Pertussis Vaccination Schedules

Introduction:
Background and framing of the questions for SAGE

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Contributions

- **Pertussis Working Group Members:**

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- **External experts:**

  Andrew Clark, Paul Fine, Colin Sanderson, (LSHTM); Judith Mueller (EHESP), Martha Roper, Karla Soares (Enhance Reviews), Tej Tejpratap (US CDC), Richard Wood, (AMP)

- **WHO Secretariat:**

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Pertussis Working Group Terms of Reference

1. Review epidemiological data from selected countries using aP and/or wP vaccines

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   - Evaluate evidence for pertussis resurgence with emphasis on severe pertussis in very young infants
   - Evaluate evidence for hypothesis that resurgence is due to shorter lived protection from aP vaccines

√ 2. Review evidence on effectiveness of 1 or 2 doses of pertussis vaccines against severe disease and death in young infants

√ 3. Review evidence on effectiveness of three strategies to reduce severe disease and death from pertussis in very young infants

4. Review evidence for optimal primary vaccination scheduling and timing of booster dose(s)

√ 5. Review evidence that changes in circulating pertussis strains had an adverse impact on the effectiveness of aP or wP vaccines

6. Propose updated recommendations for SAGE consideration on use of pertussis vaccines

WHO position on the use of pertussis vaccines, October 2010

- At least **90% coverage with 3 doses of high quality pertussis vaccines in infants remains the programme priority worldwide.**
- WHO recommends a 3-dose primary series with the first dose administered **at 6 weeks of age**, and subsequent doses given 4-8 weeks apart.
- A booster is recommended for children 1- 6 years of age, preferably during the second year of life
- Completion of this schedule is expected to ensure protection against pertussis for at least 6 years

Pertussis vaccines: WHO position paper.
WER 2010, 85, 385–400. http://www.who.int/wer/2010/wer8540.pdf

Revised guidance on the choice of pertussis vaccines: July 2014

Countries using wP vaccines

Countries where <5 doses of pertussis vaccine (only 3 primary doses, or 3 primary doses plus 1 booster) are used/affordable should continue to use wP vaccines for primary pertussis infant vaccination. Surveillance and modeling data suggest that the use of aP vaccines will result in a resurgence of pertussis after a number of years and this resurgence might also lead to an increased risk of death in those too young to be vaccinated. The magnitude and timing of this resurgence are difficult to predict, given the many factors that intervene such as vaccine coverage, natural immunity, vaccine type, and vaccination schedules. Thus, the switch

Countries using aP vaccines

Available evidence indicates that licensed aP vaccines have lower initial efficacy, faster waning of immunity, and possibly a reduced impact on transmission relative to currently internationally available wP vaccines.

Countries currently using aP vaccine may continue using this vaccine but should consider the need for additional booster doses and strategies to prevent early childhood mortality in case of resurgence of pertussis.

Source: WHO WER 2014, 89, 337-344. http://www.who.int/wer/2013/wer8930.pdf?ua=1

August 2014 face-to-face meeting of the pertussis working group: purpose

- Present the various components of the systematic reviews completed under the aegis of the schedule optimization project and explore the implications of different vaccination schedules for diphtheria, tetanus and pertussis
- Discussions focused on the revision of the current ideal schedule for DTP - with some discussions of TT and DT boosters.
- Key questions to be addressed were the number and timing of primary pertussis doses and their interval.

Purpose of this session

- **The current session focuses on children and pertussis.**
  - It only presents diphtheria and tetanus related information that is essential to understand the drivers of the pertussis vaccine containing schedules in the context of the main aim of pertussis control at global level.

- **Discussions on the overall duration of protection induced by adolescent and adult boosters and how to ensure durable protection for tetanus and diphtheria are very complex!**
  - During the August 2014 meeting, data presented were insufficient for a full discussion of booster schedules necessary to ensure continuous protection as compared to current recommendations / practices.
  - **Work will continue to retrieve and interpret additional data,** acknowledging the major limitations of the currently available data.

FOR DECISION

- Review the evidence in support/against different schedules for DTP containing vaccines and the impact of different vaccination strategies.
  1. **Is there enough evidence to support the preferential use of different DTP-(X) immunization schedules?**
     - How does this differ for wP and aP-based vaccines?
  2. **Is there enough evidence to identify criteria supporting the preferential use of different DTP- (X) immunization schedules?**

- Update recommendations on the optimal schedules for DTP containing vaccines
  - with a view to lead to the updating of the pertussis position paper

Session Overview

Evidence in support/against various primary DTP vaccination schedules

E. Miller, Member of SAGE pertussis vaccine working group (chaired the group until February 2014)

Modelling of impact of different DTP schedules

A. Clark, LSHTM

Summary and review of proposed recommendations

C. A. Siegrist, Chair of SAGE pertussis vaccine working group

Discussion