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Editorial

Immunization in the African Region

Vaccination has been lauded as one of the greatest public health achievements. Smallpox, a human disease, and rinderpest, which affects livestock, were eliminated through vaccination. Currently, several vaccines are given to children and adolescents to prevent a number of childhood diseases, including pneumonia, diarrhoea and measles. There has been a steady rise in immunization coverage over the years and vaccines have become available to many communities and populations, especially deprived communities in the countries of the WHO African Region. There has also been significant progress in the introduction of several new vaccines, including pneumococcal conjugate vaccine (PCV), rotavirus and conjugate meningitis vaccines in the Region. The impact of these new vaccines is being felt. There has been a dramatic decline in the incidence of meningitis due to *Neisseria meningitidis* serotype A and the Region is on course towards the elimination of meningococcal meningitis A epidemics.

Linked to immunization are the eradication, elimination and control of vaccine-preventable diseases. To achieve this, surveillance for diseases targeted by these vaccines has been strengthened in all countries as part of monitoring disease trends, vaccine impact and progress towards eradication, elimination and control. In the short time since the meningococcal meningitis A vaccine was introduced, in 2010, the epidemiological picture of epidemic meningitis has changed. Through a sustained partnership between the World Health Organization and PATH (Project for Appropriate Technologies for Health) – a non-profit global health innovation organization – the Meningitis Vaccine Project (MVP) has become a success story in which the new vaccine against meningococcal group A (the predominant cause of epidemic meningitis in the countries of the “meningitis belt”) has been developed and rolled out within 10 years.

These successes have been made possible with the commendable leadership and unwavering commitment of governments and people in the Region and of partners. However, several challenges remain to be addressed. One major challenge is how to ensure equity in access to effective vaccines. There is also the struggle to promote an immunization culture, and place vaccination of the people on government, community and household agendas across the Region.

The comprehensive analysis of the progress made in immunization, status of disease eradication, elimination and control programmes, together with a discussion on the accompanying challenges presented in this special edition is extremely useful and timely. The articles carefully chart the successes and challenges of immunization in the African Region.

This special edition is a call to all stakeholders – governments and people of the African Region as well as partners – to increase efforts at making immunization a way of life across the Region. Governments should continue to make vaccination a top priority and commit adequate resources and communities should appreciate the value of immunization, and demand and protect immunization services as a basic right.

Dr Matshidiso Moeti
WHO Regional Director for Africa

This is a call to all stakeholders – governments and people of the African Region as well as partners – to increase efforts at making immunization a way of life in the WHO African Region.
Routine immunization in the WHO African Region: Progress, challenges and way forward

Richard Mihigoi, Blanche Anyai, Joseph Okeibunoru, Alain Poyii, Shingai Machingaidzeii, Charles S Wiysongei, Gregory D Husseyi, Deo Nshimirimanai
Corresponding author: Joseph Okeibunor, e-mail: okeibunorj@who.int

Immunization is considered one of the most cost effective public health interventions for reducing child morbidity, mortality and disability. Globally, an estimated 2.5 million child deaths and 600,000 adult deaths are prevented annually through immunization. The global effort to use vaccination as a public health intervention began when the World Health Organization launched the Expanded Programme on Immunization (EPI) in 1974.

Over the past four decades, extraordinary progress has been made in improving vaccination coverage in Africa in an equitable and cost effective fashion. This has been mainly due to several international efforts to increase EPI coverage, including the Universal Childhood Immunization initiative, the Global Alliance for Vaccines and Immunization (GAVI), the Millennium Development Goals (MDGs) declaration, the Global Immunization Vision and Strategy (GIVS), and, most recently, the Global Vaccine Action Plan (GVAP).

These initiatives, coupled with specific regional efforts such as the WHO African Region’s EPI strategic plans of action for the periods 2001–2005 and 2006–2009, the Reach Every District (RED) approach, as well as the efforts of national immunization programmes, have seen the African coverage of three doses of the diphtheria-tetanus-pertussis (DTP) vaccine by 12 months of age (DTP3) rise from 5% in 1980 to 75% in 2013.

Progress

In the last four decades, great advances have been made in expanding the reach of immunization programmes and in developing and introducing new vaccines. More people than ever before are being vaccinated and access to and use of vaccines by age groups other than infants is expanding. As a result of immunization combined with other primary health care and development interventions – including improved access to clean water and sanitation, better hygiene and education – the annual number of deaths among children under five years of age fell from an estimated 9.6 million in 2000 to 7.6 million in 2010 globally, despite an increase in the number of children born each year.

According to 2013 coverage estimates from WHO and UNICEF, more than 111 million infants globally received vaccines to protect them from deadly diseases. These infants account for about 84% of the world’s children, but an estimated 21.8 million infants remained unvaccinated, among which 4.3 million (22%) are located in four countries (Democratic Republic of the Congo, Ethiopia, Nigeria and South Africa) in the WHO African Region. Out of a target population of 32.2 million surviving infants in the Region in 2013, an estimated 8.2 million infants did not receive their first dose of BCG vaccine. Among the 8.2 million unvaccinated infants, about 2 million were under five years of age.

SUMMARY—Tremendous progress has been made in expanding immunization in the African Region over the last four decades. And immunization, together with other primary health care and development interventions, has impacted significantly on the annual number of deaths among children under five. However, an estimated 22% (4.3 million) of the infants globally remaining unimmunized are located in four countries of the African Region (Democratic Republic of the Congo, Ethiopia, Nigeria and South Africa). Challenges remain in reaching an estimated 20–30% of children across the Region. In addition to the traditional vaccines (DTP, measles, polio and tuberculosis) newer ones, such as for PCV and rotavirus, are being rolled out in the Region but uptake and coverage is slow and patchy both within and between countries. The new regional strategic plan for immunization 2014–2020 is intended to provide policy and programmatic guidance to Member States, in line with the 2011–2020 GVAP, in order to optimize immunization services and assist countries to further strengthen their immunization programmes.

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1 WHO Regional Office for Africa, Brazzaville, Congo
2 Vaccines for Africa Initiative (VACFA), Institute of Infectious Disease and Molecular Medicine, University of Cape Town, Cape Town, South Africa
In addition to the traditional six antigens (BCG – bacille Calmette-Guérin for tuberculosis, OPV – oral polio vaccine, DTP – diphtheria, pertussis and tetanus, and measles) included in the EPI since its inception, other vaccines are being introduced into national immunization schedules. All countries but one had introduced hepatitis B vaccine and Haemophilus influenzae type b vaccine as of December 2013. However, there has been a slow pace of introduction of other new vaccines: pneumococcal conjugate vaccines (PCV) and rotavirus vaccines were introduced by 29 and 15 countries respectively while human papilloma virus (HPV) vaccine has been introduced in Lesotho, Rwanda, Seychelles and South Africa only. More than 150 million people in 12 countries have been vaccinated with MenAfriVac (the new conjugate meningococcal meningitis vaccine) in campaigns since 2010, and no confirmed case of meningitis A has been identified among the vaccinated populations. Of the 31 countries at risk of yellow fever, 23 introduced the vaccine with four countries attaining 90% coverage in 2013.

