Malaria and LRTI in children

Florida Muro

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Background

- Over the last decade there has been a shift from presumptive to parasitological diagnosis of malaria
- WHO 2010 recommended restricting anti-malarials to patient with positive test individual in all settings.
- Malaria RDT (mRDTs) are increasingly available and in use in many parts of Africa.
- Roll out of vaccines against bacterial pneumonia (Hib and PCV)

Outline of talk

- Malaria and LRTI burden
  - Malaria
  - Acute Lower Respiratory Tract infections
    - **Pneumonia**
    - Bronchiolitis and Bronchitis

- Diagnostics & treatment guidelines

- Challenges
  - Viral ALRI

Introduction

Malaria and LRTI Burden

- Infections that are both treatable and preventable.

- Constitute the leading causes of illness and death in young children.

- ~ 90% of the world's malaria deaths occurred in Africa
  - 460 000 African children died before their fifth birthdays (2012).
  - 7.2 U5's death; 18% due to pneumonia (2011).

WHO/UNICEF 2012, Lozano R et al 2011

Malaria mortality

- Since 2000
  - malaria mortality rates falling globally by 42%.
  - Decreased by 49% in WHO African Region.
    - primarily as a result of a scale-up of interventions.
  - Tanzania is amongst six highest malaria burden countries in the WHO African region (in order of estimated number of cases)
- Malaria causes significant economic losses to families and communities.

