Measles elimination in the WHO African Region: Progress and challenges

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SUMMARY—In 2001, countries in the African Region adopted the measles mortality reduction strategies recommended by the WHO and UNICEF. Following the significant reduction in measles cases and deaths with the implementation of the strategies, in 2011, the African Region adopted a measles elimination goal for 2020.

To assess progress, performance was reviewed using estimates of the first dose of measles vaccine in routine immunization (MCV1), the reported coverage for measles supplementary immunization activities (SIAs), as well as surveillance data. During 2011–2013, regional MCV1 coverage was stagnant at around 74%, while approximately 215 million children were reached in measles SIAs in 43 countries. Regional measles vaccination coverage has not increased and measles incidence has remained high in the past three years. Intensive efforts are required to ensure that routine immunization and SIAs provide high population immunity, and to increase the sensitivity of measles surveillance.

In September 2011, the 46 Member States of the WHO African Region adopted a measles elimination goal to be reached by the end of 2020 with the following targets:

- Measles incidence of less than 1 case per million population at national level;
- At least 95% measles immunization coverage at national level and in all districts;
- Minimum 95% coverage in all scheduled measles SIAs, and in outbreak response immunization activities;
- At least 80% of districts investigating one or more suspected measles cases within a year; and
- A non-measles febrile rash illness rate of at least 2 per 100,000 population at national level.

This article describes progress made by the end of 2013 towards the measles elimination goal in the African Region.

Methods

Immunization activities

The WHO and UNICEF recommended strategies for measles control and elimination include providing first dose of measles-containing vaccine (MCV1) at or shortly after 9 months of age through routine immunization (RI) and a second dose of measles vaccine (MCV2) through either RI or supplementary immunization activities. It is recommended that the second dose of measles vaccine provided through RI services is administered between 15–18 months of age. WHO and UNICEF use data from administrative records and surveys reported annually by Member States through the WHO-UNICEF Joint Reporting Form (JRF) to estimate vaccine coverage among children aged 1 year.

Supplementary immunization activities (SIAs)

Measles SIAs are often conducted as nationwide mass vaccination activities over a period of 5–7 days; however, some countries have conducted the SIAs in phases targeting a number of provinces to cover the whole country over a period of 2–3 years because of large populations, or resource constraints. Administrative coverage for MCV in SIAs at the subnational and national level is calculated by tallying the numbers of administered doses and dividing by the target population.

Surveillance

By the end of 2013, 43 of the 46 Member States in the African Region (excluding the Republic of South Sudan, which joined the African Region of the WHO in late 2013) were conducting intensive case-based surveillance for measles, supported by laboratory confirmation of suspected cases. Measles case-based surveillance is modelled upon the system of active...
surveillance established to support the polio eradication programme. It includes investigation of suspected measles cases along with the collection of blood specimens for laboratory confirmatory IgM testing. Specimens negative for measles IgM are tested for rubella IgM positivity. Suspected measles cases are confirmed based on the laboratory findings, the presence of epidemiological linkages or based on clinical criteria. The quality of surveillance performance is regularly monitored using standard performance monitoring indicators, and feedback provided to countries from the intercountry coordination level and from the African regional level.

The African regional measles laboratory network consists of 44 laboratories in 42 Member States, which are coordinated following the WHO Global Measles and Rubella Laboratory Network guidelines in order to standardize testing and quality assurance procedures. These laboratories undergo WHO accreditation reviews on a regular basis to ascertain their competence to correctly detect and promptly report confirmed measles cases and outbreaks. Technical or resource gaps identified during the accreditation reviews are corrected to maintain WHO set performance standards. The regional laboratory network additionally has three regional reference laboratories (RRLs) that support national laboratories to monitor serological quality assurance. The RRLs also support detection of circulating measles and rubella genotypes in the Region.

In addition to the case-based surveillance and laboratory data, which are shared with WHO on a weekly basis, countries also report annually the aggregate number of confirmed measles cases to the WHO through the WHO-UNICEF JRF.

### Results

The WHO-UNICEF coverage estimate for MCV1 in the African Region of the WHO was only 53% in 2000. However, by 2011 the coverage had increased to 74%, and was 73% in 2012 and 74% in 2013. The number of Member States with >90% MCV1 coverage was 15 (33%) across the three years (2011–2013). Thirteen of these countries have maintained this high coverage in the three successive years. See Table 1.

By the end of 2013, 15 (32%) member states had introduced a second dose of measles-containing vaccine (MCV2) into their routine vaccination schedules.

According to the WHO-UNICEF national vaccine coverage estimates for 2013, the DPT1-MCV1 dropout rate is 10.8% at regional level, and ranges from -13% in Kenya to 47.4% in South Sudan. Fourteen (29.7%) countries have DPT1-MCV1 dropout rates of less than 5% while 23 (48%) have dropout rates in excess of 10%.

Between 2011 and 2013 approximately 215 million children were vaccinated during 47 measles SIAs in 43 countries. Four of the follow up SIAs conducted in 2013 used measles-rubella vaccine targeting children from 9 months to 14 years of age. Of the 45 SIAs conducted between 2011 and 2013, 34 (74%) had ≥95% national level administrative coverage. Out of the 32 SIAs for which complete information is available, 6 (18.8%) had ≥95% MCV administrative coverage in all districts. Twenty-three of these 34 SIAs were evaluated with post-SIA coverage surveys, and 9 of the 21 with official reports available (43%) had coverage of 95% or more as estimated by the survey, while 15 (71.4%) had coverage of at least 90%. One or more additional antigen or child health intervention was integrated with the measles vaccination in 40 (85%) SIAs conducted between 2011 and 2013.

