

SAGE Working Group on Yellow Fever Vaccine: Other evidence reviewed by the SAGE working group

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Objectives

- Interference between YF vaccine & co-administered vaccination
- Interference with immune response and YF vaccine
- The impact of routine vaccination/outbreak control
- The impact of the combined vaccination strategy EPI and preventive campaign

Co-administration of yellow fever and other vaccines

Overview

1. There is no evidence that administration of YF vaccine with other vaccines has any effect of safety of vaccines administered.... But most studies ~~There is~~ with evidence that administration of YF vaccine with other
2. There is no ~~evidence~~ that administration of YF 17D vaccine with other ~~administration~~ results in a non-protective immune response to YF virus, but additional studies are urgently needed for MMR and measles alone.
 - a. There is good ~~evidence~~ that administration of YF 17D vaccine with other vaccines results in a non-protective immune response to YF virus,
 - b. There is no ~~evidence~~ that administration of YF 17D vaccine with other vaccines results in a non-protective immune response to YF virus,
 - c. There is good ~~evidence~~ that administration of YF 17D vaccine with other vaccines results in a non-protective immune response to YF virus,

Key Findings

- Co-administration of yellow fever vaccine and other vaccines typically has no impact on safety.
- Co-administration of yellow fever vaccine and other vaccines generally elicits a good immune response to yellow fever; notable exception is combined measles, mumps, and rubella vaccine.
- Co-administration of yellow fever vaccine and other vaccines typically has no impact on safety.
 - Additional co-administration studies are needed yellow fever lacking or incomplete
 - Co-administration of yellow fever vaccine and other vaccines

Priority co-administration studies identified by the group include:

- MMR vaccine – Only study performed showed decrease immune response to several antigens [YF, mumps and rubella]. MMR will be increasingly used in yellow fever endemic countries and based on current timing of measles vaccine, these vaccines will be co-administered.
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- Meningococcal A or

meningococcal vaccine – Currently there are no or very limited data on the co-administration with yellow fever vaccine. It is expected that yellow fever and meningococcal A doses will be administered at the same time. A study has been conducted but the results are currently pending.

- Other considerations:

increasingly used in the EPI and final doses in the series for these vaccines may coincide with yellow fever vaccine delivery. Malaria and dengue

Recommendations

- Currently available data suggest that there is minimal impact on the reactogenicity and immunogenicity when yellow fever vaccine is co-administered with other vaccines.
- Currently available data suggest that there is minimal impact on the reactogenicity and immunogenicity when yellow fever vaccine is co-administered with other vaccines.
- One notable exception is the co-administration of yellow fever vaccine and MMR vaccine in young children, where