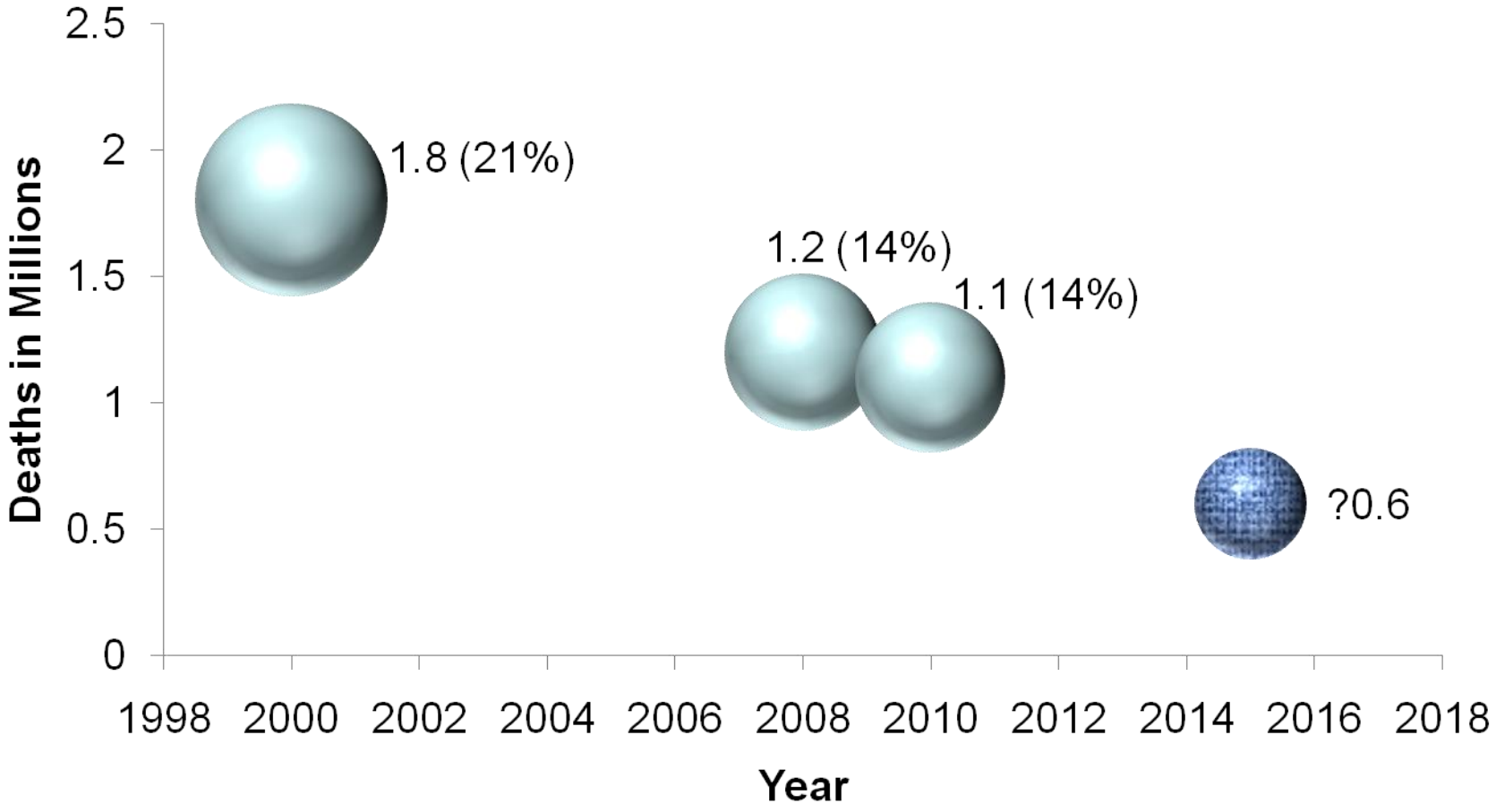
WHO/UNICEF 2012

Pneumonia mortality

- Pneumonia – most common alternative diagnosis to malaria
- Incidence is age dependant (highest under age of 2 years)
