Quantitative Immunization and Vaccines Related Research Advisory Committee (QUIVER)

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SAGE meeting
October 27, 2009
Outline

• QUIVER Composition
• Draft recommendations from QUIVER meeting October 13-15, 2009
• Brief summary of *ad hoc* meeting on rotavirus vaccines, October 13-14, 2009
 QUIVER Members 2009

1. Alan Hinman – USA (Chair)
2. Fulgentius Baryarama – Uganda
3. Zulfiqar Ahmed Bhutta – Pakistan
4. John Edmunds – UK
5. Bryan Grenfell – USA
6. Fernando De La Hoz Restrepo – Colombia
7. James Koopman – USA
8. Raman Laxinimarayan – USA
9. Anthony Nelson – China
10. Maarten Postma – The Netherlands
11. Aparnaa Somanathan – Sri Lanka
12. Siripen Supakankunti – Thailand
October 2009 meeting topics

For advice
• WHO-UNICEF estimates for national immunisation coverage (WUENIC)
• Feasibility of Measles Eradication
• Burden of VPDs
  – Measles
  – Pertussis
  – NTT
• Post polio eradication modeling

For information
• Introduction on Hepatitis A, B and E models
• Influenza social contact and mixing patterns in SEA
• NUVI Cost-effectiveness modeling for national policy makers
WHO-UNICEF estimates for national immunisation coverage (WUENIC)

- Objectives
  - Review current methods
  - Consider alternatives for assessing and communicating uncertainty
  - Improve consistency and transparency of estimation methods
  - Review future activities
WHO-UNICEF estimates for national immunisation coverage (WUENIC)-2

• Summary of method
  – Based on reported coverage and survey results
  – Accepts reported coverage if not >10% different from survey for same year
  – Accepts survey results if reported coverage is >10% different
  – Establishes anchor points in years where both are available
  – Uses trend between anchor points to estimate coverage in years with no data
  – Since survey results are not as timely as reported coverage, there may be retroactive adjustments to estimates
  – Uses computational logic to make entire approach more explicit and transparent
WHO-UNICEF estimates for national immunisation coverage (WUENIC)-3

- Recommendations
  - Rule based explicit structure is useful
  - Validate country level administrative coverage data with other health systems information (especially more frequent surveys)
  - Compare and validate WUENIC estimates with serological data
  - Uncertainty analysis: consider combination of CI of survey point estimates and +/- 10% rule
Feasibility of Measles Eradication

• Presentations
  – Two dynamic measles and CEA models (JHSPH, MathEcology)
  – Health systems impact framework (LSHTM)

• Questions
  – Are mathematical models adequate to address cost-effectiveness questions?
  – How can models be improved given the data and time constraints?
  – Are costing methods adequate for economic analysis?
  – Provide advice on best method to extrapolate from 6 countries to global analysis
  – Appropriateness of the toolkit proposed to measure health systems impact of measles eradication
Feasibility of Measles Eradication -2

• Recommendations
  – More comprehensive dynamic modelling is needed on:
    • Heterogeneity in vaccine coverage
    • Rubella vaccination
    • CEA studies
    • Empirical evidence is needed on cost function of expanding measles coverage
    • Six country CEA study cannot be extrapolated to a meaningful global ICER. Instead, results can serve as stand-alone illustrations (also to identify data gaps)
    • Given the timeframe a budget envelope could be given as global figure
Feasibility of Measles Eradication -3

- Issues to be considered for health systems impact study:
  • Dynamic view of health systems
  • Identifying the fiscal space including reallocation of resources
  • Opportunities for productivity improvements on human resources
  • Inclusion of planning and management
  • Ongoing health care reforms

- Ad Hoc QUIVER measles eradication working group to follow up on issues above
Estimation of country specific measles case and death burden

• Presentation
  – New measles burden model (Penn State University) to address limitations of the MSP tool
  – Follow up from QUIVER 2008

• Questions
  – Does the new model address the key limitations?
  – Is this method acceptable for monitoring progress towards 2010 mortality reduction?
Estimation of country specific measles case and death burden-2

- Recommendations
  - The new model addressed issues raised by QUIVER 2008 although it has some limitations
  - The new model should:
    - vary the reporting fraction over time
    - account for competing causes of death
    - validate model against seroprevalence data in selected countries
    - explore further country evidence of a secular trend in CFRs
  - With these modifications, the new model is acceptable for monitoring progress towards 2010 mortality reduction goal
Pertussis and NTT model

• Work on NIH Pertussis and LSHTM NTT modelling as follow up from QUIVER 2008 recommendations

• Recommendations
  – NIH Pertussis model
    • Selected members of SAGE Pertussis Workgroup and QUIVER should examine the model in more detail and give specific recommendations on methods and parameters
  – LSHTM NTT model
    • Overall the approach seems to be appropriate
    • Observed biases in the model need to be studied and observed
Post polio eradication modeling-1

• Presentation
  – Models to assist global policy makers to understand the risks and economics associated with options for managing poliovirus outbreaks after successful eradication of wild polioviruses (Harvard Kids Risk project)
  – Model objectives - to determine the expected impact of OPV or IPV immunization strategies to minimize outbreak risks from cVDPV and other sources.

• Question from SAGE WG
  – Guidance on methods, specifically whether decisions can be based on current models, or is more work needed?
Post polio eradication modeling -2

• Recommendations
  – Model presented is appropriate and comprehensive
  – Creation of an advisory committee for guidance was suggested
  – As it seems risky to base important decisions only on one model, recommend also supporting another team that takes a different modelling approach
  – More modelling is needed on end-stages of polio eradication
  – More collaboration is needed between pre- and post- eradication modellers
Ad hoc meeting on rotavirus vaccines-1

• Objectives
  – To review existing literature on CE of RV
  – To review existing country level CE tools for RV

• Expected outcomes:
  – Preliminary list of critical parameters and assumptions that local decision makers should consider when assessing the impact and CE of RV
  – List of priority data needed at country level required to optimize the use of CE tools in the decision making process for RV
Ad hoc meeting on rotavirus vaccines-2

- Five models compared (EU Polymod; LSHTM TriVac; GSK Roxanne; Merck; and Sanofi Pasteur MSD) using a HIC standardized dataset

Conclusions
- Overall models were comparable and gave generally consistent results
- Major drivers – RV price, CFR and hospitalizations
- Exercise could help inform surveillance – more integrated approach needed
- Use emerging LMIC data e.g. lower VE, actual age of vaccination etc.
- Marginal CE of 2\textsuperscript{nd} and 3\textsuperscript{rd} dose
- Need to include budget impact analysis
- Allow for comparison to other interventions: Zn
Back up slides
• Advise IVR on quantitative research issues
  – Estimating the burden of VPD
  – Modeling vaccine intervention
  – Economic evaluations of vaccines, immunizations, and related technologies and interventions
  – Analytical components of operational and implementation research
• Assist IVR in preparing its workplan on quantitative research
• Review public health relevance, scientific quality and budgets of projects proposed to IVR and monitor technical and scientific progress of research activities
• Make recommendations on scientists and institutions suitable to formulate and carry out specific R & D projects or other studies for IVR
• Assist in establishment of subcommittees, expert working groups or study groups
• Review norms and standards relating to methods for conducting and reporting on quantitative immunization and vaccines-related research
• Specific model recommendations
  – Incorporate the emergence of cVDPV dynamically
  – Incorporate meta-population model structures and data that characterize high risk areas
  – Use theoretical immune effect models simulating the dynamics of within-host PV infections
  – Total switch to IPV should be included
  – A model specific for Uttar Pradesh is needed