In 2013, a total of 87.8 million children received measles vaccination through supplementary immunization activities (SIAs) in 16 countries. Four of these 16 countries conducted their follow-up SIAs using the measles-rubella vaccine targeting children from 9 months to 14 years of age, thus pioneering the introduction of the rubella vaccine in the Region. Through these efforts, the African Region achieved 88% reduction in estimated measles deaths between 2000 and 2012. The elimination of maternal and neonatal tetanus was also validated in 30 countries as of December 2013.

Challenges in reaching the remaining 20–30% children in the African Region

Cold chain management in resource-poor settings, where electricity is non-existent or erratic, coupled with a lack of adequate trained staff to administer vaccines present major challenges in most African countries. Furthermore, of those children who do receive the vaccines, some receive them late or at
inappropriate times and likely receive sub-optimal disease protection.

Improvements in immunization spending in most African countries have predominantly been due to donor funds. However, of the countries that established line items in their national budgets for routine vaccines, over a third did not fund them, and those that had drawn up financial plans did not utilize them to the degree expected.

Another challenge is the quality of immunization data in many countries in the Region. Various external evaluations have identified many inconsistencies in reported data suggesting that immunization data monitoring remains weak in most African countries.

The key challenges fall under different categories:

**Programme management, monitoring and accountability**
- Fragmentation of planning and lack of clear leadership;
- Gaps in micro-planning and denominator figures (target population issues);
- Gaps in health information and monitoring systems;
- Constraints in data quality management, archiving, analysis; and
- Ineffective use and interpretation of data to redirect the programme.

**Service delivery**
- Shortcomings in service delivery strategies (insufficient supply and access to quality services, limited service delivery points and outreach sites);
- Inadequate use of the GAVI health system strengthening funds to strengthen routine immunization activities; and
- Security constraints in some countries.

**Logistics, vaccine supply and quality**
- Insufficient storage capacity at central and intermediate levels (high proportion of equipment failure or inappropriate resources);
- Inadequate supply and logistics systems resulting in recurrent shortages or overstock of vaccines and essential commodities; and
- Lack of funding for vaccine distribution at the most peripheral levels.

**Advocacy and communication**
- Weak communication strategies at all levels;
- Insufficient demand creation, weak links with communities and their leaders; and
- Low community awareness and participation.

**Capacity building**
- Insufficient human resource capacity at all levels, rapid turnover of trained staff;
- Poorly trained and supervised managers and frontline health workers; and
- Gaps in supportive supervision, often directive or punitive.

**Sustainable financing**
- Reduced EPI budget resulting in funding shortfall for vaccination activities; and
- Weak advocacy and high-level support for EPI due to competing priorities.

**The way forward**

With the 2015 deadline for the Millennium Development Goals approaching, it is necessary for the African Region to take stock, critically assess its position, take ownership of the regional and country-specific problems, and develop precise strategies to overcome the challenges identified. There is need for increased immunization systems strengthening, as many are plagued by weak infrastructure and shortage of skilled human resources. More affordable and adapted vaccines need to be made available. Other key actions include, strengthening the integration with other child survival and high impact interventions and extending the benefits of immunization to adolescents and adults.

The new regional strategic plan for immunization 2014–2020, which is intended to provide policy and programmatic guidance to Member States, in line with the 2011–2020 GVAP, in order to optimize immunization services, will be used by countries to further strengthen their immunization programmes. Key approaches in the regional strategic plan include integrating immunization into national health policy and planning and during emergencies, strengthening immunization financing, enhancing partnerships, building national capacity, improving monitoring and data quality, improving vaccine management, safety and regulation, and promoting implementation, research and innovations.

**Conclusion**

Countries in the African Region must be commended for giant steps made in EPI performance over the past four decades. However, there exist wide inter- and intracountry differences, with a significant number of children remaining unvaccinated, under-vaccinated, and still dying from vaccine-preventable diseases. Immunization systems’ strengthening is essential, as most are understaffed with inadequate resources to function efficiently. Issues of vaccine supply, financing and sustainability require urgent attention.

Increased political and financial commitment from governments as well as coordinated national evidence-informed efforts by all immunization stakeholders are needed to both maintain current achievements and make additional progress for EPI in the Region. African leaders must be held accountable for meeting agreed country targets and honouring international commitments made.

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**General references**


Rotavirus disease burden in Africa and the need to accelerate introduction of vaccines

Jason M Mwenda, Richard Mihigo, Carol Tevi-Benissan, Mutale Mumba, Deo Nshimirimana
Corresponding author: Jason M Mwenda, e-mail: mwendaj@who.int
WHO Regional Office for Africa, Brazzaville, Congo, Immunization, Vaccines and Emergencies (IVE) Cluster

Diarrhoea is a major cause of death among children under five years of age globally.1 Rotavirus is the leading cause of severe diarrhoea, resulting in an estimated 453,000 deaths in 2008, most of which occurred in developing countries of sub-Saharan Africa and South-East Asia.2 Rotavirus also causes considerable morbidity, with global estimates of 2.3 million hospitalizations and 24 million outpatient visits annually among children aged under five years.2,3

Rotavirus vaccines are an essential part of an integrated approach to the control of diarrhoea that also includes interventions, such as access to safe drinking water, sanitation and hand washing facilities; breastfeeding; vitamin A and zinc supplementation; and appropriate case management.4 In 2009, WHO made a recommendation that Member States consider introducing rotavirus vaccines in all national immunization programmes and particularly in countries with high diarrhoea-related mortality.5

This article, the result of a literature review, highlights published regional and country specific annual deaths in the WHO Regional Office for Africa.

Methods

In order to estimate the number of deaths attributable to rotavirus infection prior to widespread introduction of rotavirus vaccines, available published papers were reviewed to establish the baseline of rotavirus mortality before the introduction of rotavirus vaccines. PubMed was searched, with the keyword “rotavirus” as a primary search term, to identify studies published between...
January 2001 and January 2011 and before the roll out of rotavirus vaccines in the African Region. Papers citing data from countries that participated in the WHO-coordinated Rotavirus Surveillance Network during 2009 and which detected rotavirus-related diarrhoea with enzyme immunoassay (EIA) in at least 100 children under five years who were admitted to hospital with diarrhoea were included. For the countries with several sites, data from all sites were used. In this analysis, for countries that have introduced rotavirus vaccine into their national immunization programme, data subsequent to the introduction were excluded since the main objective was to establish a baseline of the rotavirus specific mortality pre-introduction of vaccines.