During 2011–2013, 43 (93%) Member States regularly reported measles case-based surveillance data and all reported annually the number of measles cases through the JRF. In 2011, 16 (37%) countries met the targets for surveillance performance. In 2012 and 2013, 22 (48%) and 20 (44%) countries respectively, met both targets for the two principal surveillance performance indicators, i.e. ≥2 cases of non-measles febrile rash illness per 100 000 population and ≥1 suspected measles cases investigated with
According to the measles case-based surveillance database, there were 43,155 confirmed measles cases in 2011 (giving an incidence rate of 55.8 per million population) and this number increased to 69,910 in 2013, with a confirmed measles incidence of 76.9 per million population. In 2013, 17 (40%) of the 43 countries in the case-based surveillance network had a confirmed measles incidence rate of less than 1 per million population, while 23 (53%) had incidence less than 5 cases per million population (see Table 2).11 The predominant strain of measles virus circulating in the Region is the B3 strain.

The total number of measles cases reported from countries in the Region through the JRF was 520,102 in 2000. However by 2011 it had declined to 195,620, while 108,004 confirmed cases were reported in 2012, and 83,613 cases reported in 2013. In 2013, Nigeria accounted for 63% of all reported cases of measles (see Figure 1).12

Figure 1. Number of officially reported measles cases and WHO-UNICEF coverage MCV1 estimates for the African Region, 2000–2013

Discussion

Despite substantial progress and the dramatic reduction in estimated measles mortality during this period, outbreaks of measles continue to occur. From 2011 to 2013, large outbreaks occurred in Angola, Burkina Faso, Chad, Democratic Republic of the Congo, Ethiopia, Nigeria and Zambia. Outbreak investigation activities done in these countries indicated that the principal factors contributing to the occurrence of the outbreaks included the accumulation of susceptible older children and adolescents, and the gaps in reaching all children with two doses of measles vaccine at national and subnational levels through routine vaccination or periodic follow-up SIAs.14

Despite a significant increase in the MCV1 coverage levels between 2000 and 2013, it is noted that regional coverage levels have not increased in the past three years. The same observation is noted in the number of countries that have attained at least 90% coverage with MCV1 according to WHO-UNICEF estimates. This is probably related to the infrastructural and resource challenges that countries face in order to scale up the MCV coverage in routine immunization.

The fact that nearly half of the countries have DPT1-MCV1 coverage dropout rates in excess of 10% indicates that there is much scope for the improvement of services and coverage to reach the unreached children without geographic access being a major constraint. The negative dropouts between DPT1 and MCV1 doses documented in a few countries indicate that more children...
The proportion of countries that have managed to attain the target of 95% SIAs coverage at national and district levels remains quite low. This may be related to the challenge of inaccurate denominators in some countries. Furthermore, the results from post-campaign surveys also indicated that only 43% of the campaigns had reached 95% coverage at national level, thus calling for more efforts to improve the quality of SIAs.

An increasing number of countries meet the targets for the two principal case-based surveillance performance indicators between the years 2011 and 2013. These indicators measure the geographic spread of the surveillance activities and the sensitivity of the surveillance system to detect cases. In the countries that have failed to meet the surveillance performance targets, this is an indication that their surveillance is not sensitive enough to rapidly detect and respond to cases and outbreaks. As countries progress towards the elimination goal, and the number of measles cases decreases, the sensitivity of the surveillance system needs to be very high in order to ensure that even a small number of measles cases are detected timely and that actions are taken to break the chains of transmission. The discrepancy in the number of reported measles cases between the case-based surveillance system and the summary aggregate reporting through the JRF, which is significant in about a quarter of the countries, is indicative of the need to ensure that all suspected cases are reported and appropriately investigated.

The shift in the epidemiological susceptibility to measles towards the older age groups is seen in many countries and requires appropriate programmatic response, in the form of wide age range follow up SIAs targeting the age groups in which the majority of measles cases are occurring. The conduct of wide age range measles-rubella SIAs will help to address the immunity gap to measles and rubella in school age children.

Conclusions

The implementation of the recommended strategies has resulted in a marked decrease in measles cases and estimated measles deaths in the region as compared with 2000. However, at regional level, the performance, as measured by the measles vaccination coverage as well as the incidence levels, is still far from the targets required for its elimination, and the pace of progress in the past three years has been very slow.

Intensified efforts are required to ensure that MCV coverage in routine immunization and SIAs attains high levels of population immunity in order to reach the elimination targets. The tailoring of measles SIAs to target the appropriate age groups where measles virus circulation is intensive will have to be based on national measles epidemiological data, thus re-emphasizing the issue of the quality of the surveillance performance and surveillance data.

Countries need to strengthen their leadership and ownership of the measles elimination activities. In addition, implementing partners, donors and countries should mobilize adequate resources to fully implement the strategies. GAVI Alliance funding to support the introduction of the rubella vaccine through wide age range measles-rubella vaccination campaigns is an opportunity to reinforce the implementation of the measles elimination strategies.

References

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