Vaccine Deployment and Policies

MSc in Global Health Vaccinology Module 2012

Andrew Farlow
Research Fellow in Economics, Oriel College
Senior Research Fellow, Department of Zoology
University of Oxford

Since much of this material is taken from multiple sources without getting permission from all, please note that this is for student use only and not for wider posting. Thank you.
Overview of Session

• Emphasis on public policy issues, including funding issues (much drawn from personal experience)
• The global health context into which vaccines fit
• Overview of mortality figures/deaths from infectious diseases, and possible vaccine interventions (I will skip most of these slides in class though leave them in presentation)
• Issues in the development of vaccines
  – The specific needs of vaccines for global public health
  – Divergence of products – to what extent?
  – Changes over time
  – The R&D process, the economics of vaccines, the roles of public and private sectors in research and development of vaccines
• Issues in the deployment of vaccines
  – Vaccine coverage over time and regions
  – Role of GAVI, PAHO, WHO, etc.
  – GAVI first phase, GAVI second phase… The future of GAVI
• Sustainable funding issues
  – ‘Novel’ funding instruments
• Case studies
  – Malaria, Pandemic Flu, Hep B, Pneumococcal in particular
• Discussion about future policy challenges
Please Note…

• Please note that this is a very full set of slides and meant in part as a form of note-taking and for revision purposes too.
• We will cover many but not all of the areas covered by the slides. The presentation will go on Weblearn, so the slides will give some interesting visual notes for filling in the gaps.
• Good luck with them!
SOME OPENING THOUGHTS: GLOBAL HEALTH CONTEXT
Under 5 mortality, 1990

Under-five mortality rate (probability of dying by age 5 per 1000 live births), 1990


The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Public Health Information
and Geographic Information Systems (GIS)
World Health Organization

© WHO 2011. All rights reserved
Under-five mortality rate, 2000

Under-five mortality rate (probability of dying by age 5 per 1000 live births), 2000

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.


Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

© WHO 2011. All rights reserved.
Under five mortality, 2010

Under-five mortality rate (probability of dying by age 5 per 1000 live births), 2010


The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

© WHO 2011. All rights reserved
Distribution of deaths by cause, children <5 years, WHO region, 2008

AFR, African Region; AMR, Americas Region; EMR, Eastern Mediterranean Region; EUR, European Region; SEAR, South-East Asia Region; WPR, Western Pacific Region.
Rates of cervical cancer

Incidence rates of cervical cancer (age-standardized per 100 000 women, all ages), 2004

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
World Health Organization

© WHO 2010. All rights reserved
Early neonatal mortality

HIV/AIDS prevalence

Malaria cases

Physicians working

Public health spending

Private health spending

Distribution of health workers by level of health expenditure and burden of disease

Same per capita total health expenditure, radically different outcomes

HALF: Health-adjusted life year  
Source World Health Report 2008
Please note that there are some arguable data issues in some cases.
Performance against Health MDG priorities

- Mid 2008 MDG halfway point

- “We face nothing less than a development emergency”
  - UN Secretary General

- “A global poverty emergency”
  - The U.K. Prime Minister

- An MDG Call to Action was released
- And this was before the financial crisis hit
Progress against MDGs?


NOTE: These are % of a goal set, not % of any ratio, access measure, etc.
Performance against Health MDGs:
Goal 4 Reduce child mortality

Target 4: Reduce by two thirds, between 1990 and 2015, the under-five mortality rate

Deaths by age 5 per 1,000 live births

Currently 9 million per year. 3.5 million fewer than in 1990

Still nearly 750,000 every month.

That’s about 2,500 during our session this afternoon.
Progress of child mortality (chance newborn reaches age 5, per 1000)

- In 2007, close to one in seven children in sub-Saharan Africa died before his or her fifth birthday. This is half of all under-five deaths.
- Given high levels of fertility, the absolute number of under-five deaths rose from 4.2 million in 1990 to 4.6 million in 2007.
There is improvement on the way

- The figures don’t tend to show the expected improvements on the horizon brought about by recent huge efforts
- Across sub-Saharan Africa, survey data show remarkable improvements in several key child-survival interventions that are expected to yield further declines in under-five mortality over the next few years. These include:
  - Vitamin A supplementation
  - Wider use of insecticide-treated bed nets to prevent malaria
  - Exclusive breastfeeding
  - Immunization
  - Wider coverage of antiretroviral treatment for pregnant mothers who are HIV-positive to help prevent transmission of HIV to their babies
Proportion of countries on track to achieve the child mortality target

Source: World Development Indicators.
Fragile states have made the least progress towards MDGs

• Of 49 low-income countries, 26 are fragile states
• About 80% of fragile states have been or are still engaged in conflict
MDG goal 6 Combat HIV/AIDS, malaria and other diseases

TARGET 6A
Have halted by 2015 and begun to reverse the spread of HIV/AIDS

TARGET 6B
Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it
Combat HIV/AIDS, malaria and other diseases

- TARGET 6C
- Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases

- Proportion of children under five sleeping under insecticide-treated bed nets, selected countries, around 2000 and around 2008 (Percentage)
Tackling malaria

Number of doses of artemisinin-based combination therapies procured worldwide, 2001-2008 ( Millions)

Across sub-Saharan Africa, the use of insecticide-treated bed nets among children jumped from 2 per cent in 2000 to 20 per cent in 2006. In fact, 19 of 22 sub-Saharan African countries with trend data showed at least a threefold increase during this time period; 17 of them saw at least a fivefold increase.
MDG: TB

- Tuberculosis prevalence and mortality rates are falling, but not fast enough to meet global targets

- Number of tuberculosis cases per 100,000 population (excluding people who are HIV-positive), 1990 and 2007
MDG: TB

- Incidence of tuberculosis is levelling off, but the number of new cases continues to rise (pop. growth)
- Number of new tuberculosis cases per 100,000 population (excluding people that are HIV-positive), 1990-2007
Not just vaccines…

• 42% of Africa’s population – 300 million people – have no access to safe water.

• Without clean water, anti-retroviral treatment for AIDS sufferers is not as effective, and formula milk cannot safely be used to prevent transmission of HIV from mother to child.

• Better water management can greatly reduce malaria mosquito breeding sites.
Not just vaccines…

• Two-thirds of all the African children who die under the age of five could be saved by low-cost treatments such as vitamin A supplements, oral rehydration salts and insecticide-treated bed-nets to combat malaria.

• A tenth of all the diseases suffered by African children are caused by intestinal worms
  – These can be treated for 25 US cents per child

• Research on virus-resistant maize for Africa

• LOADS OF EXISTING UNDERUSED TECHNOLOGIES

• Lots of competing financial demands…
There is always a budget constraint.

“Opportunity cost”

The alternative you were prevented from doing because you spent on the project you chose.
Vaccines: A global ‘public good’

- Child protected
- Family: vaccinate child and reduce risk of transmission across siblings/generations
- National governments: Reduced transmission nationally
- International Level: Across borders
- Such public goods tend to get underprovided