Pneumococcal Vaccine Introductions 2012

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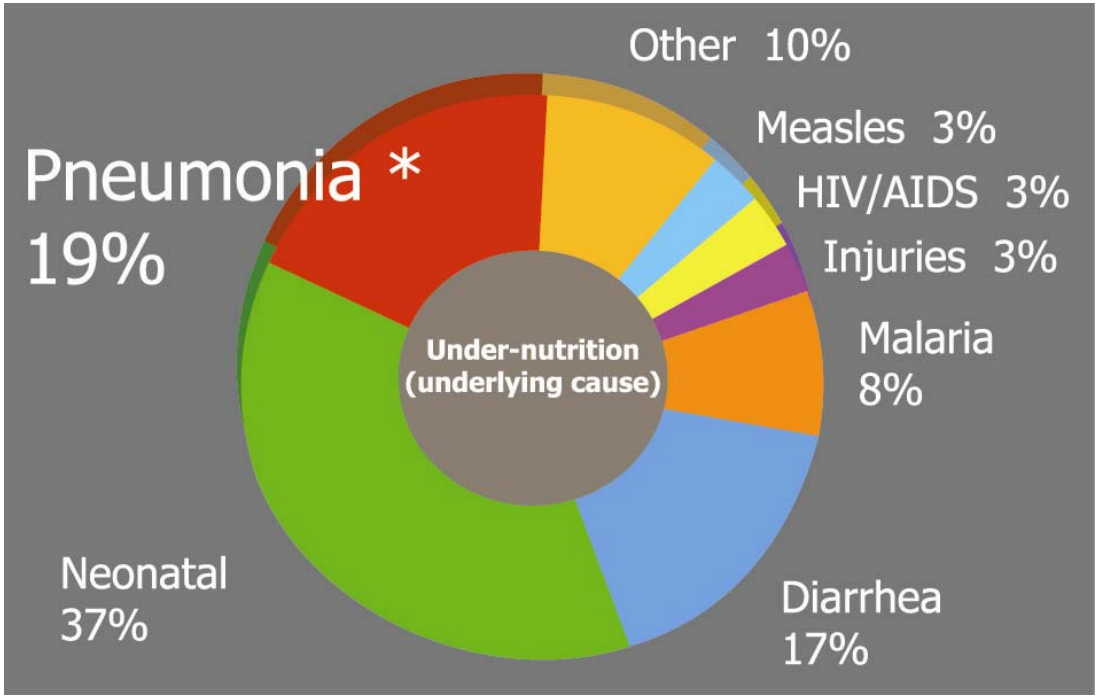
World Health Organization

Pneumonia is leading cause of death in children < 5 yrs



*** Pneumococcus and Hib are the two leading causes of life-threatening pneumonia**

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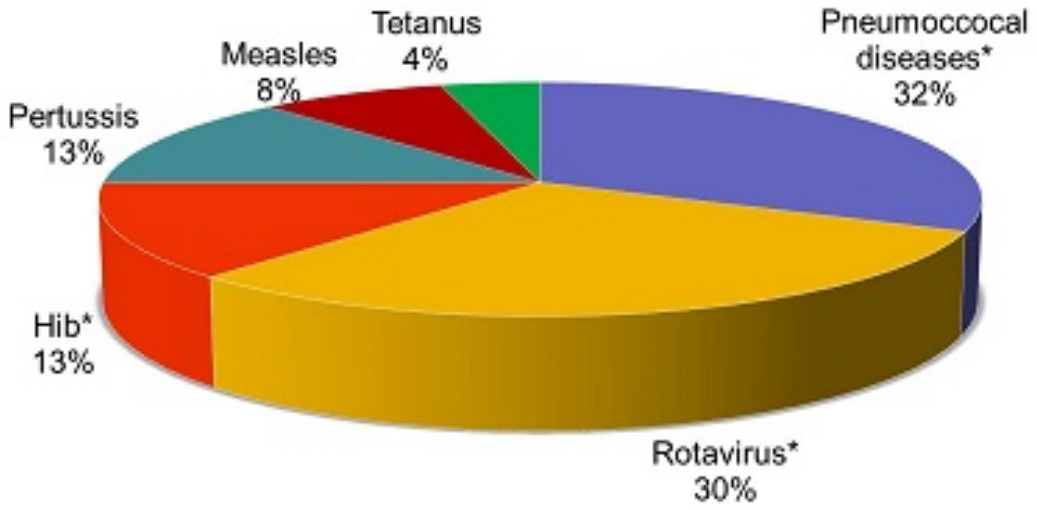
Vaccine preventable deaths in children < 5 years, 2008



Source: Black RE at all. Global, regional, and national causes of child mortality in 2008: a systematic analysis, Lancet. 2010 Jun 5;375(9730):1969-87. Epub 2010 May 11.
* WHO/IVB estimates

Pneumococcus is estimated to cause 5% of all-cause <5 child mortality

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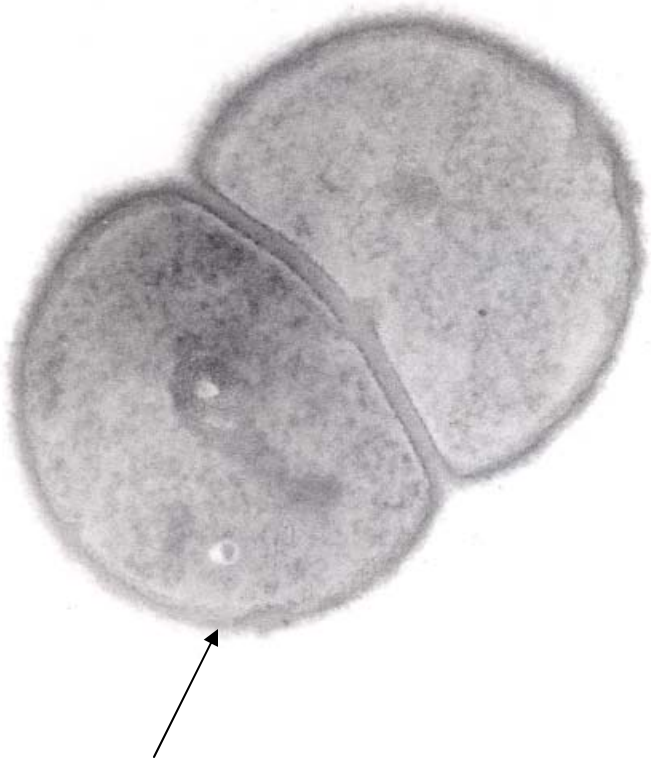
Streptococcus pneumoniae, pneumococcus, (SP)



- Gram positive diplococci
- Capsular polysaccharides:
  - Antigenic and immunologically distinct
  - Most important virulence factor
- 91 distinct serotypes which are grouped into 46 serogroups
- Only specific serogroups cause invasive disease