Results

Data from the regional Rotavirus Surveillance Network, a network of sentinel surveillance sites in over 21 countries, indicate that rotavirus is responsible for approximately 40% of acute gastroenteritis hospitalizations among children under five years prior to widespread use of rotavirus vaccination (Table 1). Some of these data from the Rotavirus Surveillance Network were cited in the literature reviewed.

Table 1. Proportion of diarrhoeal hospitalizations among children under five years positive for rotavirus in sub-Saharan countries, 2006–2013

<table>
<thead>
<tr>
<th>Year</th>
<th>Countries reporting</th>
<th>Hospital sites</th>
<th>Acute diarrhoea hospitalizations</th>
<th>Number (%) with stool specimen collected</th>
<th>Number stool specimens tested</th>
<th>Number (%) specimens confirmed rotavirus by EIA</th>
</tr>
</thead>
<tbody>
<tr>
<td>2006</td>
<td>4</td>
<td>4</td>
<td>1 351</td>
<td>1 206 (89.3)</td>
<td>1 202</td>
<td>590 (49.1)</td>
</tr>
<tr>
<td>2007</td>
<td>7</td>
<td>7</td>
<td>2 046</td>
<td>1 847 (90.3)</td>
<td>1 847</td>
<td>799 (43.3)</td>
</tr>
<tr>
<td>2008</td>
<td>8</td>
<td>11</td>
<td>3 533</td>
<td>3 344 (94.7)</td>
<td>3 225</td>
<td>1 149 (35.6)</td>
</tr>
<tr>
<td>2009</td>
<td>11</td>
<td>16</td>
<td>4 944</td>
<td>4 763 (96.3)</td>
<td>4 643</td>
<td>1 811 (39.0)</td>
</tr>
<tr>
<td>2010</td>
<td>16</td>
<td>29</td>
<td>10 972</td>
<td>9 484 (86.4)</td>
<td>9 241</td>
<td>3 987 (43.1)</td>
</tr>
<tr>
<td>2011</td>
<td>18</td>
<td>32</td>
<td>10 222</td>
<td>9 289 (90.9)</td>
<td>8 759</td>
<td>3 538 (40.4)</td>
</tr>
<tr>
<td>2012</td>
<td>20</td>
<td>34</td>
<td>9 625</td>
<td>9 017 (93.7)</td>
<td>8 668</td>
<td>3 439 (39.6)</td>
</tr>
<tr>
<td>2013</td>
<td>28</td>
<td>37</td>
<td>11 205</td>
<td>10 580 (94.0)</td>
<td>9 833</td>
<td>3 806 (39.0)</td>
</tr>
<tr>
<td>Total</td>
<td>53</td>
<td>898</td>
<td>49 530 (91.9)</td>
<td>47 418</td>
<td>19 119 (40.3)</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1. Top ten countries in Africa with the highest estimated annual numbers of rotavirus deaths among children aged under five years, 2008

- Nigeria: 41 057
- Democratic Republic of the Congo: 32 653
- Ethiopia: 28 128
- Uganda: 10 637
- Angola: 8 788
- Sudan/South Sudan: 8 450
- United Republic of Tanzania/Zanzibar: 8 171
- Kenya: 8 005
- Niger: 7 473
- Mali: 7 253

Figure 2. Estimated annual numbers of rotavirus deaths among children aged under five years in West African countries, 2008

- Nigeria: 41 057
- Niger: 7 473
- Mali: 7 253
- Burkina Faso: 6 228
- Côte d’Ivoire: 3 393
- Guinea: 2 328
- Ghana: 2 090
- Sierra Leone: 2 058
- Senegal: 1 951
- Benin: 1 757
- Algeria: 1 173
- Togo: 1 050
- Mauritania: 1 050
- Liberia: 780
- Guinea-Bissau: 641
- The Gambia: 290
- Cape Verde: 13
In the published analysis, Tate et al (2012) estimate that worldwide, each year, rotavirus-related diarrhea results in 453,000 deaths (varying from 420,000 to 494,000) in children younger than five years, which account for 37% of diarrhea-related deaths and 5% of all deaths in this age group. More than half of these deaths (230,000) occurred in African children. Rotavirus sentinel surveillance data available from sub-Saharan Africa were used in these disease estimates and the country specific rotavirus annual death rates in the African Region. The figures were modified from Tate et al (2012).

Discussion

Country and regional specific data on annual rotavirus death exist and are available via published literature and the WHO web site.

Nine of the ten countries in the African Region with the highest annual deaths due to rotavirus have established sentinel surveillance, generating high quality data. Six of the ten countries have either introduced or are scheduled to introduce rotavirus vaccines in their national immunization programmes. Hence, it will be possible to use this established surveillance system to monitor the impact of rotavirus vaccines and conduct another analysis three years after vaccine introduction to determine the vaccination programme’s impact, including on circulating rotavirus strains.

Conclusion

Surveillance data and data from other sources have been used to estimate deaths due to rotavirus. This information has been used to advocate for rotavirus vaccine introduction and to monitor the effect of vaccination on mortality before and after the introduction of vaccines. Introduction of commercially available rotavirus vaccines could substantially reduce deaths attributable to diarrhoea in the African Region.

References

Inactivated poliovirus vaccine campaign in Kenya: Lessons learned

Shaikh Humayun Kabir,ii Custodia Mandlhate,i Samuel Oumo Okiror,ii Iheoma Ukachi Onuekwusi,i Ian Njeruiii

Corresponding author: Shaikh Humayun Kabir, e-mail: kabirjsl@gmail.com

Kenya has been free of polio since 2006. But it experienced several wild poliovirus outbreaks in the subsequent years. In response to one such outbreak in Dadaab, inactivated poliovirus vaccine (IPV) was co-administered with oral poliovirus vaccine (OPV) in December 2013, as a more effective measure in closing immunity gaps. A five-day vaccination campaign was staged in Dadaab refugee camps. Despite the ongoing polio campaigns and routine immunization, pockets of immunity gaps in these countries are believed to be a catalytic factor that enables poliovirus circulation following an importation event.

In response to the 2013 WPV1 outbreak in Dadaab, inactivated poliovirus vaccine (IPV) was co-administered with oral poliovirus vaccine (OPV) in Dadaab refugee camps and adjacent host communities. The IPV co-administration was in line with the recommendations from the Strategic Advisory Group of Experts (SAGE) on Immunization and the Independent Monitoring Board (IMB) for polio eradication. As demonstrated in past outbreaks, IPV is more effective in preventing the emergence of circulating vaccine-derived polioviruses (cVDPVs). Despite the ongoing polio campaigns, a five-day vaccination campaign was staged in Dadaab refugee camps. The survey showed excellent coverage, despite the challenges. Lessons learned evidence that IPV can be administered in similar geographical settings, and that systematic tailored training; timely and evidence-based communication and social mobilization can make for successful outcomes.