  - Twice as higher in developing countries than industrialized
- Pneumonia causes significant economic losses to families and communities.

WHO/UNICEF 2013

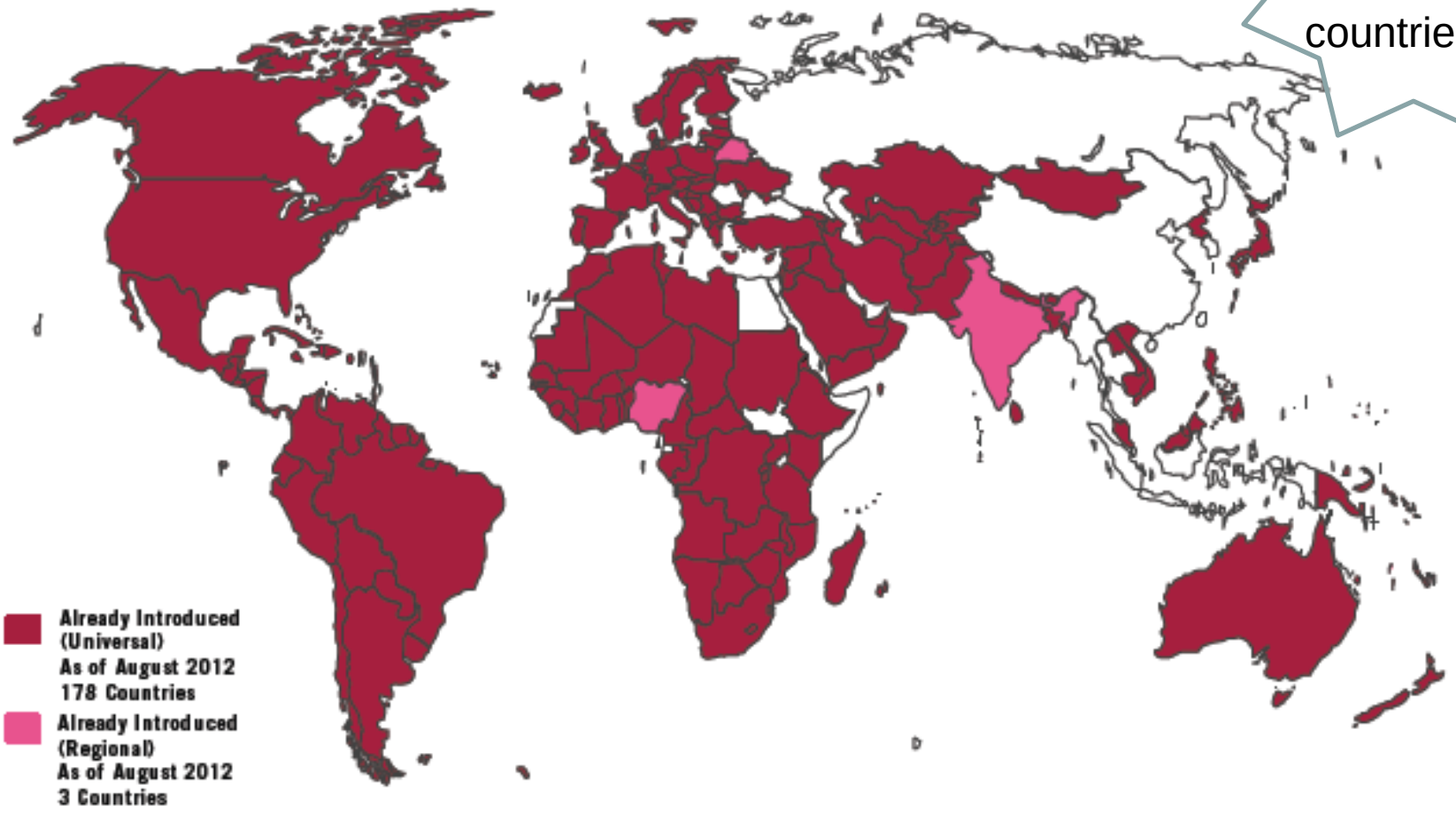
Global pneumonia deaths U5's (WHO CHERG)



