Reaching Millennium Development Goal 4:

Recent decline in Childhood Mortality in Rural Gambia

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Outline

• **Background**
  – Sub-Saharan Africa and the MDGs;
  – Data and progress measurement.

• **Methods**
  – Study area and population;
  – Data and statistical analyses;
  – Verbal autopsies.

• **Results**

• **Interpretation**
• Most LDCs not on track to meet health-related MDGs;

• At current pace, Sub-Saharan Africa is projected to reach MDG4 in 2165;

• Region is characterised by fragile and fragmented health systems;
Background - 2

• Reported pockets of improvements in childhood mortality,
  – e.g. DHS data showed significant gains in child survival in Tanzania between 1999 and 2004.

• Under-5 mortality levels in West Africa remain exceptionally high despite recent improvements in the continent;
Background - 3

• Scarcity of accurate demographic data hampers measurement of progress towards MDG attainment.

• Birth histories from national DHSs are characterised by recall and reporting biases; and do not establish causes of death.
Background - 4

• The HDSS provides an alternative approach
  – Records death prospectively for a defined population;
  – Ascertainment of causes of death through Verbal Autopsy.

• Data from Farafenni HDSS is used to demonstrate this approach and describe childhood mortality reductions.
Methods – 1
Study Area and Population

• FHDSS established in North Bank region of The Gambia in October 1981;

• Biennial census updates until 1989, and quarterly demographic update rounds from April 1989;

• Residents generally poor with low cash incomes;

• Majority are subsistence farmers and Muslim;

• Main ethnic groups are Wolof, Mandinka and Fula.

• Served by 1 Referral Hospital, 5 Health Centres, and 16 PHC Outlets;

• Population on 30th September 2008 was 17,483
Methods – 2
Verbal Autopsies

• A VA administered for every dead child from 1998;

• Questionnaires evolved to the INDEPTH Network standard VA instruments;

• Standard VA coding methodology adopted using ICD 10;

• Only immediate (direct) causes of death are presented.
Methods – 3
Data and Statistical Analyses

• Study follow-up time is from 1\textsuperscript{st} April 1989 to 30\textsuperscript{th} September 2008 — 19.5 years;

• Divided into five periods: defined \textit{a priori} as one 3.5-year period, and four subsequent 4-year periods.

• Mortality rates calculated as number of deaths per 1,000 person-years.

• Kaplan-Meier survival probabilities used to derive rates per 1,000 live births.
Methods – 4
Data and Statistical Analyses

• Conventional age brackets adopted:
  – < 1 month (Neonatal);
  – 1-11 months (Post-neonatal);
  – < 1 year (Infant);
  – 1-4 years (Child);
  – <5 years (Under-5).
Methods – 5
Data and Statistical Analyses

• Likelihood Ratio Tests used to assess Statistical significance.

• Poisson Regression used to investigate changes in cause-specific deaths rates between the periods 1998-2000 and 2004-2008.
## Results

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<tbody>
<tr>
<td>Mid-term population</td>
<td>15,692</td>
<td>16,050</td>
<td>16,880</td>
<td>18,004</td>
<td>17,330</td>
</tr>
<tr>
<td>Number of live births</td>
<td>2,280</td>
<td>2,504</td>
<td>2,513</td>
<td>2,614</td>
<td>2,950</td>
</tr>
<tr>
<td>Crude birth rate per 1,000 per annum (95% CI)</td>
<td>42 (40-43)</td>
<td>39 (38-40)</td>
<td>37 (36-39)</td>
<td>36 (35-38)</td>
<td>43 (41-44)</td>
</tr>
</tbody>
</table>

- 1,860 deaths among children under 5 years.
Neonatal Mortality Rate (0-1 Month) (per 1,000 live births)

Overall decrease = 38% (95% CI: 13% - 66%)

- 1989-1992: 32
- 1996-2000: 22
- 2000-2004: 21
- 2004-2008: 20
Post-neonatal Mortality Rate (1-11 Months) 
(per 1,000 live births)