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Methods

- The campaign targeted five refugee camps in Dadaab and five surrounding host communities in Dadaab, Fafi and Habaswein districts, which included 126,000 under fives.
- The Kenyan Ministry of Health, in collaboration with the polio partners WHO, UNICEF, UNHCR and Centers for Disease Control and Prevention (CDC), closely monitored the preparatory, implementation and evaluation activities of the campaign.
- A study was conducted to identify community attitudes and acceptance towards IPV to determine the communication and social mobilization approach for the campaign.
- During the campaign period, immunization activities were conducted over five working days from 14–18 December 2013, followed by a vaccination coverage survey.
- To ensure injection safety, all children were immunized at fixed posts, temporary fixed posts and mobile team posts.

Results

An independent vaccination coverage survey revealed the OPV and IPV coverage to be 92.8% in the refugee camps and 95.8% in the host communities.4

The reasons most commonly cited by caregivers for children older than six weeks not receiving the vaccine were: “did not know where to get vaccine” (46%); followed by “child absent during the campaign” (9%). The most common sources of information about the campaign were: “public address system or megaphone announcements” (76%); followed by “visit by social mobilizer/health worker” (47%); and “radio” (36%).

Operational challenges encountered

- Inadequate qualified vaccinators capable of injecting intramuscular vaccine;
- Low number of health facilities in relation to diverse population and area size;
- Lack of availability of suitable places for organizing temporary fixed posts in communities;
- Lack of sufficient cold chain logistics (vaccine carriers, ice packs, cold boxes) and freezing spaces;
- Gathering isolated nomadic populations into temporary fixed posts for vaccination difficult;
- Seasonal out migration of nomadic population; and
- Insecurity in some host communities.

Lessons learned

Routine immunization services – number of health facilities, outreach sessions, human resources and cold chain logistics were suboptimal in the campaign area. An injectable vaccine campaign in such a setting is challenging although outsourcing of skilled vaccinators as well as internal and external adjustment of cold chain logistics were applied to tackle the situation in the campaign area. Additionally, the scattered population and nomadic living pattern placed a heavy demand on transportation resources. Similarly, insecurity limited the movement of vaccinators in some settlements resulting in some susceptible children missing the opportunity. All these factors accounted for the high operation cost of the campaign – US$1.04 per vaccinated child. In well-established routine immunization (RI) settings, the cost is much lower. In examples like this the campaign duration may need to be extended to tackle aspects such as vaccinator and logistics shortages. For this campaign, with a scattered population, need-based house-to-house vaccinations proved effective and feasible.

Conclusion

Despite the logistics, human resources and social mobilization challenges faced in Kenya 98% administrative and 93–96% survey coverage was achieved in the campaign. Based on the lessons learned in Kenya, it is evident that IPV can be administered in similar geographical settings as well as in countries with well-established RI structures. Systematically tailored training; timely and capacity-based operational/micro-planning; and evidence-based communication and social mobilization can make for successful outcomes.

References

African Vaccination Week: Platform for effective partnership to deliver multiple interventions in the African Region

Richard Mihigo, Blanche Anya, Joseph Okeibunor, Deo Nshimirimana
Corresponding author: Joseph Okeibunor, e-mail: okeibunorj@who.int
WHO Regional Office for Africa, Brazzaville, Congo

In line with the principles outlined in the Global Vaccine Action Plan (GVAP)\(^1\) and under the advice of both the Strategic Advisory Group of Experts (SAGE) on immunization and the Task Force on Immunization (TFI) in Africa, the WHO African Region is taking steps to address issues related to vaccine-preventable diseases by implementing strategies aiming to reach all eligible persons with effective vaccines. One of these strategies is the implementation of African Vaccination Week, which provides a platform for Member States to speak through one collective voice, advocate for immunization as a public health priority in the Region, and achieve high immunization coverage. The initiative has received the support of the Regional Committee which endorsed a resolution (AFR/RC60/14) institutionalizing an annual AVW for sustaining advocacy, expanding community participation and improving immunization service delivery in its 60th session in 2010. This resolution is also in tandem with the support of the World Health Assembly for the World Immunization Week as noted in its resolutions WHA58.15 and WHA61.15.

The 2014 edition of AVW occurred from 22–27 April 2014. This is a week when countries in the African Region embark on creating awareness of the benefits of vaccination. Countries also use this opportunity to conduct different catch-up vaccination activities. The theme for 2014, “Vaccination, a shared responsibility”, was both timely and apt in highlighting the crucial importance of governments, health care workers, parents, families and communities – all doing their part to support immunization.

Introduced only four years ago, the AVW initiative is now known for promoting the benefits of immunization during a person’s life, and the delivery of other life-saving interventions across the WHO African Region. Indeed, hundreds of millions of children, adolescents, women and men have been vaccinated and/or received other health interventions during the last three editions.

Ongoing efforts by countries to introduce new vaccines are adding new momentum to vaccination programmes, which demonstrates the impact that can be achieved when stakeholders join together. Nevertheless, nearly one out of five children in the world is still not being immunized and the pace of introduction of new vaccines in the African Region remains slow.

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SUMMARY—African Vaccination Week (AVW) is an initiative of the countries in the World Health Organization African Region promoting equity and access to vaccination. The initiative focuses on reaching populations with limited access to regular health services. Available data from 2014 showed that countries took advantage of the initiative to conduct integrated delivery of multiple interventions, targeting those with limited access to regular health services. A majority of the countries integrated between five and six interventions and very few delivered single interventions. The most common integrated intervention was vitamin A supplementation, followed by de-worming. Other interventions included educational activities, supplementation minerals and provision of health services. Data on coverage of integrated interventions are shown in the article.
In participating in AVW 2014, countries demonstrate awareness of collective vulnerability to diseases – a vulnerability which calls for shared responsibility and investment of even more resources in immunization. All 47 countries participated in the 2014 edition of AVW, signalling to the world that immunization is a priority for the African Region.

This article summarizes the efforts of countries made during the fourth edition of AVW in 2014. It describes highlights activities implemented by several of the Region’s countries.

Methods

All country reports of activities conducted during the 2014 AVW in the African Region were reviewed. Countries were asked to report achievements of their pre-established AVW vaccination objectives, to describe vaccination activities and other integrated public health activities undertaken, to analyse defined indicators (when applicable) and to report on resource mobilization, launching events and communication efforts. All 47 countries submitted reports.

Although AVW is officially a one-week event at the end of April, many countries extend their vaccination activities over the course of several weeks. As a reference, the AVW activities were consolidated into broad categories and listed by countries (see Table 1). To summarize the integration of other preventive health interventions during AVW, all other interventions implemented were identified and countries were grouped by intervention, listing target populations.