Recommendations: Updates

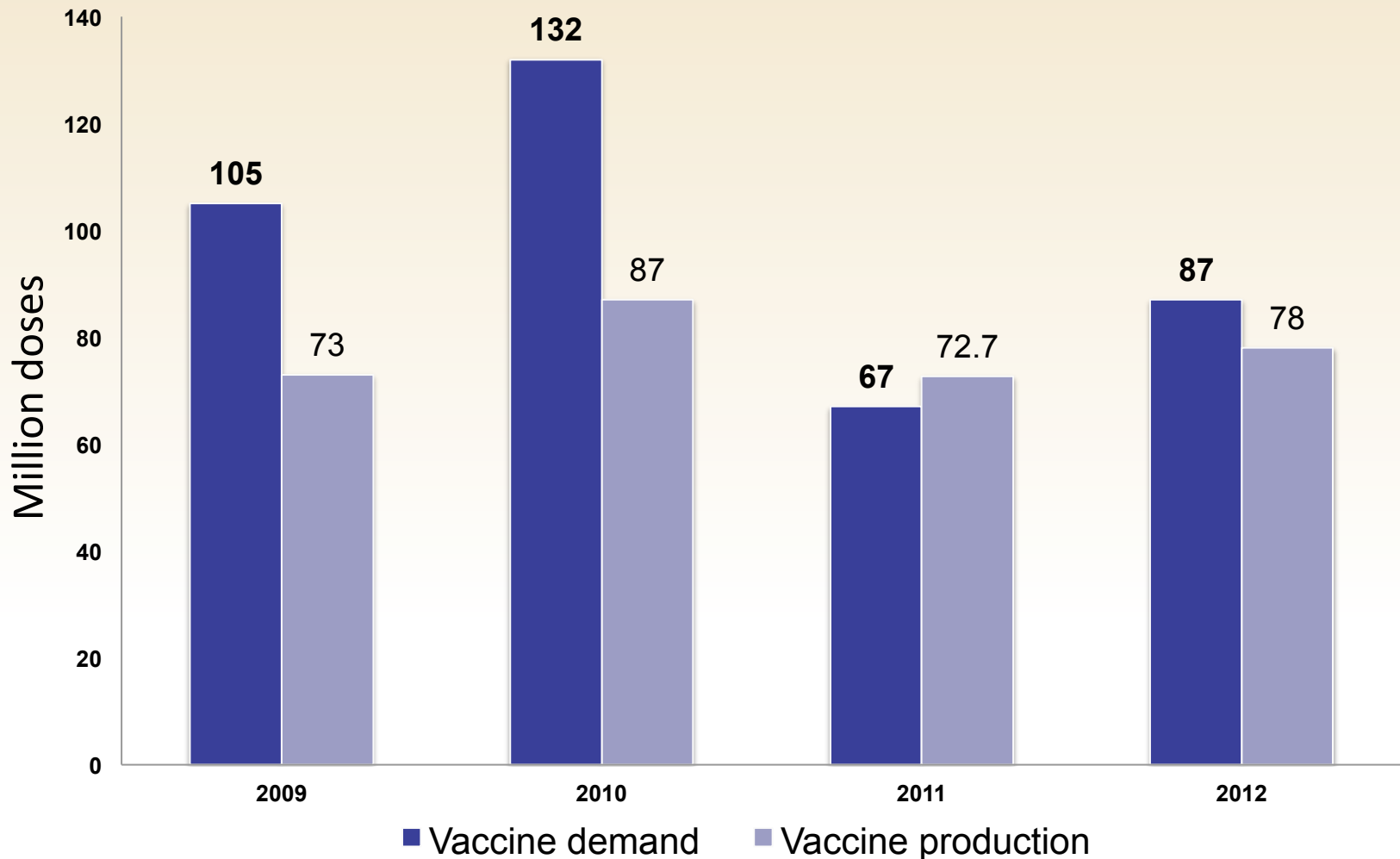
- Many of the studies on the use of YF vaccine with other live vaccine were conducted more than 30 years ago. Given the changes in manufacturing practices and potential variations in antigen loads, the vaccine data available may not be applicable
 - Many of the studies on the use of YF vaccine with other live vaccine were conducted more than 30 years ago. Given the changes in manufacturing practices and potential variations in antigen loads, the vaccine data available may not be applicable to current vaccines in use.
 - In addition to updating the YF recommendations, it was noted that some of the WHO website material lists vaccines which can be given with YF vaccine. It was suggested that this needs to be revised in combination with updating the recommendations.

Impact of vaccination strategies on the control of yellow fever

Key Findings: Impact of vaccination strategies on the control of yellow fever

- Data from yellow fever endemic countries support the combined use of yellow fever vaccine through EPI and mass vaccination campaigns as an effective approach to prevent yellow fever and control outbreaks of the disease.
- There is a continued need to improve and strengthen yellow fever disease surveillance and improve vaccination coverage.

Global vaccine demand and supply (millions of doses) *courtesy of WHO Global Alert and Response*



YF routine immunization in endemic countries in African region

- Routine YF immunization through EPI was recommended in 1998 by WHO and UNICEF as a cost effective strategy for YF disease control
- Requires several years of high level coverage to raise population immunity for prevention of YF outbreaks.
- Must be complemented with preventive mass campaigns for faster and broader coverage .
- By 2010, 24 of 34 YF endemic countries in Africa offered YF vaccine through the EPI.
- All YF at risk countries of West Africa, Nigeria excepted, have carried out mass preventive YF campaigns. Nigeria is preparing for GAVI support, a request to vaccinate 66 million people
- Countries that have conducted mass YF campaigns, must continue the use of YF vaccine in EPI programme.