Black, R, Lancet 1993; Black R, Lancet 2010; Liu L, Lancet 2012.

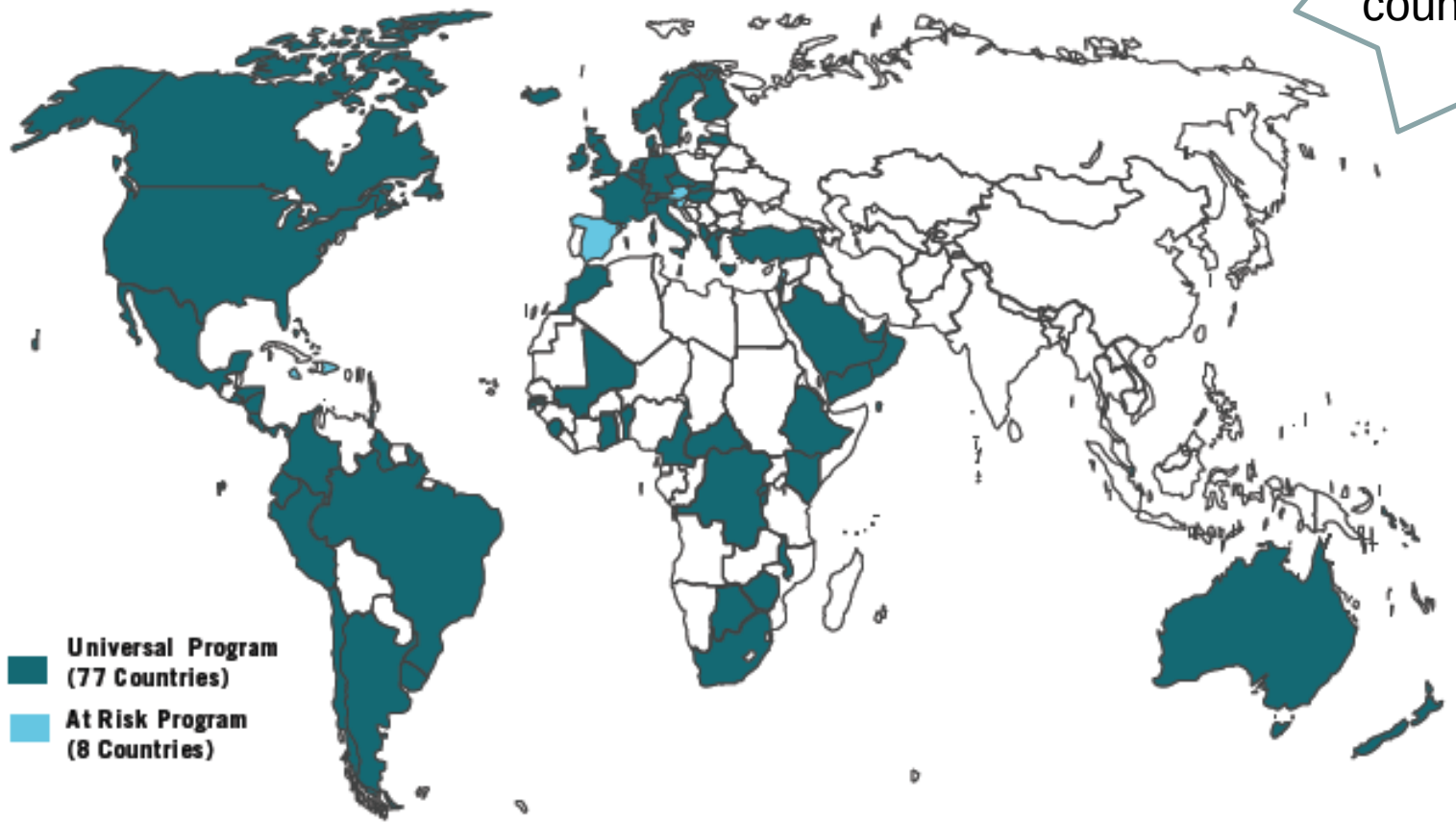
Hib vaccine use – August 2012

68 / 73
GAVI-eligible
countries



Pneumococcal conjugate vaccine use – August 2012

18 / 73
GAVI-eligible
countries



Diagnostic accuracy and overlap

- Overlapping clinical features create difficulties in distinguishing between malaria and pneumonia resulting in
    - missed diagnoses
    - inappropriate treatment

- Malaria diagnosis
  - Malaria may present as an incidental finding in a child with fever due to another cause.

- Pneumonia diagnosis
  - Problematic as X-ray and laboratory analysis i.e. blood culture – often not available and is never in time to guide crucial first treatment decisions

Diagnosis - IMCI

– Often clinician rely on guidelines for care at first-referral level in developing countries (WHO criteria)

- **NSP -** cough or DIB with raised RR for age cut-offs
  - 2 month up to <12 months ≥50 breaths per minute
  - 12 months to 5 years ≥40 breaths per minute

– Additional features:-

- low chest wall in-drawing
- severe respiratory distress
- or inability to drink

} severe levels

- **Malaria** - fever with no obvious alternative diagnosis

WHO/UNICEF 1990's-2000

RDTs

- mRDTs introduction
  - Reducing malaria over-diagnosis and treatment
  - However, increase use of antibiotic

- CRP and PCT – limited use i.e poor marker

Ann Van den Bruel et al 2011, Mtove et al 2011,

Diagnosis & Treatment

- Early diagnosis and prompt treatment of malaria and pneumonia
  - prevents deaths
  - Improved child survival
  - Achieving MDG4 reducing U5's MR by 2/3rd by 2015

- High efficacy of hib and PCV well established in African children
  - Bacterial pneumonia declining
  - But viral causes will likely increase in prominence in future

Behzad et al 2010, Berkerly et al 2008

Challenges

- Limited pneumococcal serotype coverage (50-60%)
- Incomplete vaccination coverage
- Mixed infections with virus and bacteria
- Severe malaria children up to 10% have blood stream infection.
- Emerging artemisinin and antibiotic resistance is a major concern

Viral ALRI diagnostics

- Multiple viruses are detected by PCR of upper respiratory tract

- Unclear role in causation
  - Both viral and bacterial respiratory pathogens frequently isolated from respiratory tract of healthy children
  - little is known about the burden of viral respiratory disease in malaria-endemic populations

- Difficult obtaining culture specimen
  - Lung aspirates can clarify etiologic role although use is limited
  - Role of viruses in bacterial pneumonia

Weber et al 1998, Madhi SA et al 2006, Berkeley et al 2010,

Thank you for listening

Ahsante