Results

Regional activities in the 2014 African Vaccination Week
A number of activities were conducted at the regional level. These included the production of featured stories on immunization, FAQs on AVW in audio and TV spots, and a message from the Regional Director. A joint WHO-UNICEF press release was also developed, shared with the regional media and posted on the AVW 2014 web site. A briefing of the local and international media based in the Congo was held at the WHO Regional Office and social media were used to publicize AVW activities. For example, tweets on immunization and AVW were sent out using the WHO-AFRO twitter account. A 13-minute TV programme was developed and broadcast on various international channels (TV5 Monde and Ouest TV, among others). The programmes featured health talks prior to an immunization session in a health facility and also interviews with WHO-AFRO and Ministry of Health, Congo, officials. The Director of the Immunization, Vaccines and Emergencies Cluster in WHO-AFRO elaborated on the rationale for the theme of the 2014 AVW edition, namely “Vaccination, a shared responsibility”. The Director of Health in the Ministry of Health and Population, Congo, highlighted the roles and responsibilities of governments and partners for immunization in the African Region.

The Minister of Health and Population, Congo, Mr Francois Ibovi, launched the 2014 edition of AVW at the regional level on 24 April 2014 in Brazzaville. A wide range of international (GAVI, UNICEF, WHO, Sabin Vaccine Institute, etc.) and national partners as well as representatives of the diplomatic corps in Congo were present at the regional launch. Speaking during the launch ceremony, the Minister underlined the intrinsic values of vaccines as proven, powerful tools for disease prevention and called on all stakeholders to promote vaccination for a healthy society. In his speech, he underscored that, “The success of vaccination depends largely on its promotion by the media, local authorities, educators and parents. All skills and competencies must therefore be mobilized to ensure that vaccines reach the maximum number of children. Everyone has a share of responsibility”.

The Minister also used the occasion to announce the formal introduction of rotavirus vaccine into the immunization programme in Congo. During the week he also announced the provision of vitamin A, distribution of long-lasting insecticide-treated nets (LLITNs) to pregnant women and children as well as awareness raising about the benefits of breastfeeding.

The WHO Representative in Congo, speaking on behalf of the WHO Regional Director for Africa and other development partners in Congo, pledged the commitment of WHO-AFRO and other development partners to sustain support to African countries in their quest to improve maternal, child and community health.

Country-level activities in the 2014 African Vaccination Week
Fifteen of the 47 countries in the African Region celebrated the 2014 edition of AVW within the week of 22–27 April while the remaining 32 countries celebrated the event during the months of May and June. The AVW vaccination and communication activities were consolidated into broad categories and listed by country. Reports from Member States indicated that countries used the opportunity to hold round-table discussions, advocacy and social mobilization activities for immunization, training sessions, introduction of new vaccines into national routine immunization programmes, as well as provision of other life-saving interventions such as de-worming, vitamin A supplementation, distribution of mosquito nets, growth monitoring, etc. Other undertakings included “catch-up” vaccination activities against vaccine-
preventable diseases, health education and counselling as well as distribution and supply of other health commodities. In addition, some countries used the AVW platform to introduce new vaccines such as pneumococcal conjugate vaccine, rotavirus and HPV vaccines. See Table 1 for details.

In each case significant numbers of the eligible populations were reached. For instance, over 21 million doses of oral polio vaccine were distributed in five countries. Similarly, over 10 million doses of other vaccines’ antigens were delivered in 21 countries while over 30 million capsules of vitamin A were distributed to children below five years of age in 13 countries.

These activities served several purposes: raising awareness on the life-saving value of immunization; reaching underserved and marginalized communities (particularly those living in remote areas, deprived urban settings and strife-torn areas) with high-impact child survival packages; reinforcing the medium and long-term benefits of immunization and other child survival interventions; all with the aim of increasing vaccination coverage and helping to transform the lives of millions of children, by giving them a chance to grow up healthy, go to school and improve their life prospects.

The number of interventions delivered during AVW ranged from one to six by country with an average of three per country. Figure 1 shows that only three countries implemented only one intervention in addition to the typical AVW event launch. Seventeen of the countries implemented two interventions while 19 implemented between three and four interventions. Seven others implemented as many as five to six interventions during the 2014 AVW.

Furthermore, significant achievements were recorded with respect to the communication interventions delivered during the 2014 AVW edition in the different countries of the African Region. In Angola, for instance, various government and private sector organizations committed funding in support of AVW. This support was a result of an advocacy mission to ExxonMobil, an oil exploiting company operating in the country. Other countries recorded similar successes from conducting advocacy outreach to different organizations and individuals. Some of the advocacy successes resulted in increased recognition for the programme, as was the case in Uganda. Following the regional launch of the 2013 AVW in Uganda, there was a high profile representation of the Government at the 2014 edition.

Other forms of communication interventions included social mobilization and community engagement as well as media and information for action. All countries recorded remarkable achievements and contributed to the success of the 2014 AVW in various ways. Many more people were reached with a

<table>
<thead>
<tr>
<th>Interventions during AVW 2014</th>
<th>Results obtained</th>
<th>Countries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polio campaigns</td>
<td>21 528 715 doses of OPV administered in 5 countries</td>
<td>Burkina Faso, Cameroon, Central African Republic, Mali, South Sudan</td>
</tr>
<tr>
<td>Catch-up vaccination activities</td>
<td>10 669 075 doses of vaccines of all antigens administered in 21 countries</td>
<td>Angola, Benin, Botswana, Burundi, Chad, Cameroon, Central African Republic, Congo, Côte d’Ivoire, Democratic Republic of the Congo, Eritrea, Liberia, Madagascar, Mauritania, Namibia, Nigeria, Rwanda, Sao Tome, Seychelles, South Sudan, Swaziland</td>
</tr>
<tr>
<td>Vitamin A administration</td>
<td>Approximately 30 380 710 capsules of vitamin A distributed to children under five years and women in post-partum in 13 countries</td>
<td>Angola, Chad, Cameroon, Central African Republic, Congo, Eritrea, Liberia, Madagascar, Mauritania, Namibia, Nigeria, Rwanda, South Sudan</td>
</tr>
<tr>
<td>De-worming tablets</td>
<td>Around 16 232 140 de-worming tablets were distributed to children under five years and pregnant women in 9 countries</td>
<td>Angola, Cameroon, Central African Republic, Liberia, Madagascar, Mauritania, Namibia, Nigeria, Rwanda</td>
</tr>
<tr>
<td>Malnutrition screening</td>
<td>Around 14 795 834 children under five years screened for malnutrition in 7 countries</td>
<td>Angola, Chad, Eritrea, Madagascar, Mauritania, Namibia, Nigeria</td>
</tr>
<tr>
<td>Iron distribution</td>
<td>2 142 641 iron and folic acid tablets distributed to pregnant women in 1 country</td>
<td>Nigeria</td>
</tr>
<tr>
<td>Malaria treatment</td>
<td>355 888 pregnant women were tested for malaria and received treatment in 2 countries</td>
<td>Angola, Nigeria</td>
</tr>
<tr>
<td>Distribution of family planning devices</td>
<td>270 207 devices distributed in 2 countries</td>
<td>Nigeria, Rwanda</td>
</tr>
<tr>
<td>Registration of children for birth certificate and national identity</td>
<td>169 784 children registered in 1 country</td>
<td>Nigeria</td>
</tr>
<tr>
<td>Distribution of LLITNs</td>
<td>Approximately 214 613 LLITNs were distributed to mothers in 2 countries</td>
<td>Angola, Nigeria</td>
</tr>
<tr>
<td>Introduction of new vaccines</td>
<td>New vaccine introduction</td>
<td>Angola, Congo, Lesotho, Swaziland, Rwanda, Seychelles, United Republic of Tanzania, United Republic of Tanzania</td>
</tr>
<tr>
<td>Measles second dose:</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Rotavirus: PCV: HPV:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PCV</td>
<td></td>
<td></td>
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<tr>
<td>HPV</td>
<td></td>
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<tr>
<td>HPV</td>
<td></td>
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</tr>
</tbody>
</table>