YF outbreak control in Africa

- WHO & UNICEF introduced in 2006, combined strategy of inclusion of YF vaccine in EPI and implementation of YF vaccine preventive mass campaigns to reduce risk of YF outbreaks
- Eleven of the 12 targeted at high risk countries in West Africa have undergone recent YF vaccine preventive campaigns, with high vaccination coverage (>92%)
- No YF outbreaks in these areas; no urban outbreaks have been reported in areas where preventive YF or reactive mass campaigns have been conducted.
- Need to improve and strengthen surveillance for YF, with supporting high quality laboratory testing and good quality control.
- Need to maintain a vaccine stockpile to help control outbreaks in low vaccine coverage areas

Gambia – A success story

- In 1978 a YF outbreak was reported with 271 cases and 63 deaths. An estimation mentioned more than 8000 cases and 1700 deaths;
- A reactive mass campaign vaccination covered the whole country and a vaccine coverage > 95% was obtained.
- The EPI was introduced in 1979 for children > 9 months. In 2009, the coverage reported was 96%.
- No native cases were reported in The Gambia after 1978.
- Between 2003-2010, 86 suspected cases were reported by the surveillance system with a fever and jaundice syndrome. After laboratory investigation no case was laboratory confirmed for YF
- After 33 years of implementation, the epidemiological impact of this combined

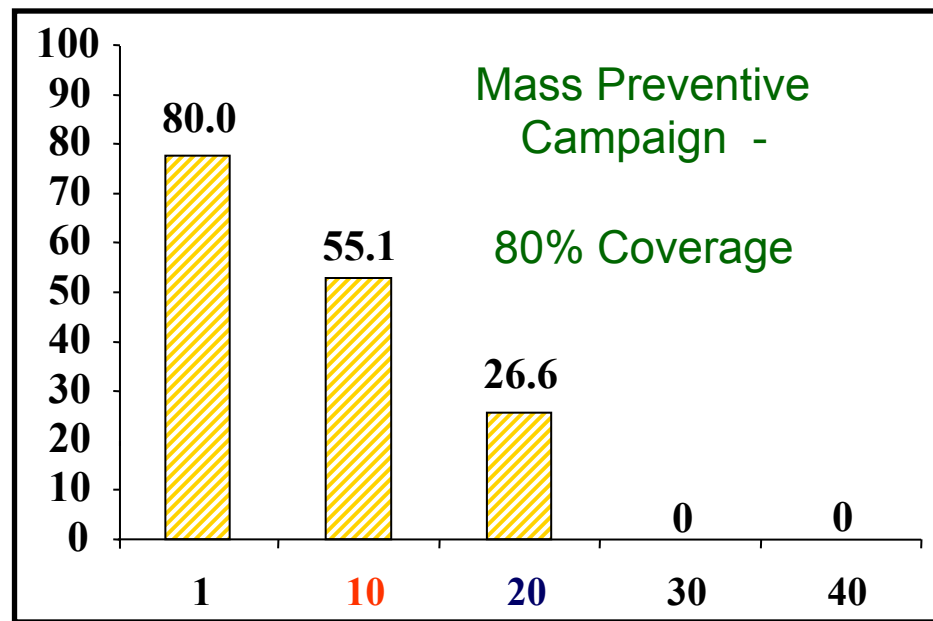
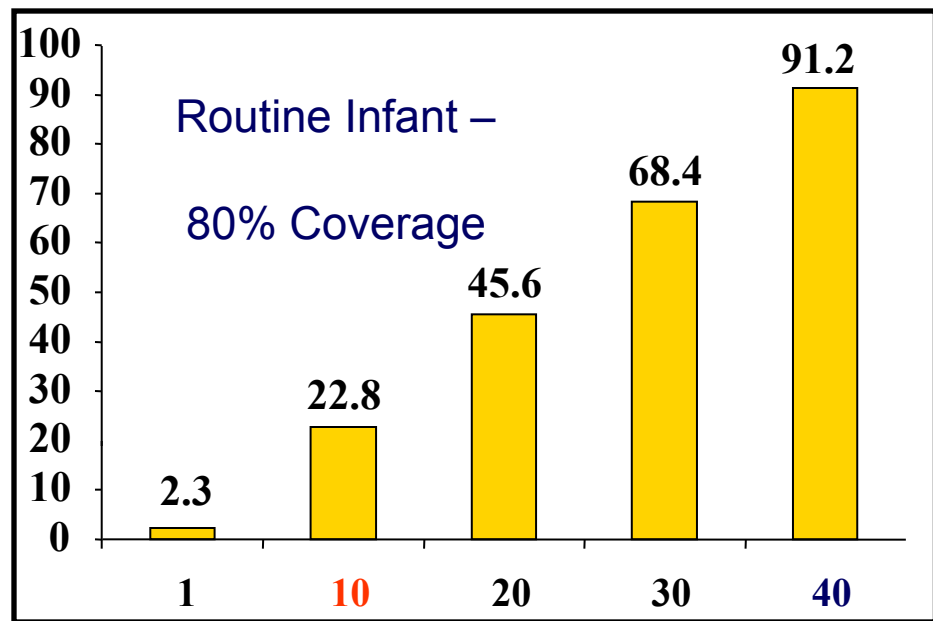
Impact of routine vaccination / outbreak control in the Americas

