

Research Article

Is Immunization Coverage in Africa Slipping? An Evaluation of Regional Progress to 2013

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Abstract

From a virtual absence of routine infant immunization in the 1970s to their current state, national immunization programmes in Africa have come a very long way. This article describes an independent evaluation process undertaken to assess whether countries in the African Region had, by 2013, reached various strategic goals set by WHO. The last decade has seen remarkable progress. Yet, there is a paradox. While the investment in immunization in the region has been considerable, the evaluation found that routine coverage has not increased significantly beyond the level of 80%, a level at which it seems to have stalled. Indeed, some countries are slipping backwards. Even though progress has been documented in many facets of the regional programme, routine immunization coverage has stalled and, in some countries, begun to fall. We conclude that failure to immunize should not be blamed on communities or any of their members: it is a failure of the public health system and should be responded to as such. As the region looks to the Decade of Vaccines for new inspiration and direction, this article looks at some possible explanations for the current situation and suggests strategic directions for change.

INTRODUCTION

Improved access to and utilization of routine immunization services have long been considered the backbone for the prevention and control of vaccine preventable diseases. Nevertheless, due to Africa's unique regional context - economic, geo-political and ecological - immunization programmes face particular challenges and obstacles that are unmatched anywhere else in the world. Since the inception of the Expanded Programme on Immunization (EPI) in 1974, six traditional antigens were initially promoted by the World Health Organization (WHO) and introduced widely in the routine immunization schedule of African countries. Immunization coverage was successfully increased in the region during the Universal Childhood Immunization (UCI) decade of the 1980s from less than 20% to around 57%, only to see it stall or even decline in the 1990s after support for UCI stopped. With the ending of the Cold War, major donors to immunization reduced or suspended their funding, leaving countries unprepared to step in with domestic resources.

Achieving and maintaining high immunization coverage is a complex task, requiring participation of the community, a trained and motivated workforce, a functioning logistics system,

supervision of staff, surveillance and monitoring, a reliable supply of quality vaccines, an adequate budget, and appropriate and stable leadership and governance at all levels. Also needed is the actual implementation and prioritization of national political commitment to improving child health. Through global efforts to support health systems in developing countries, and especially through the support of the Global Alliance for Vaccines and Immunization (GAVI) to strengthening immunization systems, efforts have recently been made to strengthen national immunization programmes and introduce new and under-utilized vaccines. According to coverage data from country administrative reports or from the WHO/UNICEF estimates, the routine immunization performance in the WHO African Region has showed continuing and steady progress during the last decade for the majority of antigens delivered through the routine immunization system (Figure 1). Significantly, immunization services have been enriched by the inclusion of vaccines against hepatitis B and Haemophilus influenzae type B (Hib).

At the request of the WHO Regional Office for Africa (AFRO), an end-term evaluation of the Regional Immunization Strategic Plan 2009-2013 was carried out. The aim of this article is to share widely the key findings and most salient recommendations