Table 1. Results of immunization and other life-saving interventions conducted during AVW
variety of health interventions than is usually possible through conventional health service delivery channels.

Discussion

The global objective of the AVW initiative is to target populations with limited access to regular health services, thereby working to close the gaps in immunization. The effectiveness of AVW in achieving this objective has been amply demonstrated by its successes in the past two editions. It has provided a platform for African countries to conduct supplementary immunization activities, target hard-to-reach groups, introduce new vaccines and place immunization on the political agenda. Although the integration of other preventative interventions with AVW was never put forth as part of the framework of the initiative, it is clear that countries have taken advantage of AVW to serve as a platform for such activities.

Some countries integrated multiple interventions during AVW, while others added on one or two supplementary interventions. Countries that integrated several interventions are likely still testing the utility of AVW for the delivery of multiple interventions, interventions of certain types or are still in the process of introducing other interventions in their public health system. Angola and Congo, among others, used the opportunity to introduce new interventions such as rotavirus. Other factors that may have affected the level of integration included whether the annual calendar of activities in the different health programmes in the countries and AVW coincided and whether the programme to be integrated had the necessary funds and logistic support.

It has been discussed that linking another intervention to a strong immunization programme has the possibility to quickly increase coverage and impact for the added intervention. In this report, coverage for both vaccination and other integrated interventions seems to be generally high, and the targets for both the AVW activities and other health interventions integrated are generally comparable. For example, during AVW 2014, countries that reported high vaccination coverage also reported high de-worming coverage, where de-worming was integrated with vaccination. Similarly, countries such as Nigeria and Angola that combined the distribution of anti-malarials with AVW activities, reported high coverage for both activities. Currently it is not possible to assess the impact of this integration on vaccination coverage with the available data, and therefore this is an important area for further investigation.

This review provides insight into the degree and type of integration that could occur during AVW in African countries and suggests that African countries are integrating other interventions with immunization to a much larger extent than anticipated. This summary of integration during AVW highlights the need to promote better and more complete reporting of integrated activities and may serve as a baseline to plan for additional evaluations of integration practices in African countries.

The results achieved to date by the annual celebration of AVW predict continued success in the future. It is essential that countries maintain the momentum of this regional initiative in order to address regional/global priorities of reaching under/unreached populations, achieving the polio endgame, eliminating measles, rubella and neonatal tetanus, achieving yellow fever control and successfully sustaining the introduction of new vaccines and technologies into national immunization programmes. The implementation of an integrated approach to all of these immunization initiatives will accelerate the reduction of morbidity and mortality in children.

It is essential that the achievements obtained so far in the region are maintained by countries thus ensuring that immunization remains a priority and that adequate resources are secured. The upcoming ministerial conference on the Regional Vaccine Action Plan 2015 is a forum that should be used to advocate for the reinforcement of this country ownership, which should then be translated into concrete activities.

The future success of AVW will also depend on the ability of countries to include this activity in their strategic and annual national immunization plans and budget resources for implementation. The countries utilizing AVW as an opportunity to integrate immunization with other high-impact interventions should be well coordinated at country level and supported – with the aim of strengthening health systems and sustainability.

References

Polio eradication in the African Region: Progress and way forward

Alex Gasasira, Joseph Okeibunor, Mbaye Salla, Nicksy Gumede, Deo Nshimirimana
Corresponding author: Joseph Okeibunor; e-mail: okeibunorj@who.int
WHO Regional Office for Africa, Brazzaville Congo

Following the declaration of global polio eradication as a programmatic emergency for public health in 2012,1,2 targets and milestones were set (see Figure 1); and innovative approaches were taken to address the polio situation in the African Region. The innovations include, but are not limited to quarterly meetings with the four priority countries (Angola, Chad, Democratic Republic of the Congo, Nigeria) and WHO representative’ monthly reports on polio in the polio affected countries. In Nigeria there is a presidential task force with governors involved, and in Chad the president chairs monthly Polio Eradication Initiative (PEI) meetings. Traditional and cultural leaders meet regularly in all affected countries. Further efforts made to enhance the implementation of polio activities include the surge in human resources boosted with staff from CDC, the Bill & Melinda Gates Foundation and WHO. Nigeria has 2 207 staff, Chad 43 and the Democratic Republic of the Congo 43. There is also a deployment of India surveillance medical officers to support emergency plans in Nigeria.

In terms of core programming, supplementary immunization activities (SIAs) and surveillance received a major boost during the emergency period. To this effect, there was a restructuring of polio teams, development of polio dashboards (see Figure 2), and the use of GIS/GPS to support micro-planning and support monitoring of vaccination teams. Furthermore, independent monitoring has also been improved; there is routine immunization strengthening between rounds of polio campaigns, lots quality assurance sampling (LQAS) is being used to monitor the quality of campaigns, and environmental surveillance has been initiated in Nigeria, Kenya and, recently, in Angola.

Strategies have also been put in place to reach nomads in Chad and Nigeria. One such strategy is the involvement of nomadic populations in planning and execution of vaccinations. Emphasis is placed on transport and intra-nomadic population capacity for oral polio vaccine (OPV) delivery. There is also cross-border collaboration between the African and Eastern Mediterranean WHO regional offices and between countries (for example, Ethiopia and South Sudan). Communication and social studies are being conducted to better understand

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**Summary**—In 2012 the declaration of global polio eradication as a programmatic emergency for public health targets resulted in the setting of objectives and a schedule for eradication. Innovative approaches were taken to address the polio situation in the African Region. Supplementary immunization activities, planning, monitoring and surveillance have all been stepped up, and technological advances such as GPS and the use of polio dashboards to monitor key performance data have been employed. Key priority countries (Angola, Chad, Democratic Republic of the Congo, Nigeria) and communities (including nomadic groups) have been targeted. Great progress has been documented, for example routine immunization has risen from less than 10% in 1980 to 77% in 2013. However, there are still some challenges to overcome, notably wild poliovirus outbreaks and three remaining foci of transmission – Nigeria, the Central Africa subregion and the Horn of Africa. This article charts the steps taken and the continuing action needed to realise the aim of polio eradication.