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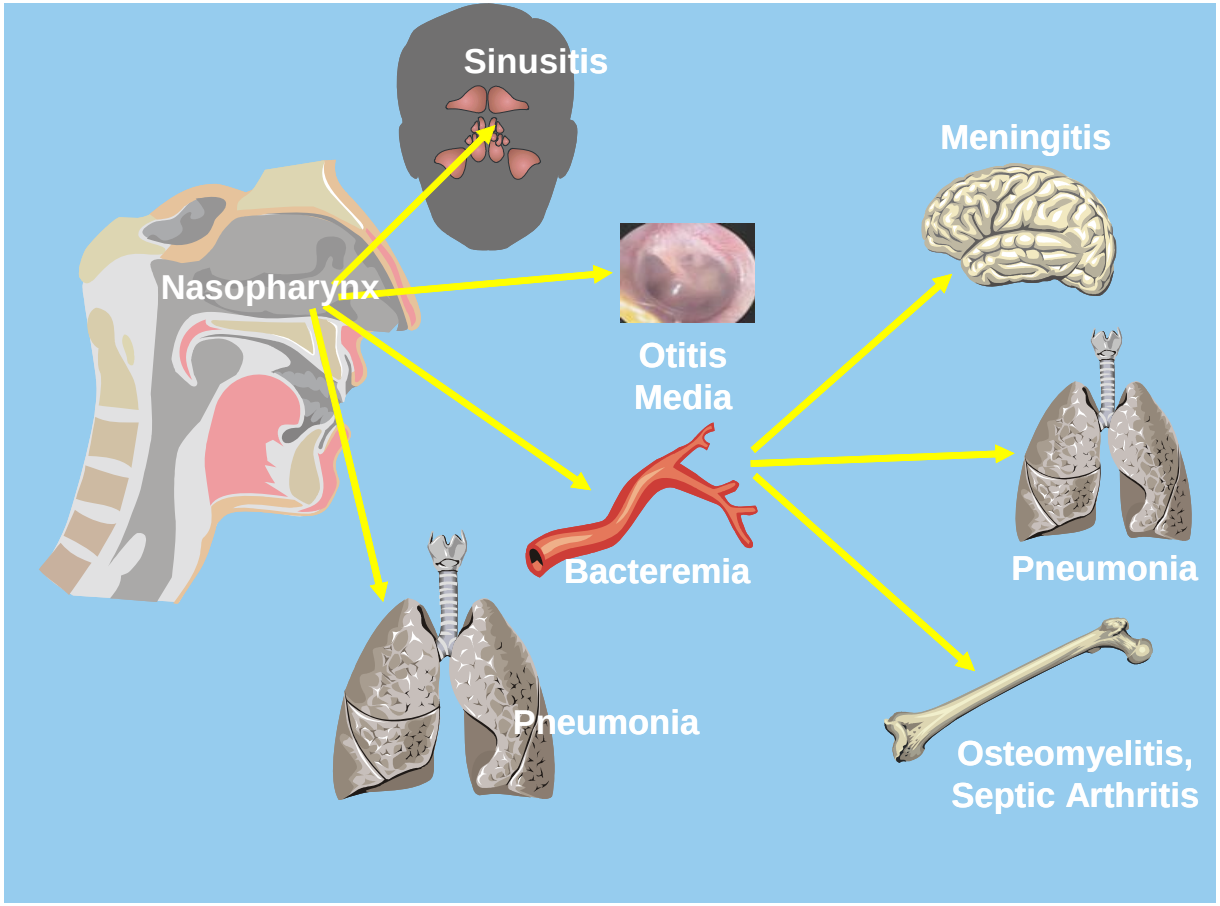
Diseases caused by *Streptococcus pneumoniae*



Invasive Pneumococcal Disease

Febrile Bacteraemia
Meningitis
Bacteraemic Pneumonia
Arthritis
Peritonitis
Osteomyelitis

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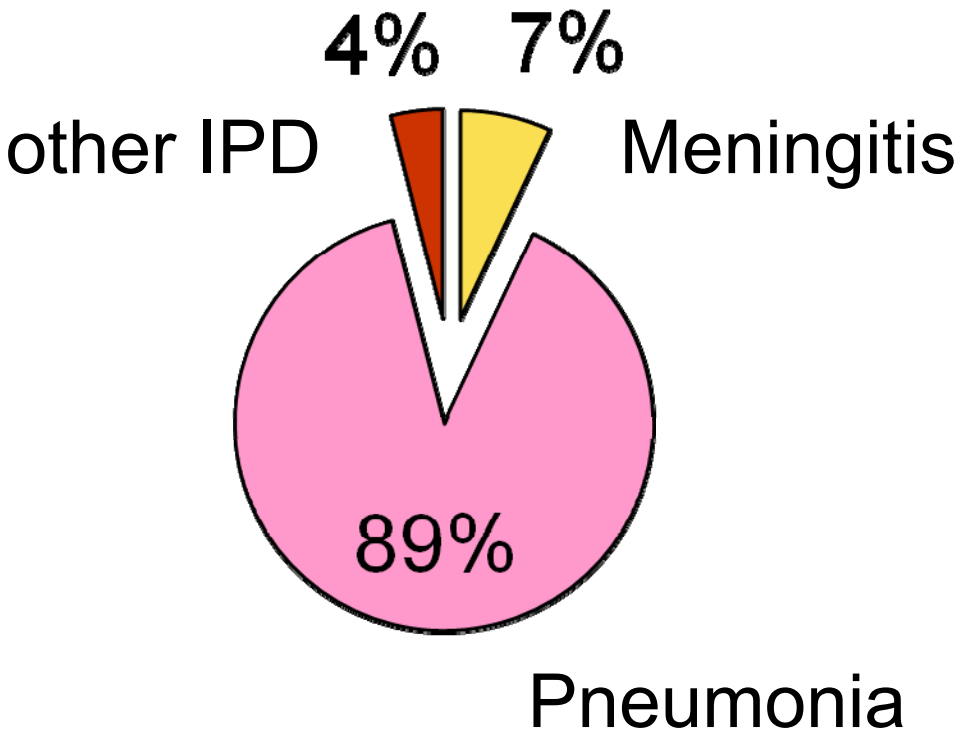
Distribution of *Strep. pneumoniae* deaths by syndrome



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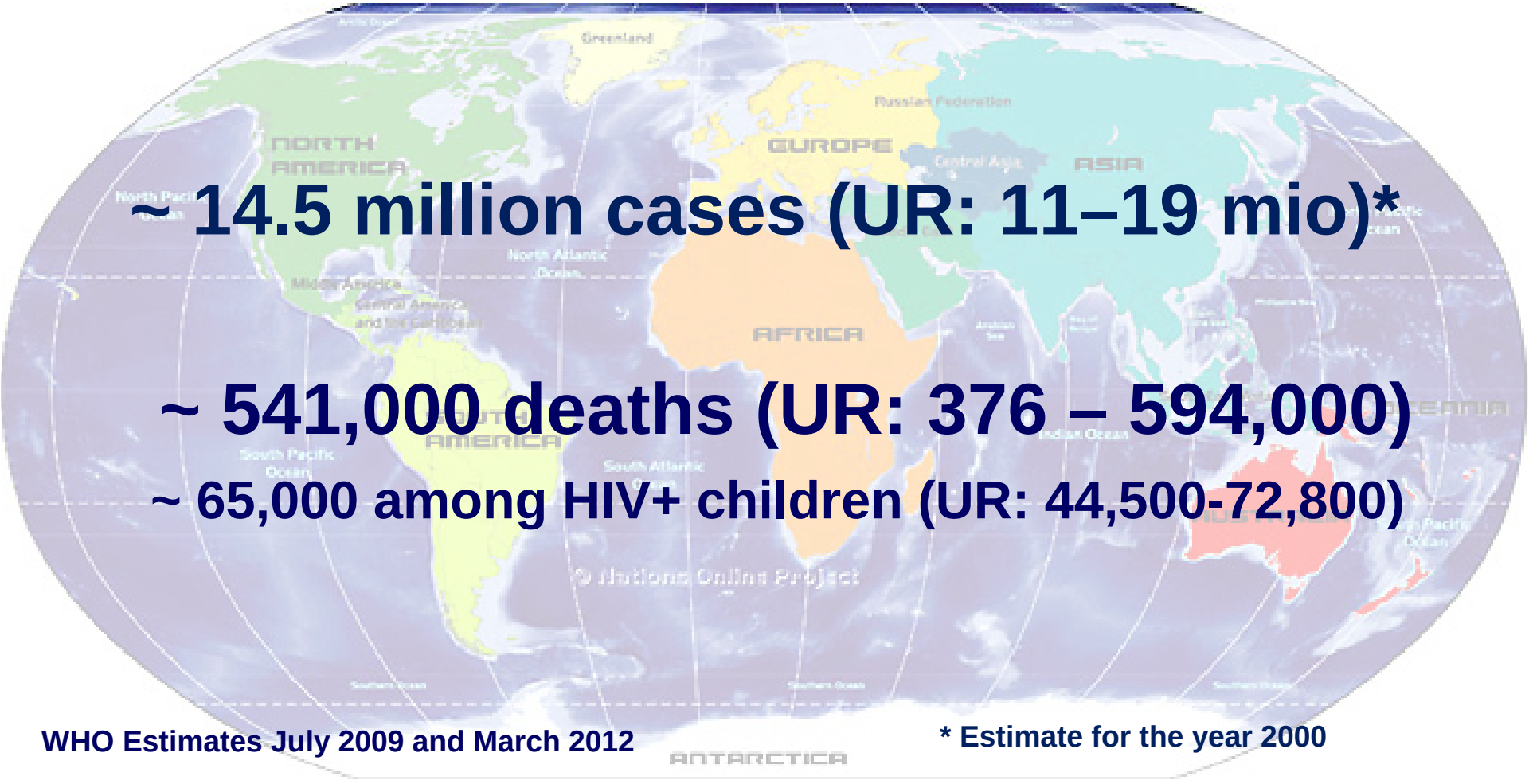
Pneumococcal Global Disease Burden, 2008 (children under age 5 years)



