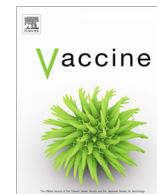


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Strengthening routine immunization through measles-rubella elimination

Robin J. Biellik^{a,*}, Walter A. Orenstein^b

^a Geneva, Switzerland

^b Emory Vaccine Center, Emory University School of Medicine, Atlanta, USA

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ABSTRACT

The 2016 mid-term review of the Global Measles-Rubella Strategic Plan 2012–20 for achieving measles-rubella elimination concluded that the full potential of strategies and activities to strengthen routine immunization (RI) service delivery had not been met. In December 2017, we contacted WHO and partner agency immunization staff in all six WHO Regions who identified 23 countries working on measles or rubella elimination that have implemented examples of recommended activities to improve RI, adapted to their needs. Among those examples, opportunities to strengthen RI through implementing supplementary immunization activities (SIAs) were reported most frequently, including advocacy for immunization and educational activities targeted at the public and skills training targeted at health professionals. The expansion of cold chain capacity to accommodate supplies required for SIAs facilitated widening RI service delivery to reach more communities, introduce new vaccines, and reduce the risk of vaccine stock-outs. Substantial numbers of under-vaccinated children, according to the national immunization schedule, have been identified during SIAs, but it is not possible to confirm whether these children actually received missing RI doses. Micro-planning exercises for SIAs have generated data that permitted the revision of catchment populations for fixed site and outreach RI services. Some countries reported using the opportunity afforded by measles/rubella elimination to strengthen overall vaccine-preventable disease surveillance and outbreak preparedness and to introduce mandatory school-entry vaccination requirements covering other vaccines in addition to measles and rubella. Unfortunately, we were unable to obtain information regarding the cost, impact or sustainability of these activities. The evaluation of the many other strategies that have been deployed in recent years to strengthen RI systems and raise vaccination coverage was beyond the scope of this survey. We conclude by providing recommendations to encourage more countries to adapt and implement a comprehensive set of RI-strengthening activities in association with the MR elimination goal.

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1. Background

Global experience has clearly demonstrated that, due to measles' extraordinary contagiousness leading to herd immunity thresholds of 92–94%, measles elimination can only be achieved in the presence of near-universal vaccination coverage with two doses of measles-containing vaccine (MCV) [1,2]. Full, equitable and sustainable routine immunization (RI) services are essential to achieve and sustain measles elimination. In countries using combined measles- and rubella-containing vaccines (MRCVs), rubella transmission should be interrupted even before measles transmission is interrupted, since rubella exhibits lesser conta-

giousness. The Measles-Rubella (MR) Global Strategic Plan 2012–2020 reconfirms that the achievement of regional and global MR goals requires robust and effective health and immunization systems, and that strengthening RI contributes to strengthening health systems [3]. Strategies and activities designed to achieve MR elimination offer multiple opportunities to strengthen RI service delivery, including raising vaccination coverage and closing gaps in the population immunity profile, strengthening vaccine-preventable disease (VPD) surveillance, increasing operational reach and efficiency, and rationalizing the use of resources.

The correct balance between RI service delivery and the implementation of the additional strategies required to eliminate VPDs such as measles and rubella has been debated *ad nauseam* for >50 years.

* Corresponding author at: Tranchepied 10, 1278 La Rippe, Switzerland.

E-mail address: rbiellik@gmail.com (R.J. Biellik).

Achieving this balance is context-specific. Studies show that in countries with strong health systems, the implementation of additional strategies, particularly SIAs, causes little or no disruption to RI service delivery, but where systems are chronically weak, difficulties may arise [4]. Staff may be temporarily diverted from health facility duties, causing postponement or cancellation of routine services; funds, cold chain equipment and/or vehicles may be temporarily reassigned; in some cases, staff incentives have been paid for additional strategies, but not for RI service delivery; and issues may arise related to data standardization and quality. It is therefore critical to take full advantage of the opportunities arising from VPD elimination to avoid these difficulties and strengthen RI services.

MR vaccination coverage through RI has stagnated in recent years [5]. From 2000 to 2016, estimated coverage with the first dose of measles-containing vaccine (MCV1) increased globally from 72% to 85%, although coverage has not increased since 2009 and there is significant variability in regional coverage. During 2000–2016, the number of countries providing a second dose of measles-containing vaccine (MCV2) nationally through RI services increased from 98 (51%) to 164 (85%). Estimated global MCV2 coverage steadily increased from 15% in 2000 to 64% in 2016.

During 2016, approximately 119 million persons received MCV during 33 supplementary immunization activities (SIAs)¹, implemented in 31 countries. Reported coverage was $\geq 95\%$ in 20 of 31 (61%) SIAs, but this was only confirmed by survey in 3 countries.