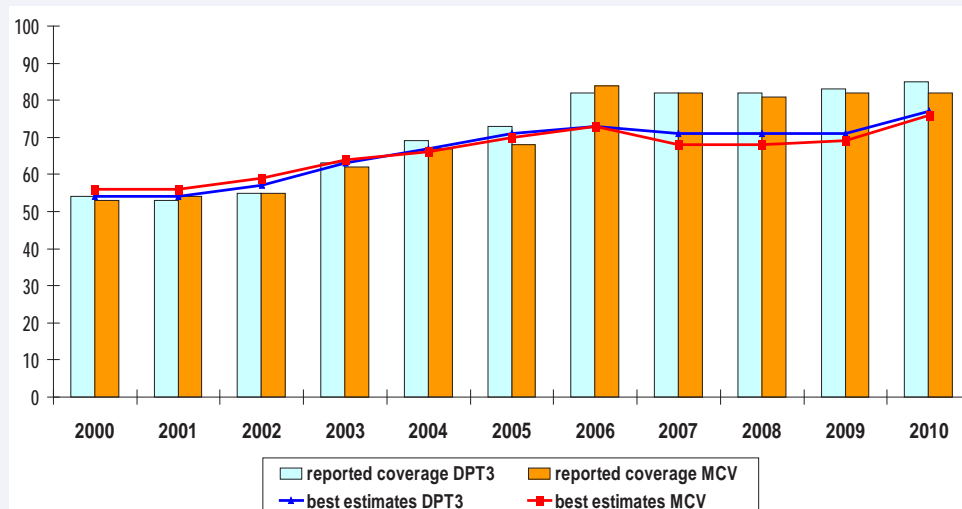


Figure 1 DTP3/MCV1 coverage for the African Region, by reported coverage and by WHO-UNICEF best estimates, 2000-2010. MCV1 – Measles-containing vaccine first dose, DTP3 – third dose of vaccine containing diphtheria toxoid, tetanus toxoid and pertussis antigens.

arising from this evaluation. It draws attention to adverse trends in routine immunization coverage regionally and in specific countries, several of which host large, incompletely immunized or unimmunized, infant populations.

METHOD

A team of external experts performed an end-term evaluation for the WHO's African Regional Immunization Strategic Plan 2009-2013. The Terms of Reference for this evaluation included: a review of the level of achievements against set targets; a critical evaluation and documentation of progress achieved in specific strategic components of the plan; an assessment of the accomplishments of the WHO's AFRO with regard to the support it extended to countries towards immunization system strengthening; and the adequacy and coordination of technical and financial support by other stakeholders to the implementation of the Strategic Plan. In addition, the evaluation team was asked to make specific recommendations in support of the formulation of the next Regional Immunization Strategic Plan, 2014-2020 [1]. Importantly, this new plan will give the African Region the opportunity to harmonize its upcoming strategic approach to immunization and the Global Vaccine Action Plan of the Decade of Vaccine that AFRO has contributed to design and promote. The evaluation team membership consisted of four independent consultants, while additional members represented the Bill and Melinda Gates Foundations, the GAVI Alliance, the Mother and Child Health Integrated Programme (MCHIP), The United States Centers for Disease Control and Prevention (US CDC), UNICEF and USAID.

The evaluation process spanned a two-week period in June, 2013 and combined a desk review of documents and a series of presentations by staff of the Immunization and Vaccines Division (IVD) working at the Regional Office as well as by members of IVD/Polio inter-country and country teams and others working in related AFRO departments. When necessary, additional interviews were held with selected staff outside the main meeting. Two teleconferences with WHO staff posted at

the WHO Headquarters in Geneva and three teleconferences with members of IVD inter-country teams created additional opportunities for the evaluation team to hear the perspectives and concerns of staff assigned outside the Regional Office. Documents reviewed included summary reports generated by each national immunization programme, as well as internal WHO documents written by regional focal points for each aspect of the programme.

The first week was essentially devoted to the presentation to the evaluation team of discrete components of the regional strategy by WHO staff. Each topical presentation was followed by an active discussion around the meaning and value of the information presented to the visiting team. Data from the WHO/UNICEF Joint Reporting Form, special surveys, and information supplied by member countries were assembled analyzed and summarized with relevance to the evaluation objectives. The following days were set aside to analyze and compile the information accumulated during the first week and to consolidate a report.

RESULTS

When the accumulated data were compared against the targets set in the strategic plan, it became evident that none of these targets had been reached. Trends in immunization coverage were measured and monitored against strategic targets on the basis of figures reported by UNICEF and WHO through the Joint Reporting Form. Country administrative data were analysed along with the WHO/UNICEF best estimates. However, looking at the available WHO/UNICEF estimated data for the period 2009-2011 [2], the DTP-3 coverage at regional level was ten points lower than the reported administrative data, raising the question of data quality at national level.

Among targets that were not attained at the end of the review period was the planned elimination of wild poliovirus (WPV) from the region, although the number of countries in the African Region that reported WPV transmission plummeted from

19 in 2010 to only 2 by July 2013. Unmet targets also included projected coverage levels of yellow fever and tetanus toxoid (TT) vaccines.

Another failed target that was particularly noticeable was the proportion of countries with at least 80% DTP-3 coverage in all districts, an indicator of equity in the use of immunization services (Table 1) - this indicator revealed only 2% incremental progress. The proportion of countries that attained a minimum of 80% TT-2 coverage nationally among women of childbearing age fell from a low 14/46 (31%) countries in 2009 to 11/46 (24%) in 2013.

