

Roadmap to Immunity

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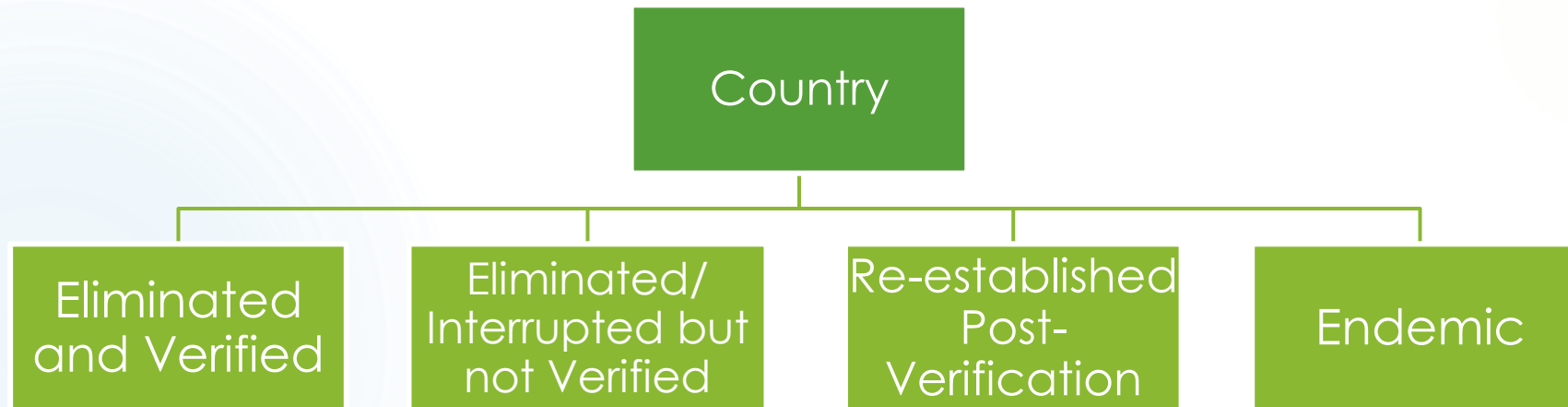
Decisions at Oct 2017 SAGE Meeting

- ▶ SAGE endorsed the 4 proposed country categories
 - ▶ provide a standardized approach to country categorization
 - ▶ encouraged their use by the Regional Verification Commissions
- ▶ SAGE noted that countries in the endemic category include countries at different levels of control
 - ▶ Further subcategories should be explored to facilitate development and implementation of strategies to improve vaccine coverage and increase population immunity

Decisions at Oct 2017 SAGE Meeting - 2

- ▶ Achieving “at least 95% immunity across all age groups, geographical regions, and population subgroups”
 - ▶ should remain the primary strategy of measles elimination”
 - ▶ countries should attempt to identify specific age-group and subpopulation groups with immunity gaps
 - ▶ “There is no perfect measure of immunity”
- ▶ SAGE requested for the SAGE MR WG to develop guidance on estimating age-specific immunity gaps

Country Categorization in relationship to Elimination



Summary of Progress Toward Elimination by WHO Region, 2017

WHO Region	Eliminated and Verified		Eliminated/Interrupted but not Verified		Re-established endemic		Endemic	
	No. of countries	%	No. of countries	%	No. of countries	%	No. of countries	%
Americas	Measles: 35 Rubella: 35	100 100						
Europe	Measles: 33 Rubella: 33	62 62	Measles: 7 Rubella: 4	13 8			Measles: 13 Rubella: 14	25 30
Western Pacific	Measles: 6 (2) Rubella: 2	22 6			Measles: 1	3	Measles: 29 Rubella: 35	78 94
South-East Asia	Measles: 2	18					Measles: 9	82
Eastern Mediterranean								
Africa								

Purpose of the “Roadmap to immunity”

- ▶ Getting countries on the right track by helping those in the endemic category to identify immunity gaps and priorities for control/elimination
- ▶ Countries need to prioritize activities according to their epidemiological profile reflecting the stage of their M/R program as well their capacity to implement the control/elimination strategies
 - ▶ The issues with immunity gaps generally arise during the transition from endemic to good control
 - ▶ Countries do not move from endemic status through to elimination status in a straight line, and it is not a simple process

Objectives

- ▶ To propose epidemiological groupings for endemic countries and activities that should be prioritized in each group to increase population immunity, prevent outbreaks and achieve elimination
- ▶ To review available data sources and analytical methods and describe their strengths and weaknesses for estimating age-specific immunity gaps

Methods – Part 1: Epidemiologic profiles and priority control strategies

- ▶ Review of existing guidelines and published papers
- ▶ Review epidemiology of country experiences and characteristics
- ▶ Consultation with the WHO regional staff
- ▶ Consultation with experts (expert opinions)