~ 14.5 million cases (UR: 11–19 mio)*

~ 541,000 deaths (UR: 376 – 594,000)

~ 65,000 among HIV+ children (UR: 44,500-72,800)

WHO Estimates July 2009 and March 2012

*** Estimate for the year 2000**

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PAHO *Spn* Disease Burden 2000 and 2008 Children under age 5 years

- 2000: 33,000 *Spn* deaths (UR: 23,000 – 39,000)
- 2008: 13,400 *Spn* deaths (UR: 9,200 – 15,500)

Model input parameters changed: **(!)**

- UN Population Division <5 yr population values
- All-cause pneumonia mortality envelope (1.8m→1.2m)
- HIV+ prevalence values
- Access to care estimates
- Hib vaccine coverage
- PCV coverage not (yet) taken into account

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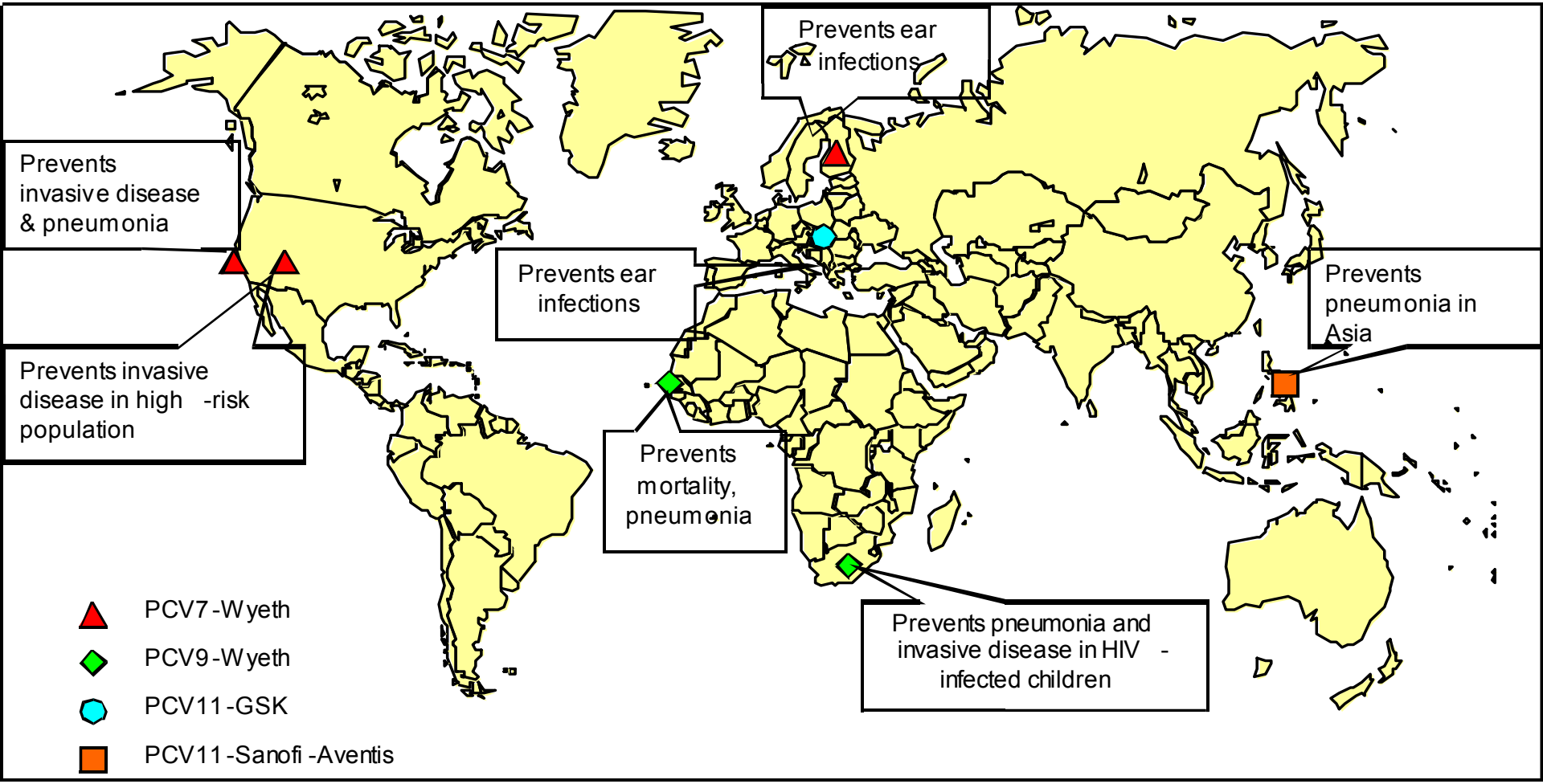
Pneumococcal Conjugate Vaccines

- PCV7: includes serotypes 4, 6B, 9V, 14, 18C, 19F, 23F
- PCV10: includes serotypes of PCV7 + 1, 5, 7F
  - fully liquid in 1-dose and 2-dose vials (no preservative)
  - Cc volume is 4.8 cm^3/dose
- PCV 13: includes serotypes of PCV10 + 3, 6A, 19A
  - fully liquid in 1-dose vials
  - Cc volume is 13.2 cm^3/dose

Pneumococcal conjugate efficacy established around the world



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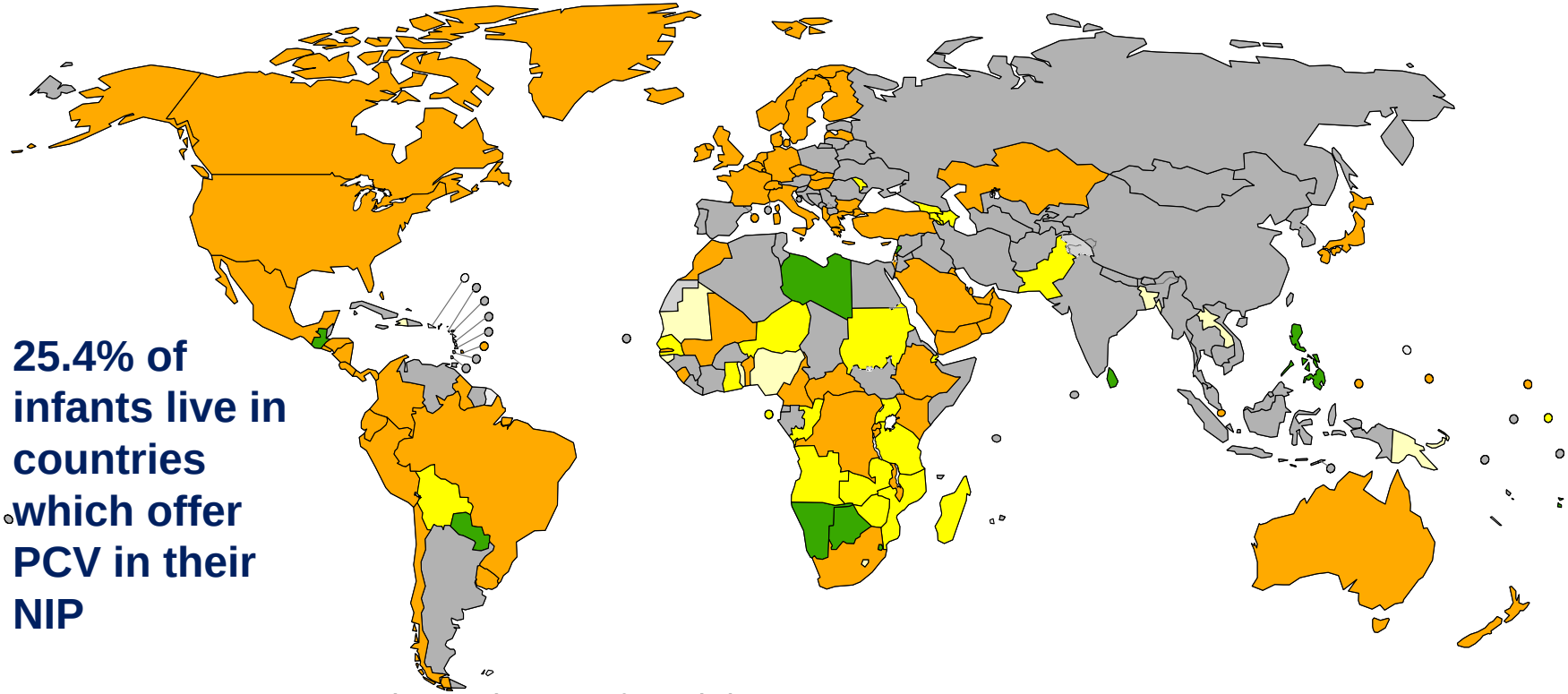
PCV Introduction – Achievements