Despite some improvement in immunization coverage levels in several countries in 2009-2012, considerable disparities were observed between and within countries. While the region as a whole showed faltering coverage levels (Figure 2), the individual countries that showed a significant decrease in coverage included Central African Republic, Republic of Congo, Equatorial Guinea, Lesotho, Uganda, Zambia, Burkina Faso, Ghana, Nigeria and Senegal. Remaining countries showed modest increases or remained the same. This is of great concern, as the African Region contains a large proportion of the world's unimmunized children. In 2011, out of a total annual cohort of some 29 million infants who survived to their first birthday in the African Region, 8.4 million [3] had not received their third dose of DTP compared

to 7.4 million in 2010. The majority of these children (more than 80%) were located in only ten countries (Figure 3). It was also a surprise that the Region, which was doing so well earlier in the decade, should start to lose traction. This was against a backdrop of a rekindled commitment to immunization expressed by all states in international forums, larger budgets dedicated to this service area, lower cost of basic vaccines and greater focus on logistical and human resources than ever before. The reasons for this are not self-evident.

In contrast, measles control has been among the major public health success stories in the African Region. Figure 4 shows the remarkable success of the vaccine in helping to control the disease. As a direct result of the accelerated disease control activities launched in 2001, coverage-based modelling suggested an 89% reduction in measles mortality by the end of 2009 as compared to the estimates for 2000, thanks to intensified immunization campaigns and improvements in routine coverage. However the first dose of measles-containing vaccine (MCV-1) coverage has stagnated over the last 3-4 years (Figure 4), leaving important immunization gaps in many countries. This has resulted in a resurgence of the disease that was previously under control in some parts of the region. This situation has led to a failure to meet the regional measles pre-elimination targets.

1. The WHO African Region traditionally consisted of 46

Table 1: Number (proportion) of countries* attaining targets set in the 2009-2013 strategic plan.

Indicator	Target by end-2012	Attained in 2009	Attained in 2010	Attained in 2011	Attained in 2012
Reported DTP-3 coverage for the Region		83	84	82	81
Proportion of countries with 90% DPT3-containing vaccine coverage at national level	80%	19/46 (41%)	21/46 (46%)	22/46 (48%)	24/46 (52%)
Proportion of countries with 90% measles vaccine coverage at national level	80%	17/46 (37%)	19/46 (41%)	21/46 (46%)	20/46 (43%)
Proportion of countries with at least 80% DPT-3-containing vaccine coverage in all districts	75%	7/46 (15%)	8/46 (17%)	8/46 (17%)	8/46 (17%)
Proportion of countries that have DPT-1 - measles dropout rates below 10%	40%	25/46 (54%)	24/46 (52%)	20/46 (43%)	22/46 (48%)
Number of countries with budget lines for EPI in their national budgets	46	38/46 (83%)	44/46 (96%)	43/46 (93%)	44/46 (96%)
Proportion of countries with minimum of 80% TT2+ national level coverage among pregnant women	80%	14/46 (30%)	16/46 (35%)	14/46 (30%)	11/46 (24%)
Proportion of countries at high risk that have routine yellow fever immunization coverage of at least 90% at the national level	80%	8/24 (33%)	6/24 (25%)	7/24 (29%)	6/24 (25%)
Proportion of countries that have incorporated an immunization component in their national health promotion and communication plans	100%	44/46 (96%)	44/46 (96%)	43/46 (93%)	44/46 (96%)
Proportion of countries that have functional Inter Agency Coordination Committees (ICC) or equivalent coordinating mechanisms for immunization	100%	39/46 (85%)	39/46 (85%)	39/46 (85%)	39/46 (85%)
Proportion of countries that have integrated other interventions into routine immunization and SIA sessions for target populations	70%	36/46: (78%)	35/46: (76%)	38/46 (83%)	38/46 (83%)

*The WHO African Region traditionally consisted of 46 member countries. Since 2013, South Sudan has been added, making 47.

Source: Joint Reporting Form data as supplied by countries.