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**Figure 1. Targets and milestones in polio eradication**

- **Objective 1**: Poliovirus detection and interruption
  - Last WPV case
  - Last OPV2 case
  - Global certification
  - bOPV cessation

- **Objective 2**: Strengthening immunization systems and OPV withdrawal
  - Strengthen immunization systems
  - Address prerequisites for OPV2 cessation
  - Complete OPV2 withdrawal
  - IPV and OPV in routine immunization

- **Objective 3**: Containment and certification
  - Finalize long-term containment plans
  - Complete containment and certification globally

- **Objective 4**: Legacy planning
  - Legacy planning consultation and development
  - Legacy planning implementation

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Voir page 65 pour le résumé en version française.
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the under-immunization in Angola and Nigeria. Special emphasis is placed on the interpretation of being a vaccinator and reasons for poor interactions between vaccinators and supposed recipients. The polio dashboard was developed and used to monitor implementation of polio eradication activities.

The efforts put into achieving these results, namely SIAs, planning, monitoring and surveillance have been evaluated and documented in some studies.3,4 The Region seems set to stop the transmission of polio by the end of 2015 as targeted in the milestones. This article gives a brief report on the successes, challenges and the way forward.

**Polio transmission in the African Region**

Twelve countries, in the African Region, had active wild poliovirus (WPV) transmission with a total of 350 cases in 2011. In 2014, as of week 33, the number of African countries with the wild poliovirus had decreased significantly showing only 16 WPV cases from four countries (Cameroon, Ethiopia, Equatorial Guinea, and Nigeria). Previous re-established transmission countries have been able to interrupt WPV transmission. Angola, for instance, has remained poliovirus free for more than three years now; Democratic Republic of the Congo for almost three years and Chad for more than two years. The last WPV case in Chad was recorded on 14 June 2012. Oral polio vaccine coverage in polio reservoirs is constantly reducing, indicating greater acceptance of the vaccine and reducing the number of cases.

The three remaining foci of transmission in the African Region are Nigeria, the Central Africa subregion and the Horn of Africa. All three foci continue to show persistent transmission of WPV, albeit with much lower intensity, as the timeline for cessation of transmission approaches. All the same, while Nigeria still witnesses some cases of circulating vaccine-derived polioviruses (cVDPV2) the other subregions have not reported any cases of cVDPV in 2014. In total, 18 cVDPV2 cases were reported in the region as of week 33 of 2014 and all from Nigeria.

**Actions taken to get us here**

Steps were taken to rapidly improve population immunity with a focus on infected and high-risk areas. Some of these steps include intensified SIAs scheduled in all infected countries with the implementation of expanded age group campaigns in outbreak countries. Special initiatives were employed in areas where security was compromised, including targeted use of IPV.

Furthermore, efforts were put into rapidly closing gaps in poliovirus detection through the enhancement of acute flaccid paralysis (AFP) surveillance field activities, expansion of environmental surveillance and increased support to...
WHO accredited laboratories, especially in outbreak countries. Certification and containment systems were also reinvigorated.

The Region has also witnessed tremendous improvements in a number of public health indicators that may have contributed to this progress towards eradication of polio in line with the global targets. For instance there has been a gradual but sustained improvement in routine immunization. The coverage of infants by age 12 months with three doses of polio vaccine (Pol3) through routine immunization rose from less than 10% in 1980 to 77% in 2013.5

This was complemented with successful SIAs and sustained effective polio surveillance. In 2013, 265 SIAs, using OPV were conducted in 42 countries, 52% in the African Region.1 These included national immunization days (NIDs), subnational immunization days (SNIDs), child health days and large-scale mop up rounds. With an effective AFP surveillance system in place, polio cases caused by WPV and eVDPV were detected and stool specimens tested in WHO accredited laboratories.6

All the same, it is important to note that the number of WPV cases in outbreaks after WPV importation into previously polio-free countries increased from six cases in two countries (Chad and Niger) in 2012 to 27 cases in three countries (Cameroon, Ethiopia and Kenya) in 2013. Importation of WPV type1 (WPV1) from Nigeria into the Horn of Africa resulted in 217 cases in 2013 (9 in Ethiopia, 14 in Kenya and 194 Somalia); one WPV1 case was reported by Ethiopia in 2014. Four WPV1 cases were reported in Cameroon in 2013 and five in 2014, five cases have so far been reported in Equatorial Guinea and five WPV1 cases reported in Nigeria as at week 33 of 2014. On genomic sequence analysis, the isolates were of Nigerian origin most closely linked with WPV cases reported from Chad in 2012.7

The way forward

Despite the occurrence of recent outbreaks, considerable progress has been made toward polio eradication in the African Region. The last WPV3 case in the Region and globally was recorded in Nigeria in 2012 signifying a successful interruption of WPV3 transmission in the Region. The transmission of indigenous WPV in the Region has been narrowed to restricted geographical areas. The significant decrease in the number of WPV cases and number of affected geographical entities in the Region has been attributed to the significant improvement in a number of programmatic indicators including quality of SIAs, routine immunization and AFP surveillance, albeit gaps at subnational level in surveillance quality remain an issue of concern. The plan for carrying the initiative forward to the finishing line includes the intensification of efforts at interrupting transmission, continued enhancement of AFP surveillance, as well as immunization strengthening.

With respect to interruption of transmission, advocacy to critical stakeholders and decision-makers will be undertaken to increase and sustain national commitment to stopping poliovirus transmission. High quality, synchronized SIAs will continue to be implemented in Nigeria, and Central and West Africa, where threats of transmission remain a concern.