- PCV10 and PCV13 introduced in 19 developing countries – first introduction within 1.5 years after introduction in an industrialised country (Canada)
- To date, in use in 72 countries, 16 countries with GAVI support
- 18 countries planning to introduce in 2012 (10 with GAVI support)
- 13 countries planning to introduce in 2013 (10 with GAVI support)
- 9 additional countries were approved for GAVI support
- Advance Market Commitment (AMC) agreements for 96 Mio doses annually for 10 years as of 2012/13

Countries Using Pneumococcal Conjugate Vaccine in National Immunization Schedule and Planned Introductions 2012



25.4% of infants live in countries which offer PCV in their NIP

Data Source: Joint Reporting Form, 2011and WHO/IVB database

Map production: IVB, WHO

Date of slide: 13 February 2012

- **Yes *(72 countries or 37% of countries)***
- **Approved by GAVI *(21 countries or 11% of countries)***
- **Recommended for Approval *(9 countries or 5% of countries)***
- **Planning to Introduce in 2012 or 2013 (*10 countries or 5% of countries*)**
- **No *(82 countries or 42% of countries)***
- Not available
- Not applicable

0 850 1,700 3,400 Kilometers

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.
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PCV Introduction – Key Challenges

- Supply situation 2012-2013
- Continued AMC eligibility of 72 GAVI countries – reduction of tail price
- PCV10 2-dose presentation conditions for WHO prequalification
- Continuous review of changing *Strep. pneumoniae* epidemiology
- Vaccine schedules (3p+0 vs. 2p+1)
- Catch-up in children under 1 year of age
- Vaccine interchangeability (PCV10 and PCV13)
- Integrated approaches to pneumonia prevention and control

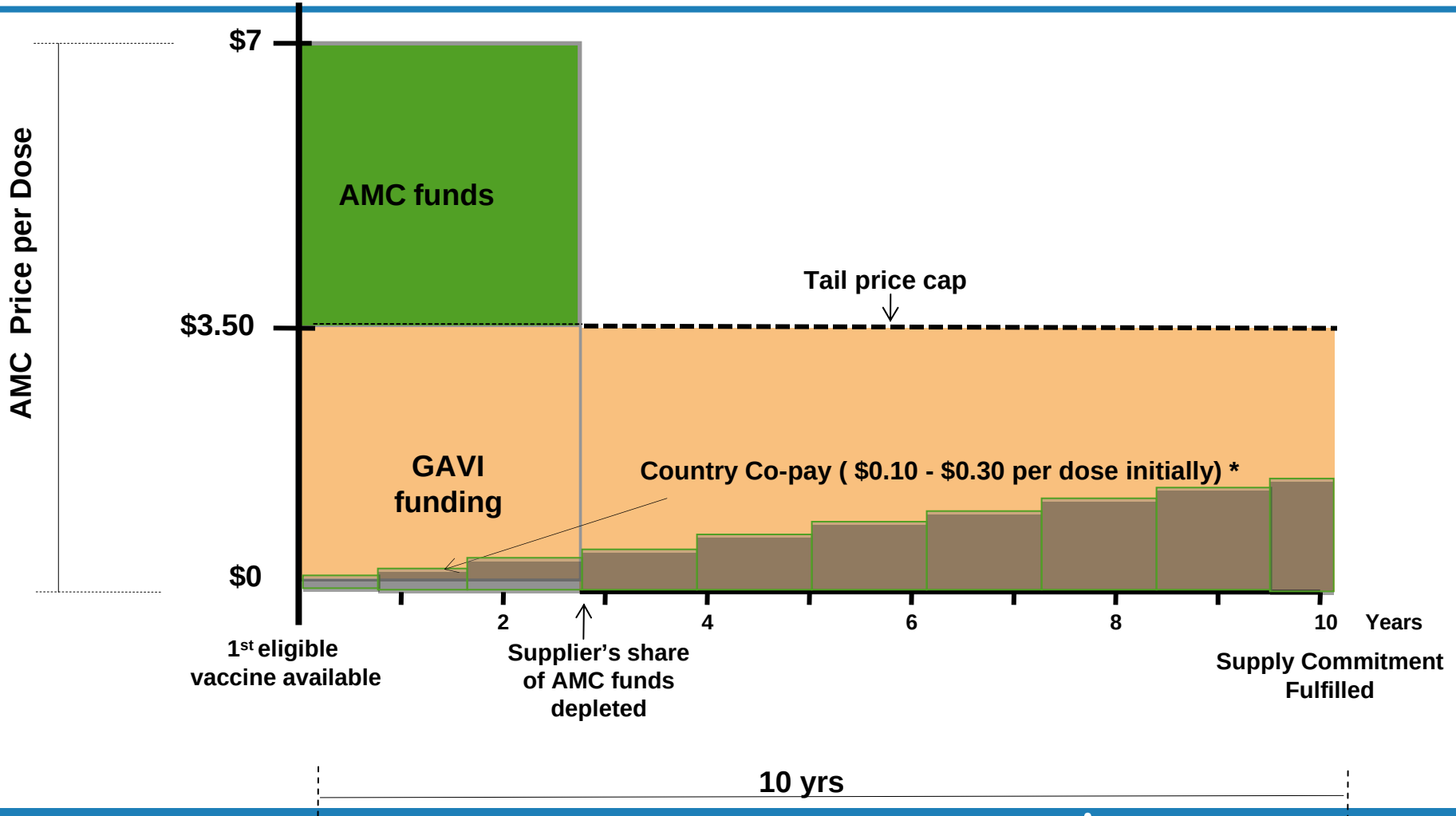
Supply availability for PCV - current projections

- Supply of both PCV13 and PCV10 presently not sufficient to meet demand from all countries
- Sufficient supply for 10 GAVI eligible countries set to introduce in 2012
- Four additional countries wished to introduce in 2012, but may need to postpone to 2013
- Additional supply to become available in 2013 – not confirmed to date.
- Countries recommended for approval in March 2012 will undergo allocation procedure:
  - Criteria: BoD (mortality), date of approval, AEFI reporting system, DTP3 coverage, cold chain readiness

Pneumococcal Advance Market Commitment

- Italy, UK, Canada, Norway, Russia, BMGF have committed to support pneumococcal vaccine market: $ 1.5 billion (AMC funds).
- Interested companies who develop an appropriate vaccine commit to supply certain quantities of the vaccine for 10 years.
- As GAVI eligible countries demand the vaccine, companies receive a maximum of $ 3.50 per dose
- In addition, for approximately 20% of the doses, companies also receive an additional payment of $3.50 per dose from the AMC funds.

The pneumococcal AMC funding sources



* Co-financing levels in line with the applicable GAVI co-financing policy.

