Dengue vaccination: critical issues for future vaccine introduction

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Outline

- Dengue epidemiology/surveillance/challenges
- Vaccine introduction
- Pharmacovigilance
- Policy & advocacy
- Vector Control
Dengue Epidemiology-challenges for vaccine introduction

• Surveillance for febrile illnesses to detect dengue
• Multiple virus types (serotypes)
• Incidence: high endemicity + periodic epidemics
  Early detection and prediction of outbreaks
• Peak age of incidence varies by region/country
• Sustainability?
Dengue surveillance needs

- Reporting to National Surveillance System mandatory
- Laboratory surveillance should be an integral part
- Operational Research-modeling & evaluating vaccine effectiveness
Dengue Trends in Sri Lanka

The graph shows the number of dengue cases and case-fatality rate (CFR) from 1992 to 2013. The cases are represented by blue bars, and the CFR is represented by red triangles.

Key points:
- The number of dengue cases varied significantly over the years, with peaks in 2010, 2011, and 2012.
- The CFR also showed fluctuations, with peaks in 2000 and 2010.
- The data indicates a considerable increase in cases from 2010 to 2013.

The graph provides a visual representation of dengue trends in Sri Lanka, highlighting the need for ongoing monitoring and control measures.

Reported mean age changed from 10-15yrs to 20-25yrs between 1996 & 2006
Sero-prevalence among Urban Children

Dengue Surveillance in Colombo, Sri Lanka: Baseline seroprevalence among children

Figure 1: Age stratified seroprevalence among children 0 - 12 in the study cohort
From licensure to programmatic use

- Demands on regulatory authorities
- Needs for post-registration studies
  - Extended safety, in particular longer-term studies
  - Measure vaccine effectiveness, understand impact of pre-existing immunity
  - Assess booster needs
  - Understanding the impact on transmission (herd immunity)
  
  ➢ Need for coordinated approach between early introducer countries
- Vaccine procurement and supply
Some programmatic considerations

- What strategy is being adopted?
  - Age for routine immunization
  - Catch-up campaign or no catch-up
  - Urban vs rural

- How will this vaccine be delivered?
  - through EPI or through other mechanisms?

- Are cold chain and logistics requirements met?

- Are training materials and Job aids ready & available?

- Is there a surveillance plan with funding to support it?

- Is there a communications plan with funds to support its implementation?
Introduction strategies

• Premature to introduce into EPI/NPI – targeted introduction, phase-in manner - intensely follow up for several years

• Most convenient age of introduction -From (modeling) projections it appears that a catch-up campaigns reaching up to 14 years of age seems the best option for the highest impact
  – Amaku et al* showed that with 80% coverage, targeting 3 to 14 years would have the greatest impact
  – Longini** show that a catch-up reaching up to 14 years would have significant impact; reaching up to 44 years while have an impact, the incremental impact gain from reaching just 14 years is not so significant

• Depending on availability and affordability a ‘catch-up’ programme to be considered – few years

**Chao DL et al., PLoS NTD 2012
Ongoing preparatory work: policy considerations and evidence-based decision-making*

- Generating political awareness & support
  - Asia Pacific and Americas "Dengue Prevention Boards"
  - Policy studies (opinion-leader surveys, case studies)

- Registration & Licensure (NRA) – WHO prequalification
  - WHO regulatory standards established
  - Technical advice to interested country NRAs

- Vaccine cost, cost-effectiveness, & immunization financing
  - Cost effectiveness of other control methods – vector control
  - Cost estimates and financing strategies studied
  - Demand forecast model developed

- Modeling impact of vaccine intervention/synergies with vector control

*Activities conducted by the "Dengue Vaccine Initiative", http://www.denguevaccines.org/
Summary on unique challenges for dengue vaccine introduction

- Regulatory & post-licensure: need for coordinated studies on effectiveness and long-term safety in early introducing countries

- Immunization strategies: variable epidemiology, define target age groups & catch up needs, combine operational considerations with modeling studies, immunization schedules & booster needs

- Integration: develop immunization strategies in conjunction with vector control for optimal impact; advocacy and communication

- Evidence for decision-making: cost and cost-effectiveness, vaccine supply and logistics

- Immunization financing (many non-GAVI countries)

- Monitoring & evaluation: needs for strengthened surveillance