Consequently, the 2015 global measles control milestones were not met. With suboptimal MCV coverage, outbreaks continued to occur among susceptible individuals, including school-aged children and young adults. A mid-term review (MTR), conducted in 2016 and subsequently endorsed by the WHO Strategic Advisory Group of Experts on Immunization (SAGE), noted that current measles elimination strategies were sound but that implementation of the strategies needed improvement [6]. The MTR concluded that the full potential of using MR elimination activities to strengthen aspects of RI service delivery had not been met. Consequently, the MTR recommended that examples showing where a focus on MR elimination has led to building of the overall immunization system should be identified.

In response, the present survey was commissioned to document specific national examples from all six WHO Regions where MR elimination activities have contributed to strengthening aspects of RI service delivery. The goal is to encourage National Immunization Programme (NIP) managers to adopt similar strategies, as appropriate for their countries, and implement selected activities to strengthen RI service delivery.

2. Methodology

A letter was sent to WHO and partner agency immunization staff requesting them to provide a list of countries where, in their professional opinion, the implementation of activities associated with measles/rubella elimination had strengthened RI. WHO and partner agencies identified 25 countries where suitable examples were located. The same letter was then sent to key informants in those 25 countries, with follow-up by email, telephone and Skype, in order to secure a full description of the activities and, if

¹ Supplemental immunization activities (SIAs) generally are carried out using 2 target age ranges. An initial, nationwide catch-up SIA focuses on all children aged 9 months–14 years, usually regardless of prior vaccination status, with the goal of eliminating susceptibility to measles in the general population. Periodic follow-up SIAs then focus on all children born since the last SIA. Follow-up SIAs generally are conducted nationwide every 2–4 years and focus on children aged 9–59 months; their goal is to eliminate any measles susceptibility that has developed in recent birth cohorts and to protect children who did not respond to MCV1.

Table 1
Adapted GRISP categories of activities to strengthen RI through MR elimination.

Category	Activities
1	SIAs used to identify children unvaccinated or under-vaccinated with antigens other than measles and rubella
2	SIAs used to strengthen RI in other ways, e.g. social mobilization, health care worker (HCW) refresher training, additional resources for RI (e.g. cold chain), etc.
3	MR surveillance used to strengthen other VPD surveillance, identify high-risk communities, etc.
4	MR outbreak investigation used to strengthen RI, e.g. prioritize low coverage communities for antigens other than measles and rubella
5	Adoption of MR elimination goal used to close immunity gaps with antigens other than measles and rubella, e.g. through 2YL, MCV2 or RCV introduction, school entry requirements, adult vaccination, etc.
6	Expansion of HCWs' terms of reference specifically to include RI strengthening activities

available, quantitative or qualitative evidence of cost, impact and sustainability.

National examples were divided into six categories of recommended opportunities to strengthen RI through MR elimination activities adapted from the WHO Global Routine Immunization Strategic Plan (GRISP) [7] (Table 1). For each category, documentation provided describing the country strategies and activities was analysed and, where possible, conclusions were drawn highlighting those strategies and activities that have demonstrated impact and appear reproducible in multiple settings.

The survey identified a convenience sample of examples of recommended RI-strengthening activities in each WHO Region, but this set of examples should not be considered representative. Therefore, inter-regional and inter-category comparisons could not be made. Further research would be required to document the global scope of RI-strengthening activities associated with MR elimination.

3. Results: Country examples and experiences

From the 25 countries contacted, 31 examples from 23 countries (92%) from all six WHO Regions were reported in the survey, with supporting documentation (Table 2). Despite multiple reminders, two countries did not provide examples. No examples of how SIA or other MR elimination activities that may have weakened RI were reported in the current survey.

3.1. SIAs used to identify children unvaccinated or under-vaccinated with antigens other than measles and rubella

The WHO guidelines for planning, implementing and evaluating measles and measles-rubella SIAs in each WHO Region include guidance on multiple ways to utilize the opportunity of campaigns to identify unvaccinated or under-vaccinated children in order to complete their RI schedules [8]. Since 2000, dozens of countries have included these activities while implementing SIAs. In the current survey, countries reported that children missing RI doses were identified prior to SIAs during social mobilization and house-to-house (H2H) canvassing by health extension workers, Red Cross workers or community volunteers, e.g. in Indonesia [9], Liberia [10] and Namibia [11]. In other countries, children missing RI doses were identified during SIAs by reviewing home-based records (HBRs) at the time of receiving MCV, e.g. in Pakistan (at fixed sites only) [12]. In some cases, e.g. in Honduras [13] and the Lao People's Democratic Republic (PDR) [14], children who missed MCV during SIAs and those missing other RI doses were identified during rapid coverage monitoring (RCM) and post-SIA surveys.

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