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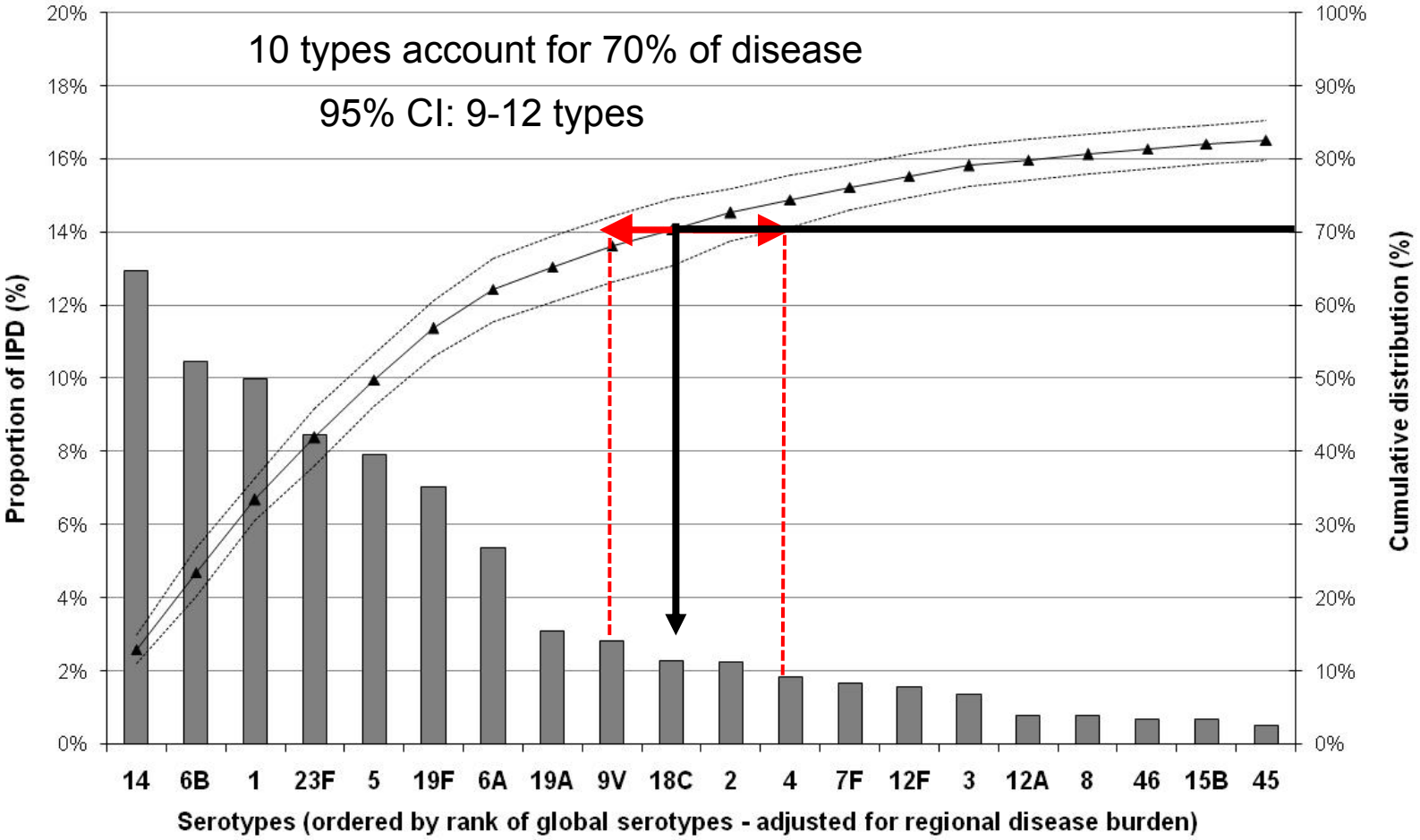
PCV10: 2-dose presentation without preservative

- WHO prequalification with stringent conditions:
  - Continuous review of data from safety studies and programmatic surveys (Kenya and Ethiopia)
  - Adequate training (two rounds including refresher training)
  - Fridge stickers (“do not return opened vials”)
  - Sustained behaviour-change activities
  - Appropriate labeling (visual cues)

Top 20 global *Spn* serotypes*



Source: GSP Version 2 Dec 5, 2008 AMC/TPP analysis

*Weighted by regional disease burden

Ver: 28 Feb/09

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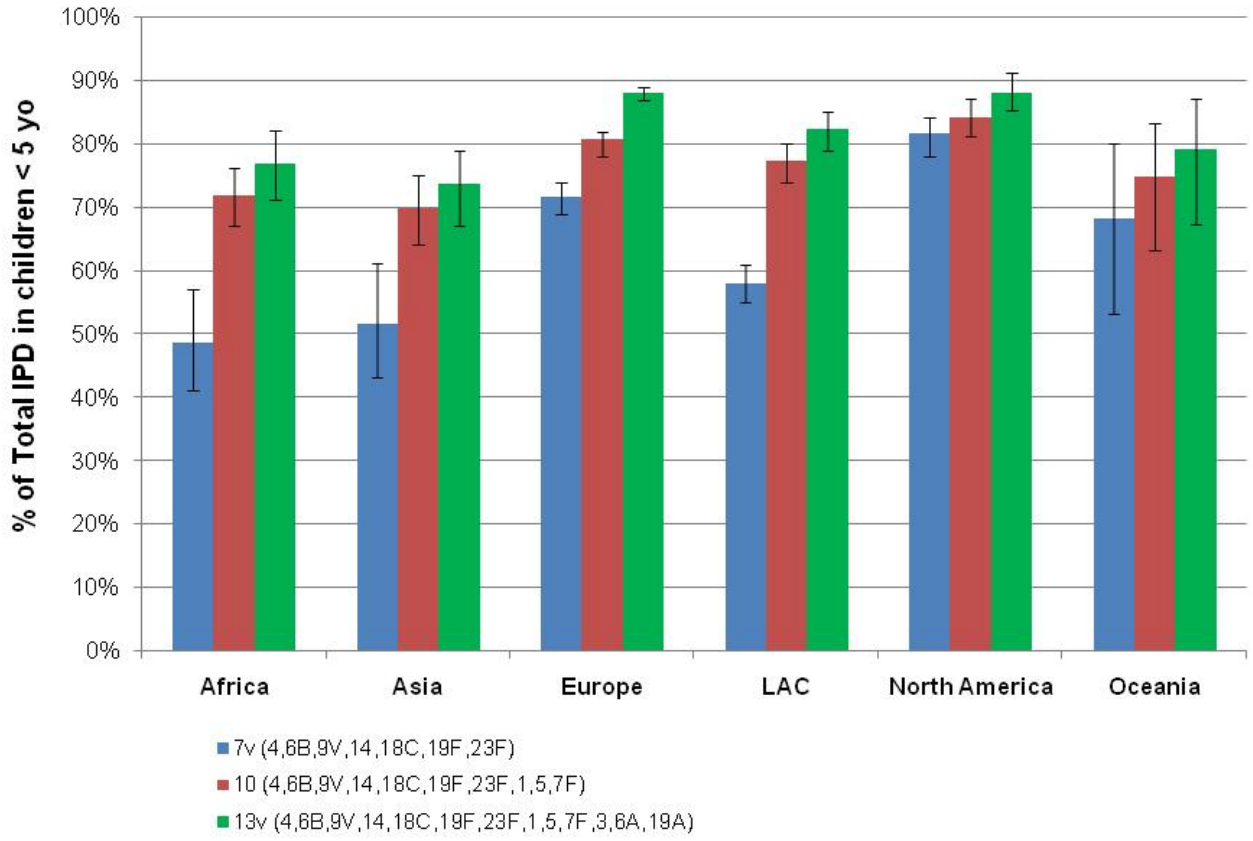
Proportion of regional IPD represented by *Spn* serotypes in vaccine formulations



Source: GSP Version 2 Dec 5, 2008 AMC/TPP analyses

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PCV 7 impact on IPD, UK
(without and with correction for trends in case ascertainment)