Results for Epidemiologic Profiles

- ▶ Endemic countries have widely varying epidemiologic profiles
 - ▶ Different short-term control and elimination goals.
- ▶ Three epidemiologic profiles
 - ▶ Low incidence of measles/rubella.
 - Irregular, infrequent outbreaks, temporally- (generally <12 months duration) or geographically-limited, predominantly adolescents/adults or children too young to be immunized.
 - ▶ Regular outbreaks that are contained. Majority of cases in children <15 years.
 - ▶ On-going, endemic transmission
 - ▶ Regular large-scale, long duration outbreaks even shortly after SIAs. Majority of cases in children <5 years (as adults were either vaccinated or had prior infection).
- ▶ Additional epidemiologic profile for rubella
 - ▶ For countries that have not introduced RCV, there is another specific sub-category.

Results for Epidemiologic Profiles

- ▶ Table 1:
 - ▶ General Epidemiological Profiles
 - ▶ General characteristics
 - ▶ Population Immunity
 - ▶ Programme Capacity
 - ▶ Outbreak response
 - ▶ Control/Elimination priorities
 - ▶ Control Strategies
 - ▶ Routine and SIA
 - ▶ Tools to assess immunity gaps

Results for Epidemiologic Profiles

General Epidemiology of Country Based on Triangulation of Surveillance and Coverage Data (all sources of each)	General Characteristics of Countries in this Category (assume spectrum across and within each category)			Control/Elimination Priorities	Control Strategies (see Table 3)		Tools to Assess Immunity Gaps (see tables 2a and 2b)
	Population Immunity	Programme Capacity	Outbreak Investigations		Routine/System Interventions	SIAs	

Methods – Part 2: Assessment of Age-Specific Immunity Gaps

- ▶ Data sources/analytic tools reviewed to estimate immunity gaps:
 - ▶ Case-based surveillance data
 - ▶ Outbreak investigations
 - ▶ Historical coverage data (administrative and WUENIC)
 - ▶ Population coverage surveys (including post-campaign, Multiple Indicator Cluster Surveys [MICS], Demographic and Health Surveys [DHS], etc.)
 - ▶ Serosurveys
 - ▶ WHO Measles Strategic Planning (MSP) tool and other excel-based tools,
 - ▶ Data triangulation
 - ▶ Mathematical modeling.

Methods – Part 2: Assessment of Age-Specific Immunity Gaps

- ▶ To gather evidence for the application of these methods we:
 - ▶ Conducted an internet search of guidelines and other documents from WHO headquarters and regional offices
 - ▶ Requested relevant materials from the measles and rubella focal persons at WHO regional offices
 - ▶ Reviewed manuscripts generated from a PubMed search using the terms *(measles OR rubella) AND ("immunity profile" OR "susceptibility" OR "herd immunity" OR "immunity gaps")*
 - ▶ Conducted targeted PubMed searches for additional manuscripts describing methods that were underrepresented in the first PubMed search results (e.g., *"rubella outbreak"*)

Results for assessment of age specific immunity gaps

- ▶ Provided a brief description and described the strengths and limitations of each data source (Table 2a) and analytic method (Table 2b)
 - ▶ Considered data quality, guidance that can be obtained, and implementation issues such as cost and feasibility
- ▶ Published examples of the use of each tool to identify gaps and the action taken to address these gaps (where available) are summarized in an appendix
- ▶ Challenging to provide simple guidance on when each tool should be used; highly dependent on individual country context and their data availability/quality

Data and data quality needs

- ▶ Need for better quality surveillance emphasized in the MTR
- ▶ In addition, the WG and others have recognized the need for
 - ▶ better quality coverage data (immunization information systems)
 - ▶ metrics to assess the quality of coverage data
- ▶ It is hard for any country to achieve elimination without good quality surveillance and coverage monitoring, and even harder to sustain elimination
- ▶ Where data quality allows, subnational approaches (SIAs, data assessments) are also needed especially as control increases.

Methods – Part 3: Interventions to address specific immunity gaps identified

- ▶ Review of existing guidelines and published papers
- ▶ Review epidemiology of country experiences and characteristics
- ▶ Consultation with the WHO regional staff
- ▶ Consultation with experts (expert opinions)
- ▶ Combination of two approaches should be considered:
 - ▶ Immediate
 - ▶ Long term

Specific Types/Causes of Immunity Gaps

- ▶ Age specific
 - ▶ Under 1 year
 - ▶ 1 to 5 years
 - ▶ Children ≥ 5 and adolescents
 - ▶ Adults
- ▶ Groups
 - ▶ Marginalized
 - ▶ Migrants
 - ▶ Refugees
- ▶ Location
 - ▶ Subnational
 - ▶ Geographical
- ▶ Immunization Systems issues
 - ▶ Lack of vaccine services (e.g., rural)
 - ▶ Due to invisibility (e.g., urban settings)
 - ▶ Stock outs
- ▶ Vaccine hesitancy