- 14 countries with YF enzootic areas
- PAHO Technical Advisory Group (TAG) recommends
 - Universal vaccination through the EPI in countries with enzootic areas
 - Non-enzootic areas
 - Vaccinate travelers to enzootic areas
 - Enhance surveillance for early case detection and outbreak response
 - Stockpile vaccine at national level.
- Some YF enzootic countries implement vaccination policies different from TAG
- Infant coverage 75%, declining due to vaccine shortage.

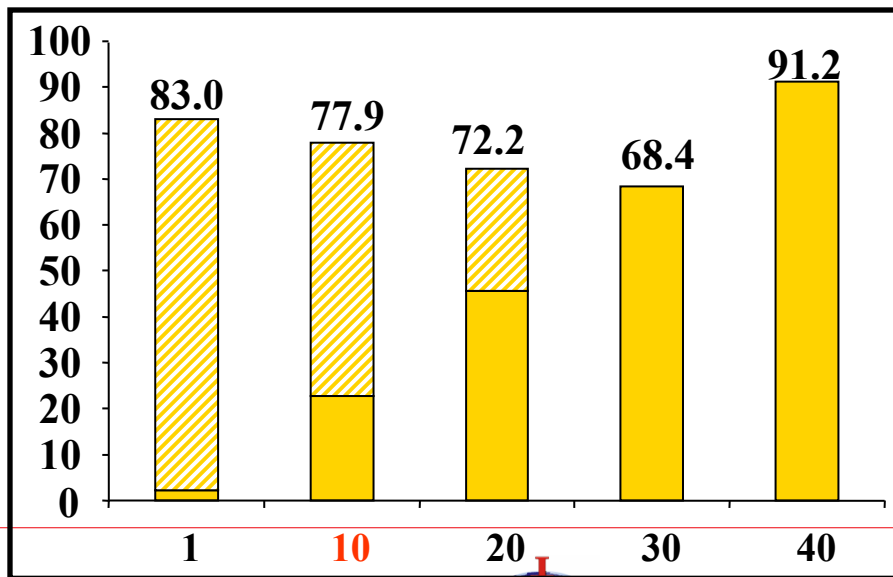
Impact of routine vaccination / outbreak control in the Americas

- YF vaccine is the most cost-effective tool for YF control in the Americas
- A comprehensive YF control program needs to combine good surveillance, high vaccination coverage, and an understanding of factors that drive population movements
- Risk assessments & serological studies needed to address the potential risk of re-urbanization of YF in the region.
- Vaccine supply issues are a major concern for this region.
- The Americas remain at risk for large urban YF outbreaks because of the expanded distribution of *Aedes* mosquitoes.