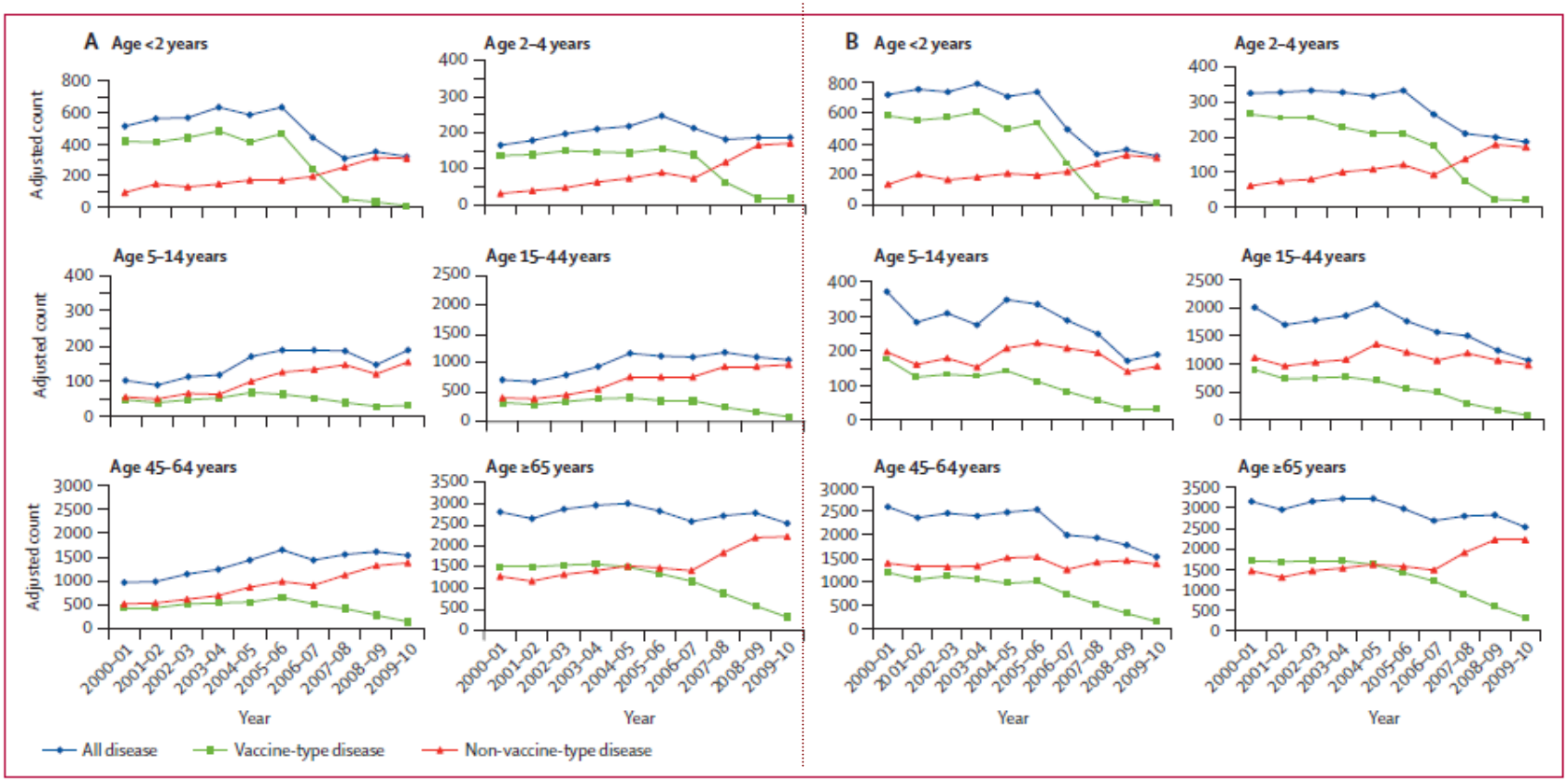

Figure 1: **Trends in Invasive pneumococcal disease in England and Wales (2000–10), by age group**
Without correction for underlying trends in case ascertainment (A). With correction for underlying trends in case ascertainment (B). Data are adjusted for missing serotype or age and for changes in population denominators.

Miller et al. Lancet ID 2011;11:760-8

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Spn serotype replacement following PCV WHO SAGE discussion Nov 2011

- Data review: 71 countries that have introduced PCV contacted; 38 with relevant data; 17 eligible for inclusion in analysis
  - All data are from developed countries and with PCV 7
- Reduction in PCV 7 serotypes in < 5 yr and > 5 yr olds in all populations
- Increase in non-PCV7 serotypes in both age groups
- **Reduction in overall IPD and meningitis in < 5 yr population**
- Impact on overall IPD in older age group variable
- Replacing serotypes are mostly present in PCV10 and PCV13
- **SAGE concluded no changes required on PCV recommendations**
- SAGE recommended continued monitoring for seroptype replacement
  - Requires high intensity surveillance in select sites that have defined catchment population and ability to account for non-vaccine factors that may affect serotype changes

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PCV Schedules
WHO SAGE discussion - Nov 2011

- Substantial evidence supports the use of a 3p+0 schedule
- There was some evidence for additional benefit of a booster dose, in terms of immunogenicity, nasopharyngeal carriage of vaccine type serotypes and IPD.
- If disease incidence peaks in young infants (e.g. 24–32 weeks of age), a 2p+1 schedule might not offer optimal individual protection in the absence of herd protection.

PCV Schedules
SAGE recommendation - Nov 2011

- WHO recommends 3 primary doses (3p+0) or 2 primary doses plus booster (2p+1)
  - 3p+0 if disease incidence peaks in young infants (e.g. 24-32 weeks of age)
  - 2p+1 for improved duration of protection or effectiveness against specific serotypes – two primary doses with 8 week interval, booster between 9-15 months of age
- Regardless of the choice of schedule, countries are encouraged to achieve and maintain high coverage and to improve the timeliness of vaccination to maximize the potential benefits of PCV.

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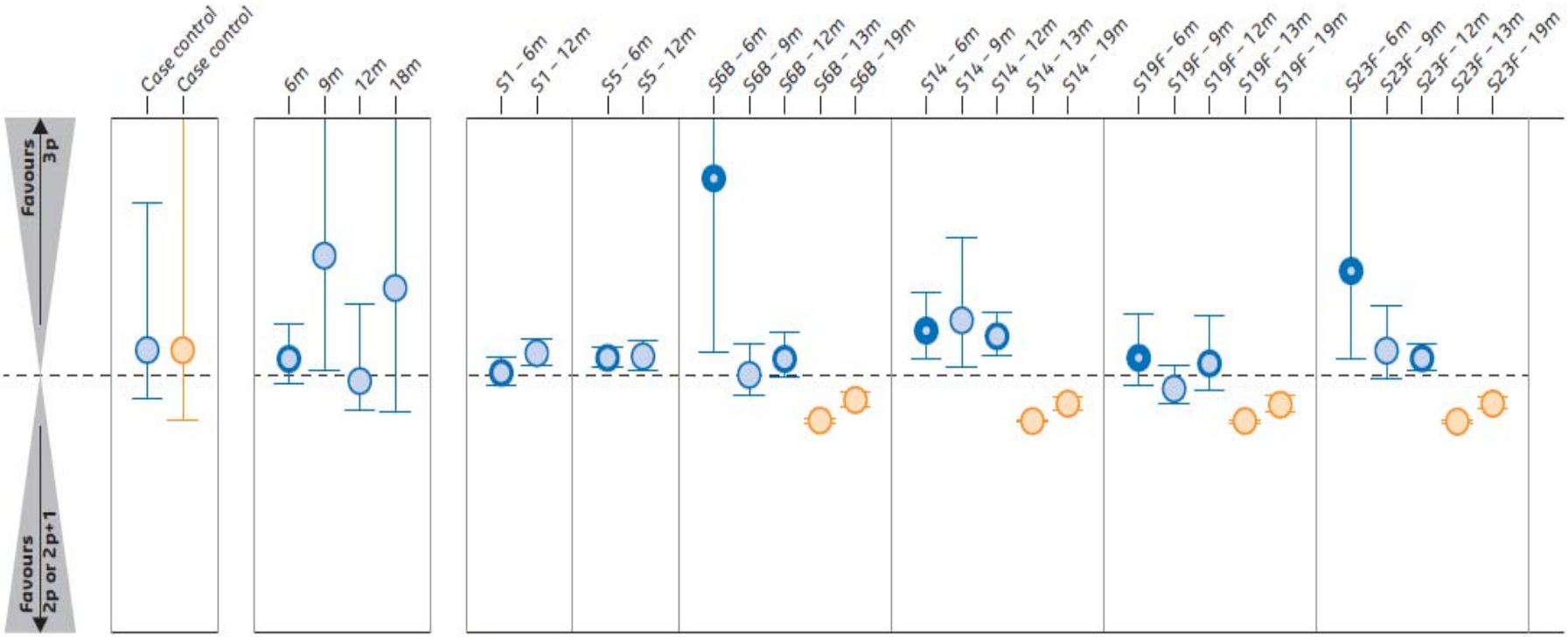
Overall assessment of selected pneumococcal conjugate vaccines schedules with public health relevance