Abbreviations: EPI: Expanded Programme on Immunization; WHO: World Health Organization; AFRO: African Regional Office; UNICEF: United Nations Children's Fund; DTP: Diphtheria-Tetanus-Pertussis Vaccine; MCV: Measles-Containing Vaccine; SIA: Supplementary Immunization Activities; ICC: Inter Agency Coordination Committee; BCG: Bacillus Calmette Guérin Vaccine; OPV: Oral Polio Vaccine

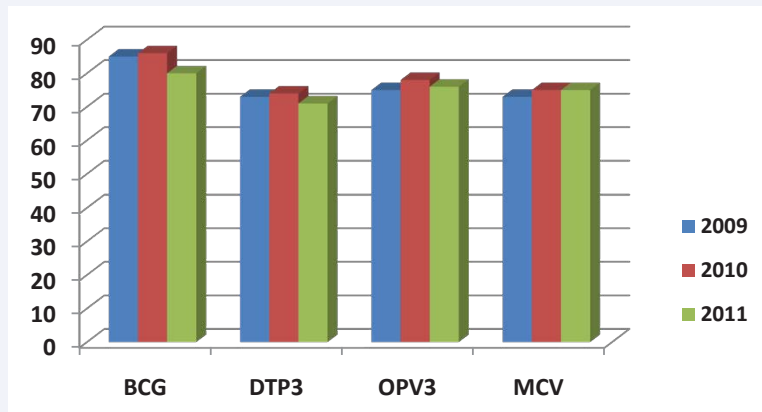


Figure 2 African Regional coverage of four antigens 2009-2011 (Source: WHO/UNICEF).

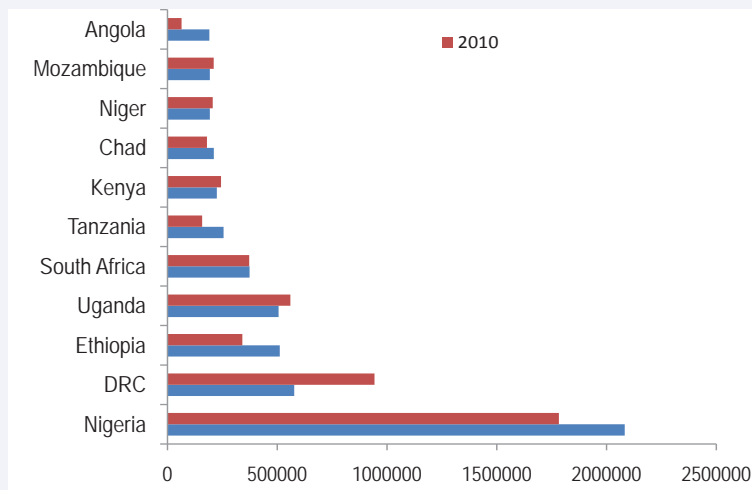


Figure 3 Countries where the unimmunized are in the WHO African Region, 2009-2010.