Estimated Impact of combination YF Prevention Strategies



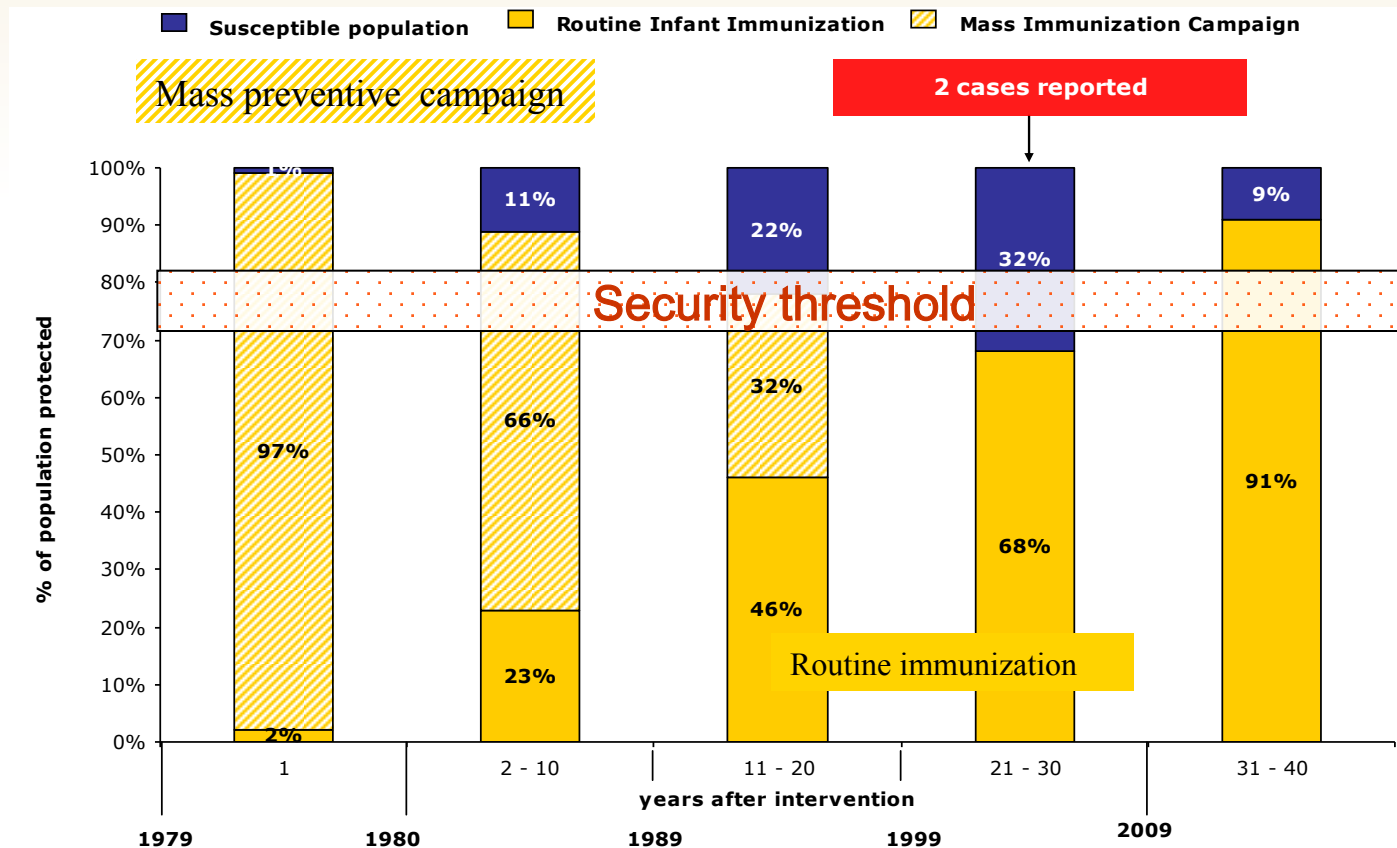
Percent of Population Protected



Combined Strategy :
Routine Infant Immunization (80%) + One Preventative Campaign

Combined vaccination strategy

- Sustained high EPI coverage with mass vaccination campaigns
Example of Gambia



Conclusions – Approach to YF vaccine delivery

- Need to define types of YF vaccination (e.g., routine, preventive, and outbreak control)
- Need to strengthen YF surveillance
- Outbreak control through vaccination is important
- Routine vaccination is cost effective
- Data from Gambia and South America support combined (routine and preventive) approach
- No outbreaks in areas receiving preventive campaigns
- Issues with vaccine supply and seed limitation should be noted
- Discuss route of administration
- Better cost data are need to help countries place each approach into context

Recommendations:

- Control strategy for yellow fever should include sound epidemiologic surveillance and delivery of yellow fever vaccine through a complementary and optimized combination of EPI and mass preventive campaigns.
- Reactive campaigns should be conducted in response to yellow fever outbreaks if there is inadequate vaccination coverage within the population.