Examples of interventions for selected groups

Immunity Gap	Immediate Approach to Address Gap	Long-term Strategy to Avoid Accumulation of Susceptibles
Children ≥5 and adolescents	<ul style="list-style-type: none">- Conduct a high quality, wide-age range SIA (nationally or sub-nationally, depending on the extent of the identified gap; consider selective vaccination, consider school-based campaigns/strategies).	<ul style="list-style-type: none">- Identify and address the underlying reasons for the immunity gap.- Improve MRCV2# coverage and timeliness.- Implement school entry checks for elementary, high schools and universities.- Implement strategies to avoid missed opportunities for vaccination.
Populations not vaccinated due to "invisibility" to vaccination services (e.g., urban populations)	<ul style="list-style-type: none">- Conduct SIAs in low coverage areas; consider many types of vaccination sites/mobile teams, e.g., markets, transportation centers, work places.- Increase social mobilization, advocacy and communication (targeting diverse age groups).	<ul style="list-style-type: none">- Register new inhabitants with health services and include in target population for routine immunization.- Increase social mobilization, advocacy and communication about vaccination services.

Next steps

- ▶ Incorporate feedback received at SAGE
- ▶ Develop more directive algorithm for countries to assess their epidemiologic profile & specific immunity gaps and then take appropriate actions to address their weaknesses and gaps
- ▶ Continue to refine the tables from in-depth review and discussion with experts
- ▶ Work with the regions to identify groups of countries to further test the tool
- ▶ Further develop guidance for countries and regions on how to use this tool

Questions to SAGE

- ▶ Does SAGE agree with the approach taken for a roadmap to immunity?
- ▶ Does SAGE agree with the proposed next steps ?



Thank you!

Strengthening of RI Systems

23

- ▶ RI is critical for achieving the elimination goals:
 - ▶ $\geq 95\%$ coverage with 2 doses of MCV is needed
 - ▶ Central theme for M&R Initiative Strategic Plan (2012-2020) and ongoing activities
 - ▶ 2/3 of measles cases averted through RI (J. Inf Dis. 204, 2011)

- ▶ Studies demonstrate that *properly* planned SIAs can strengthening RI (E.g.):
 - ▶ Improve micro-planning, training and supervision of HCW
 - ▶ Improvement of CC, waste management system & injection-safety standards
 - ▶ strengthened AEFI surveillance

- ▶ MCV2 in the 2YL offers an ideal opportunity by:
 - ▶ fixing an immunization/health check contact during 2YL (e.g. growth monitoring, booster doses, Vit A)
 - ▶ catch-up vaccination for all missed vaccines

- ▶ Measles vaccination school entry checks can improve coverage of other VPDs.

- ▶ Measles Outbreaks as an indicators of weak RI:
 - ▶ Measles is highly infectious and seeks out susceptibles; disease is highly visible,
 - ▶ Outbreaks identifies gaps in RI programs and population groups missed by RI.

Results for Epidemiologic Profiles

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	Population Immunity	Programme Capacity	Outbreak Investigations		Routine/System Interventions	SIAs	
Low incidence of measles/rubella. Irregular, infrequent outbreaks, temporally- (generally <12 months duration) or geographically-limited, predominantly adolescents/adults or children too young to be immunized.	High population immunity, particularly among children; however, may have age or geographic immunity gaps resulting in occasional outbreaks.	Consistent high coverage (e.g. ≥90%) with both doses of MRCV†. Good demonstrated capacity to conduct high-quality campaigns. Highly sensitive surveillance systems.	Outbreaks are infrequent and irregular. Each outbreak investigation is well conducted including looking for the source and documenting the end of transmission. Investigations provide valuable information on immunity gaps in the population.	Elimination: Increase routine coverage with both doses to at least 95%; actively look for age-specific, sub-population and geographic immunity gaps and address them so that outbreaks are quickly contained.	Increase MRCV1* and MRCV2# coverage to ≥95% in all districts/areas and maintain this level of coverage. Set up country policy and establish vaccination of HCWs if not in place. Extend school entry checks to other entry points into education where feasible, e.g., high school, university, or college. Promote vaccination (and develop innovative strategies) for migrants/travelers. Gain political support.	May not be needed if coverage with both MRCV1* and MRCV2# are greater than 90% unless an immunity gap is identified. In that situation, SIAs will likely be targeted to the identified gaps rather than nationwide follow-up campaigns.	Triangulation of case-based surveillance data, vaccine coverage data (administrative, WUENIC, available coverage surveys), and outbreak assessments. Consider serosurveys or modeling to assess gaps that may be unidentified if there is very little circulating virus.