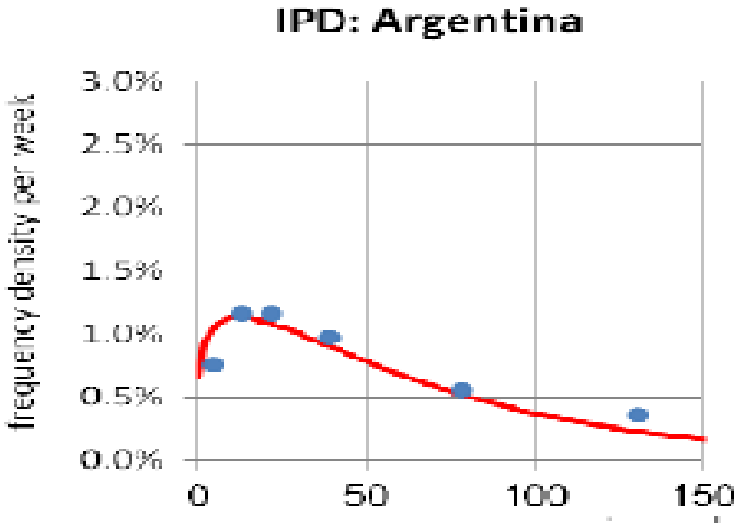


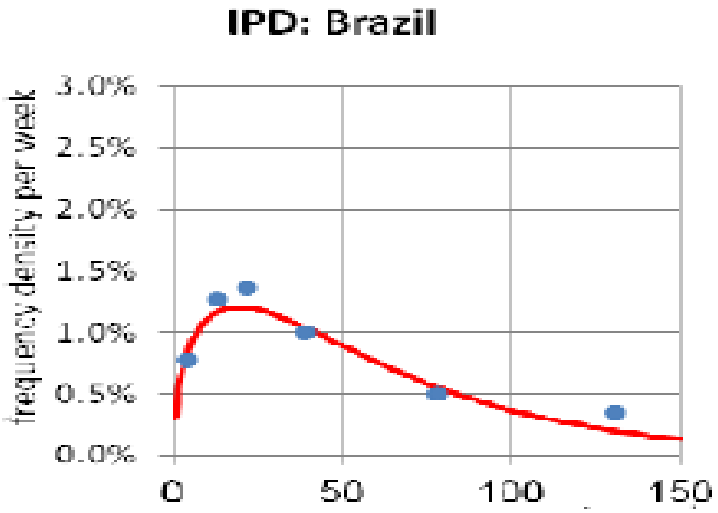
No data available on:
- mortality, pneumonia, for 3p versus 2p or 3p versus 2p+1 schedule comparisons
- nasopharyngeal carriage for vaccine types for the comparison 3p versus 2p+1

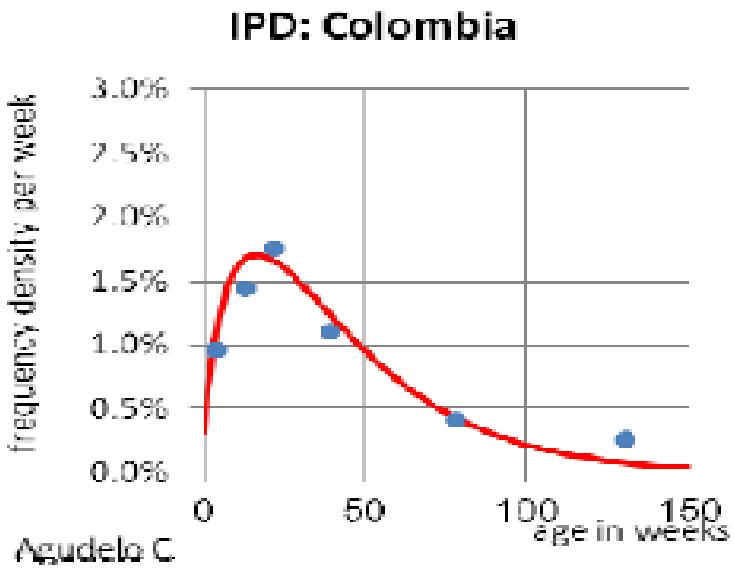
Data source: Pippa Scott et al, 2011

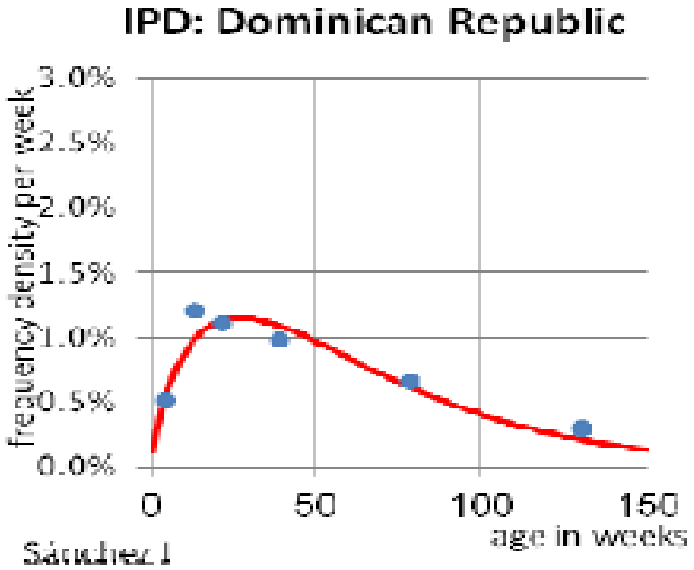
Chart: Xavier Bosch-Capblanch, 2011
Design: Hauser, Schwarz GmbH

SAGE discussion – Nov 2011









PCV delivery issues

- Catch-up campaigns as part of vaccine introduction may accelerate herd immunity
- Some countries vaccinate all children under 1 yearr of age, not just the birth cohort
- Interchangeability PCV10 and PCV13 not yet documented.
  - If not possible to complete series with same type of vaccine, the other PCV product should be used.

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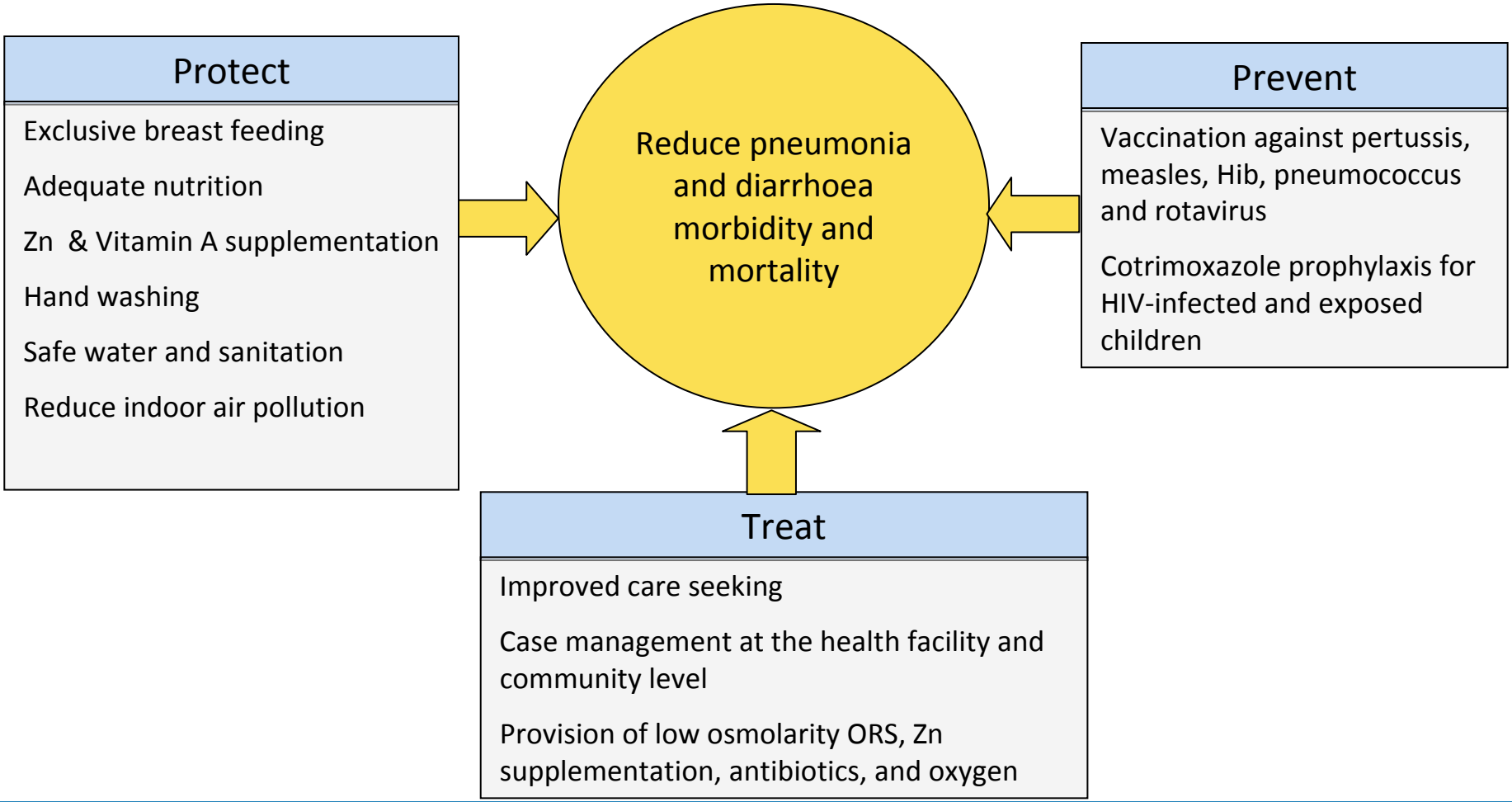
Protect, prevent and treat strategies for pneumonia and diarrhoea



