Clearly articulated vision
- Effective scientific leadership

**Data systems / management**
- Suitable technical solutions
- INDEPTH playing leadership role in sharing public health research data

**Capacity Strengthening**
- MSc programme at Wits University
- New masters in research data management
- Develop local scientists at scale to support INDEPTH’s scientific agenda
Ongoing INDEPTH cross-national research

- Vaccination & Child Survival
- Mortality levels, patterns, and trends
- Causes of death in developing countries
- HIV/AIDS
- Migration and urbanization
- Fertility
- Sexual and Reproductive Health
- Effectiveness and safety studies of antimalarials

- NCD Risk Factor Surveillance in Asia
- Adult Health and Aging
- Climate Change, Migration and Health
- Indoor Air Pollution
- Demographic and health transition
- Health systems
- TB
- Impact evaluation

GLOBAL HEALTH DIMENSION

Clusters of HDSSs take part....
Projects & Collaborative Initiatives

• INDEPTH Effectiveness and Safety Studies of Antimalarials in Africa (INESS): Gates Foundation ($36.8M)

• Umea, Sweden: INDEPTH Training and Research Centres of Excellence (INTREC) - EU funding

• Heidelberg, Germany: International Research Consortium on Dengue Risk Assessment, Management and Surveillance (IDAMS) - EU funding

• Wits, South Africa: Human Heredity and Health in Africa (H3Africa) - NIH funding (US$ 5M)
Quality Issues

• Support member centres to improve data quality

• Data quality checks through templates developed by INDEPTH scientists and data managers

• Researchers/data managers trained to critically analyse the data and spot major problems
Some INDEPTH products

Journal supplements and many papers in international peer-reviewed journals
Capability to evaluate interventions
Distribution of bednets...
Oh...Oh... Used for fishing....
Wear condom(s)....?
Longitudinal research for health

• Demographic health surveillance creates the framework for basic research in public health
• INESS training workshop in Ho, Ghana
  o Testing the safety of an antimalarial - Phase IV
Longitudinal research for health

• Offers a peek into the real issues

INTREC – help us understand the real social issues...
Some Deliverables: Scientific Programme

• Comparable, multi-centre analyses
  o cause-of-death distributions
  o epidemiological and demographic transitions
  o differences / inequalities

• Assessing progress against MDGs and other targets

• Impact of transitions on health system, social sector

• Strengthened multi-centre platform for
  o Cohort studies (including genetic / genomic contributions)
  o Trials, evaluating interventions, policy

• Inform policy, support policy dialogue
INDEPTH Data Management and Sharing Efforts

• INDEPTH Data Sharing and Access Policy published in June 2012
  - International Journal of Epidemiology
  - INDEPTH website

• INDEPTHStats launched
  - www.indepth-ishare.org/indepthstats
INDEPTH Population Statistics (INDEPTHStats)

**Population**

The data displayed in this menu show the distribution of the population of each centre by sex and age in person-years. These allow users to display the population pyramid for each of the centres for each of the years.

**Mortality**

Mortality indicators displayed in INDEPTHStats include age- and sex-specific death rates, crude death rates, infant, child and under five mortality rates. In the near future, data will also be available on deaths by cause, based on "verbal autopsies".

**Fertility**

Fertility data presented include the distribution of women aged 15-49 years and births by women in five-year age groups. These data allow age-specific fertility rates (ASFR) and the total fertility rates (TFR) to be calculated.

**Migration**

Generally, migration refers to movement of people (groups or individuals) that involves a permanent or temporal change of their usual place of residence. In- and out-migration data at HDSSs will be presented in the near future.
iSHARE2 Data Management

Scientific Programme Support
- Define & source data
- Extract, harmonise, quality assure & document

Network Data Repository
- NADA-based web catalogue
- DDI Codebook metadata
- Dissemination of metadata
- To be launched on 1st July 2013

Core Micro-data
- Annual release – July 1
- Population denominators
- Automated, verbal autopsy-based cause of death
- Mortality, fertility, migration
INDEPTH Network Data Repository

Africacentre HDSS, South Africa
The service facility survey catalog provides access to data along with accompanying survey documents from facility level surveys conducted by the World Bank. Service delivery surveys are tools to measure the effectiveness of basic services such as education, health, and water and sanitation. The Africa Centre Demographic Information System (ACDIS) started data collection in January 2000. Read More »

Central Data Catalog
The Central Data Catalog is a portal for all surveys and datasets held in catalogs maintained by the INDEPTH Network and a number of contributing external catalogs.

Search the Central Microdata Catalog

View all Surveys »

INDEPTH iSHARE2 REPOSITORIES

Network Catalog
iSHARE takes the next step, launching of all new Next Generation iSHARE2 Data Repository. Until then, bear with us as no data are currently shared. Please checkout this space regularly for updates

FAQS
- How can I contribute to improving the catalog?
- Can you help with analyzing the data?
- Can I get help in implementing a survey catalog in my agency?

Click here for more...

NEWS
- 1st INDEPTH iSHARE2 workshop in Pune, India
- ... More
- 21.06. INDEPTH iSHARE2

wellcome trust
Strategic Award

SHARE 2
an INDEPTH project

INDEPTH iSHARE2
Better Health Information for Better Health Policy
Capacity Strengthening and Training

• INDEPTH Scientific Development and Leadership Programme
  o Masters programme
    ✓ Wits University, South Africa
    ✓ Dhaka University, Bangladesh
  o Support for PhD Studies

• Series of Training Workshops
  • Data management and analysis
  • Scientific writing
Graduate Training

- Data management
- Epidemiology
- Demography
- Biostatistics

- Understand research
- How data is used
- Generate data

• Acknowledges scarce skills while emphasising interdisciplinarity
• Research-oriented data managers
• Develop research supervision capacity at HDSS centres

Exceptional platform for PhDs, post-docs with links to other initiatives in Africa and Asia
Evolution of HDSS field sites

Past
Population observatories

Present
Population & health observatories

Future
Population, health & health system observatories

We will be known as...
Some Key Challenges...

- **Science:**
  - Leadership, new cross-site research opportunities

- **Capacity:**
  - Achieving tailored capacity strengthening

- **Funding:**
  - Core support, Project funding

- **Communications:**
  - Strengthening the INDEPTH brand
  - Policy Dialogue

- **Partnerships:**
  - Fostering win-win relationships
INDEPTH Next 5 Years...

• World-leading multi-centre platform engaged in ground-breaking comparative and collaborative population-based research
  – Accelerated research outputs relevant to policy and programmes
  – A robust and versatile platform to evaluate interventions

• High-quality standardised longitudinal data accessible to the global scientific community – INDEPTHStats launch 1st July 2013 (www.indepth-ishare.org/indepthstats)

• A cutting-edge graduate programme producing research-oriented data managers who support knowledge production