Overall decrease = 40% (95% CI: 18% - 56%) 
P < 0.0001
Infant Mortality Rate (0-11 Months) (per 1,000 live births)

Overall decrease = 39%  (95% CI: 23% - 52%)

Farafenni Health & Demographic Surveillance System

MRC Medical Research Council

Farafenni Health & Demographic Surveillance System
Child Mortality Rate (1-4 Years) (per 1,000 population)

Overall decrease = 69% (95% CI: 60% - 76%)  
P < 0.0001
Under-5 Mortality Rate (0-4 Years) (per 1,000 live births)

Overall decrease = 54% (95% CI: 48% - 63%)  
P < 0.0001

Farafenni Health & Demographic Surveillance System

Trend in Under-5 Mortality

MDG4 target of ≤ 53 per 1,000 live births attained in 2008
Cause-Specific Mortality Rates Among Infants Aged 0-11 Months (per 1,000 person years)

- Acute febrile illness with seizures: 1.0 (1998-2000), 1.0 (2000-2004), 0.7 (2004-2008)
- Perinatal and congenital causes: 0.7 (1998-2000), 1.0 (2000-2004), 1.0 (2004-2008)
Cause-Specific Mortality Rates Among Children Aged 1 - 4 Years (per 1,000 person years)

- Acute febrile illness with seizures: 0.8 (1998-2000), 0.8 (2000-2004), 0.8 (2004-2008)
- Pneumonia: 0.6 (1998-2000), 0.6 (2000-2004), 0.2 (2004-2008)
- Other causes: 0.7 (1998-2000), 0.7 (2000-2004), 0.2 (2004-2008)
What accounts for the decline?

The role of malaria

- Introduction of ITNs, 1992
- Opening of AFPRC General Hospital
- Bednet Re-treatment Campaign, 2003
- Introduction of CQ+SP Combination as First-line Treatment and Bednet Re-treatment Campaign, 2005
- Adoption as First-line Treatment and Distribution of Coartem at Primary Level 2007/8
- Free Distribution of ITNs to Pregnant Women and Mothers of Malaria Elimination Policy Launched, 2008

Under-5 mortality rate (per 1,000 live births)

- Military Coup & Reduced Foreign Aid for Health Care, 1994-96

Dates: 1988-2008
## Other Malaria Indicators ……

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Kerewan Local Government Area</th>
<th>The Gambia</th>
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<tbody>
<tr>
<td>Proportion of children under 5 years with fever in last 2 weeks and received any appropriate anti-malarial drug.</td>
<td>41%</td>
<td>65%</td>
</tr>
<tr>
<td>Proportion of children under 5 years old who slept under a bed net§</td>
<td>46%</td>
<td>63%</td>
</tr>
<tr>
<td>Proportion of bed nets that were treated with insecticide.</td>
<td>49%</td>
<td>54%</td>
</tr>
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§ Reference is the night prior to survey interview.
## Any Effect From Immunisation?

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<tr>
<td>Proportion of children aged 12-23 months who received all EPI vaccines*</td>
<td>65%</td>
<td>68%</td>
</tr>
<tr>
<td>Proportion of children aged 12-23 months who received measles vaccine</td>
<td>87%</td>
<td>93%</td>
</tr>
<tr>
<td>Proportion of children aged 12-23 months who received DPT3 vaccine</td>
<td>76%</td>
<td>78%</td>
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* The range during this period was BCG, DPT 1-3, Polio 0-3, Measles, HepB 1-3, Yellow Fever, Vit A and Hib.

### Other Factors.....

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<td>Proportion of children under 5 years old with acute respiratory infection†.</td>
<td>11%</td>
<td>6%</td>
</tr>
<tr>
<td>Proportion of females aged 15 years and over who are literate‡.</td>
<td>17%</td>
<td>30%</td>
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† Reference period of two weeks prior to each survey interview.
‡ The estimates for 2006 refer to females aged 15 – 24 years only.
Conclusion

• Decline in childhood mortality became pronounced with a marked fall in malaria prevalence;

• The decline in malaria incidence resulted from scaling up of simple effective control strategies.
Thank You!!!