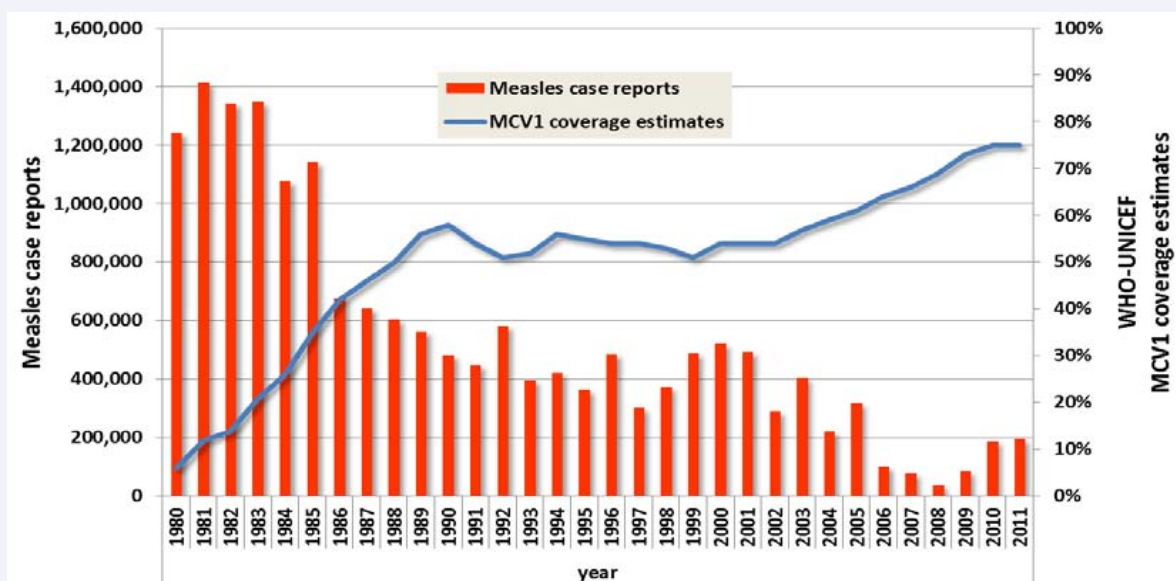


Figure 4 Measles cases and MCV-1 coverage 1980-2011 in WHO African Region (Source: WHO/UNICEF data).
 MCV1 – Measles containing vaccine first dose

member countries. Since 2013, South Sudan has been added, making 47.

In 2009, the WHO Regional Office identified five (the “Big Five”) priority countries (Chad, Democratic Republic of the Congo, Ethiopia, Nigeria and Uganda) and devoted special attention and support to them. The main performance problems identified in these priority countries are reported as being related to health systems issues. As Nigeria represents by far the largest annual cohort of infants as well as unimmunized infants, it is important to understand reasons for under-performance, as a step towards practical solutions. The inter-country WHO team identified as of particular importance fragmentation of planning and leadership, limited service delivery points and outreach sites, inadequate availability of vaccines and cold storage capacity at all levels, lack of funding for vaccine distribution at the most peripheral levels, weak capacity of health workers at all levels, ineffective use and interpretation of data to redirect the programme, and security constraints. On the other hand, another of the “Big Five” is DR Congo whose problems include lack of trained personnel (newly engaged and already in place), problems with the cold chain and logistics systems (recurrent shortages of essential commodities including vaccines, high proportion of equipment failure, insufficient storage capacity at central and intermediate levels), low reliability of the collection, management and use of data for action, and weak communication strategies at all levels. These two examples raise the question “*Is there a common reason for slippage?*” The problems are clearly multi-faceted and reflect issues related to dysfunctions within the health system. Such systemic problems do not have quick fixes.

A number of new vaccines have been or are being introduced. Between 2010 and 2012, more than 100 million people in ten countries received a dose of newly formulated Meningitis A conjugate vaccine (MenAfriVac™) specially designed for the African meningitis belt (i.e. mostly countries of the sub-Saharan Sahel) [4]. The campaign resulted in a dramatic reduction in type A meningococcal meningitis, signalling one of the most exciting achievements in vaccine development and immunization in this decade. The introduction of pneumococcal vaccines (PCV13 and PCV10) has been confronted with issues of vaccine availability and vaccine selection by countries. Nevertheless, as of the end of May 2013, PCV had been introduced in 22 countries [5,6], although the uptake was slower than expected. Since 2012, Rotavirus vaccine (RV) has been rolled out in 6 countries [7]. Because the vaccine targets adolescent girls (9-13 years), delivery of human papilloma virus vaccine (HPV) represents a major challenge to national immunization programmes [8]. Several countries (Cameroon, Uganda, Ghana, Senegal and Tanzania) have undertaken pilot projects. Only two countries (Rwanda and Lesotho) have initiated a nation-wide roll-out.

The polio eradication initiative (PEI) has not been discussed here – it deserves a fuller account than there is space for [9,10]. Few studies have focused on PEI’s impact in Africa and they have tended to be observational and anecdotal rather than evidence-based. The actual impact of PEI on EPI has yet to be fully documented. Suffice it to say, the initiative has had some positive and some negative effects on routine immunization in the region.

DISCUSSION

While it is important to uphold targets as critical references against which programmes should be held accountable, a failure to reach the targets may not indicate programme failure *per se*. There may be several reasons for missed targets: either (a) there was insufficient progress in the five years under evaluation; (b) the targets had been too ambitiously set; (c) data quality was sub-optimal; or (d) a mixture of the above. This article examines some of the most significant successes and failures of the programme and their underlying causes.

When combined with an analysis of individual country-level coverage, it is clear that progress in routine immunization in the region has not been as satisfactory as had been hoped. Indeed there are signs of a faltering in many countries that is reflected in the numerous targets that are far from achieved.