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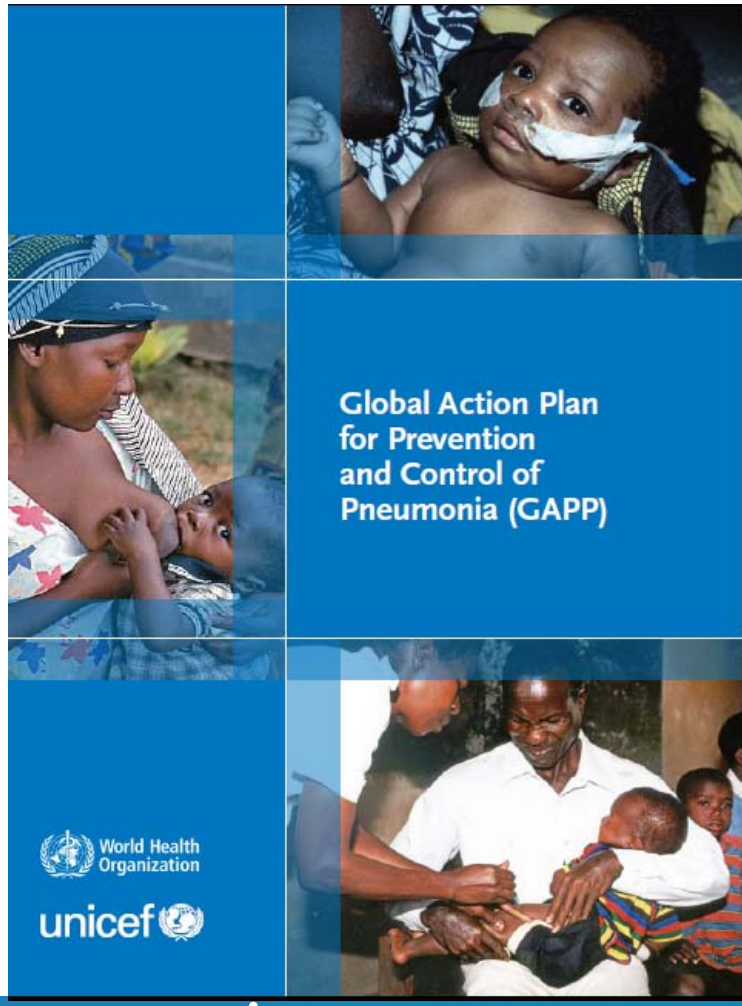
Resolutions at WHO Governing Body Meetings

- WHO EB Resolution
  - Calls for establishment of evidence-based policies and national plans to control pneumonia
  - Asks for reports on progress on pneumonia control as part of report back on progress towards MDGs
- World Health Assembly
  - Resolution adopted in May 2010



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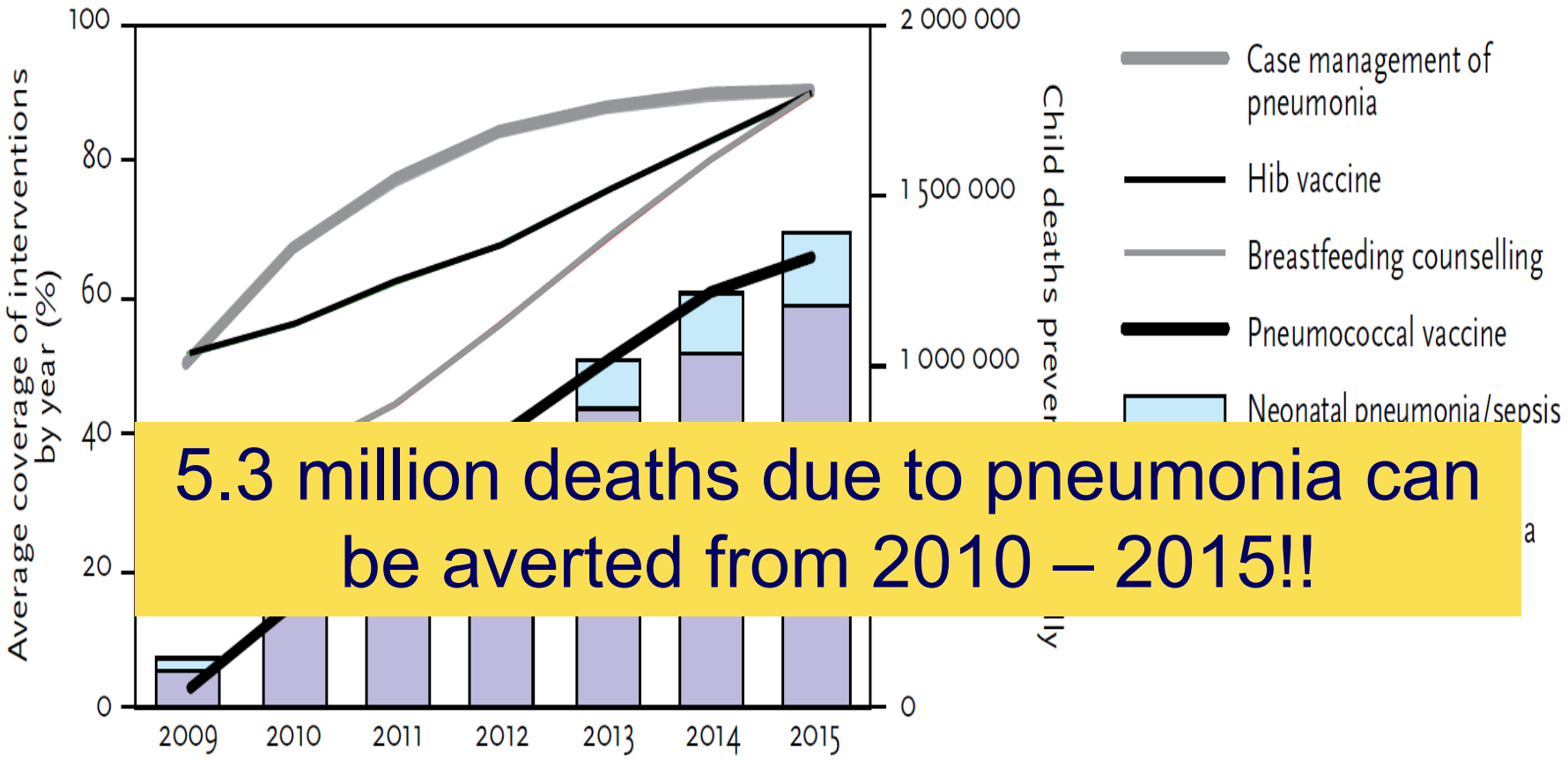
Impact of increasing GAPP coverage to 90%



5.3 million deaths due to pneumonia can be averted from 2010 – 2015!!

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Acknowledgements

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Thank You