Assuming conditions in two of the Big Five countries are fairly typical, there is no one single element that has resulted in stagnation or decline of coverage across the region. Clearly each country needs to evaluate its own particular situation and assemble a list of priority problems that need solving.

However, it is identifying and reaching the last 20% of children that represents the greatest challenge for countries in the Region now. There is no doubt that the Reaching Every District (RED) strategy that has been in use for a number of years has helped [11,12]. This has been particularly useful for districts that were known to contain large pools of unimmunized children. However, it is no longer enough to identify the district; rather, it is essential to be able to identify the individual child – “reaching every child”. This will require a considerable effort to implement. As services are pressed to reach wider age groups with new vaccines or additional doses of existing vaccines, new strategies will be needed beyond targeting the under-ones. The scope of routine immunization has changed - it is no longer the delivery of just six antigens as it was in the 1980s. The national schedule now contains many more vaccines, and more are in the pipeline. The very concept of “routine immunization” is changing and expanding. There is now an urgent need to increase its scope, both in terms of antigens and the diversity of targeted age groups [13].

Strengthening immunization system performance and monitoring, as part of a functioning health system is the foundation to achieve and sustain coverage targets, sustainably reduce disease and mortality, and successfully introduce new vaccines. Yet, despite their relative maturity, immunization programmes in many African countries have become fragile even as they face new challenges. Many of the shortcomings of immunization can be related to changes in the political landscape, management issues, insufficient use of information for decision-making and impact monitoring, weaknesses in human resources, shortcomings in procurement, supply and logistics, and perfunctory financial management. These failings can undermine sustained country commitment, transparent accountability and the attainment of self-reliance.

The results of this evaluation offer a stimulus to look at new, perhaps radical ways to do things and to think about problems. The transition from the Global Immunization Vision and Strategy

(which inspired the formulation of the 2009-2013 Strategic Plan), to the Global Action Plan [14] for the decade will require several strategic adjustments, of which three will be highlighted here.

From offer-driven to demand-driven

Until now, the delivery of immunization services has been driven by offers of vaccines to communities. Awareness of the right to receive vaccines needs to be enhanced so that immunization services become driven by informed demand, with even greater emphasis on micro-planning.

From globally-driven immunization agendas to national ownership

The Decade of Vaccine [14] is an opportunity for countries to bolster national self-reliance and partnerships. In many countries there is a growing perception of immunization as being principally driven by global agendas on which they have limited control. As a result, national ownership of these initiatives is weak and self-reliance in decision-making falters.

From a single stream programme to an integrated health system

Until recently, integration within AFRO has mostly been about the “piggyback” approach, that is, looking for what primary health element can ride on the back of another without having them both collapse [15]. However, true integration probably involves a much more complex process. Ultimately, the national immunization programme should move away from its current vertical structure towards inclusion in a broader-based disease prevention and control approach.

CONCLUSIONS

The immunization programme in the WHO African Region has come a very long way in the last thirty years. Yet there is a paradox. While the investment in immunization in the region has been considerable, routine coverage has not increased significantly beyond the level of 80%, a level at which it seems to have stalled over the last ten years. The reasons for this faltering are varied and differ between countries. But looking at the whole picture, it is clear that systems need to be re-organized to bring immunization closer to other elements of primary health care. Contacts between health care providers and families must become more frequent and inclusive. Health staff needs to be retrained to provide the population they care for with a bundle of prevention and care services that meet their needs. Most importantly, health staff has to act as agents of change, stimulating members of communities to seek health services, in particular immunization, as an entitlement—in fact as a human right - and not as a favour.

These challenges will test countries to the utmost, not least through the scarcity of resources. As if this were not enough, towards the end of 2014, immunization services were brought to a halt in some West African countries as a result the Ebola fever outbreak [16]. All countries and partners in immunization believe that African children deserve the protection afforded by vaccines. And to make the best use of available vaccines requires a renewed emphasis and prioritization of routine immunization services - the platform on which other immunization activities can be mounted.

The over-arching conclusion of this evaluation is that even if progress has been documented in many facets of the regional programme, routine immunization coverage has stalled and, in some countries, begun to fall. Failure to immunize is not to be blamed on communities or any of their members: it is a failure of the public health system and should be responded to as such.

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