The enhancement of poliovirus detection will take the form of strengthening field surveillance activities in all geographical entities with suboptimal AFP surveillance performance. Further still, there will be a deliberate expansion of environmental surveillance activities as well as continued and deliberate support to strengthen routine immunization systems.8

References

Measles elimination in the WHO African Region: Progress and challenges

Balcha Masresha,1 Amadou Fall,1 Richard Luce,1 Messeret Eshetu,1 Reinhard Kaiser,1 Annick Dosseh,2 Charles Byabamazima,3 Reggis Katsande,1 Jim Ting,1 Deo Nshimirimanana2
Corresponding author: Balcha Masresha; e-mail: masreshab@who.int

The African Region adopted a regional measles mortality reduction goal in 2001, and started the implementation of the WHO-UNICEF recommended strategies.1 Successful implementation of these strategies resulted in a 93% reduction in reported measles cases and 92% reduction in the estimated number of measles deaths in the African Region between 2000 and 2008, following which the regional goal was revised to attain pre-elimination by 2012.2,3

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.4

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.5 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.6

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.7 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.
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

### Table 1. Vaccination coverage with the first dose of measles vaccination (MCV1) in the African Region, 2011–2013, according to the WHO-UNICEF coverage estimates

<table>
<thead>
<tr>
<th>Year</th>
<th>WHO-UNICEF coverage estimates for MCV1 for the African Region</th>
<th>Number of countries with MCV1 coverage &lt;60%</th>
<th>Number of countries with MCV1 coverage 61–70%</th>
<th>Number of countries with MCV1 coverage 71–80%</th>
<th>Number of countries with MCV1 coverage 81–90%</th>
<th>Number of countries with MCV1 coverage &gt;90%</th>
</tr>
</thead>
<tbody>
<tr>
<td>2011</td>
<td>74%</td>
<td>5</td>
<td>9</td>
<td>9</td>
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<td>15</td>
</tr>
<tr>
<td>2012</td>
<td>73%</td>
<td>4</td>
<td>8</td>
<td>10</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td>2013</td>
<td>74%</td>
<td>5</td>
<td>9</td>
<td>10</td>
<td>11</td>
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Table 2. Measles surveillance performance and incidence levels in the African Region, 2011–2013

<table>
<thead>
<tr>
<th></th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total number of suspected cases reported*</td>
<td>74,896</td>
<td>55,717</td>
<td>101,196</td>
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<tr>
<td>Total confirmed measles cases*</td>
<td>43,155</td>
<td>25,609</td>
<td>69,910</td>
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<tr>
<td>Incidence of confirmed measles*</td>
<td>55.8</td>
<td>30.2</td>
<td>76.9</td>
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<tr>
<td>Total lab confirmed rubella cases*</td>
<td>7,774</td>
<td>1,713</td>
<td>3,918</td>
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<tr>
<td>Number of countries that have measles incidence levels below 1 per million population*</td>
<td>16 of 43</td>
<td>15 of 43</td>
<td>17 of 43</td>
</tr>
<tr>
<td>Number of countries that have measles incidence levels below 5 per million population*</td>
<td>24 of 43</td>
<td>18 of 43</td>
<td>23 of 43</td>
</tr>
<tr>
<td>Number of countries meeting the targets for the two principal case-based surveillance performance indicators</td>
<td>16 of 43</td>
<td>22 of 43</td>
<td>20 of 43</td>
</tr>
<tr>
<td>Number of measles cases reported through the JRF</td>
<td>195,620</td>
<td>108,004</td>
<td>83,613</td>
</tr>
</tbody>
</table>

* Based on data reported through the case based surveillance system.

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. 

Discussion

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...
get their 9 months MCV1 dose than children receiving DPT1 in early infancy. Such situations arise when measles doses provided during child health days or other similar interventions are included in the routine reports. However, these opportunities should be used to initiate and/or complete the primary series for the DPT/pentavalent vaccines.

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 though 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
10. Measles SIAs coverage data, available from the WHO Regional Office for Africa.
11. Measles case-based surveillance data, available from the WHO Regional Office for Africa.
12. Measles cases reported to WHO and UNICEF through the Joint Reporting Form. See: http://apps.who.int/immunization_monitoring/globalsummary/timeseries/tsicdmeasles.html [accessed 8 January 2015].
Update on elimination of epidemic meningitis in the African Region

Meningococcal meningitis is a life-threatening disease which affects children particularly and young adults below 30 years old. It occurs as large-scale epidemics during the dry season in sub-Saharan Africa in the desert region known as “the African meningitis belt”, which stretches from Senegal in the west to Ethiopia in the east. Infected individuals usually die within the 28–48 hours following the onset. Without treatment, the case fatality rate can be as high as 50%. Between 10–20% of the survivors suffer from permanent disability such as, hearing loss, impaired vision, difficulties in learning. Every year, during the dry season, African populations are affected by meningitis epidemics with thousands of deaths, disability, distress and socioeconomic burden on families and national budget.

In 1995–1996, the African Region suffered from the most devastating ever recorded meningitis epidemic with more than 250 000 cases and 25 000 deaths. This situation prompted the ministries of health of the countries of West Africa, Algeria and Chad to organize a meeting in October 1996 in Ouagadougou, Burkina Faso, in order to find solutions to these devastating meningococcal meningitis epidemics. An appeal was launched to the World Health Organization and partners to find a vaccine to eliminate the deadly and recurring meningitis epidemics in Africa. Note that African public health officials emphasized that the cost of the vaccine will be a key factor for its use in routine immunization programmes and its sustainability. Thus the vaccine to be developed should not cost more than US$1 per dose to allow national budgets to support and sustain its use in routine immunization.

Thanks to a partnership between WHO and the Project for Appropriate Technologies for Health (PATH), with a US$70 million grant from the Bill & Melinda Gates Foundation, the Meningitis Vaccine Project (MVP) was created in June 2001. The goal of MVP is to “eliminate meningitis epidemics as a public health problem in sub-Saharan Africa through the development, testing, licensure and wide spread use of affordable conjugate meningococcal meningitis vaccines”.

In the decade following the creation of MVP, and with the support of Serum Institute of India Limited as well as other key partners, a novel conjugate vaccine against meningococcal meningitis A, responsible for more than 95% of the epidemics in the African meningitis belt, was developed and a market authorization obtained in December 2009. The vaccine is conjugated to tetanus toxoid and is registered and known as MenAfriVac® (PsA-TT).

Clinical trials conducted in Gambia, India, Mali and Senegal showed that MenAfriVac is, highly immunogenic, induces a long-lasting and protective immunity against Neisseria meningitidis A, the main cause of meningococcal meningitis epidemics in Africa.

MenAfriVac was prequalified by WHO in June 2010, opening the way for its large-scale use in the countries of the African meningitis belt, with more than 500 million inhabitants.

After a pilot phase introduction in September 2010 in three districts of around 400 000 inhabitants each in Burkina Faso, Mali and Niger, no serious adverse event was recorded. MenAfriVac...
was officially launched in December 2010 in Ouagadougou, for use in large-scale campaigns in the 26 countries of the meningitis belt, under the leadership of President Blaise Compaoré of Burkina Faso.

By the end of 2013 more than 153 million people aged between 1 to 29 years old have been vaccinated in 12 countries (Benin, Burkina Faso, Cameroon, Chad, Ethiopia, Gambia, Ghana, Mali, Niger, Nigeria, Senegal and Sudan). No case of meningococcal meningitis A has been reported among vaccinated individuals. No case of Neisseria meningitidis A was found in the nasopharynx of vaccinated individuals during carriage studies conducted after the vaccination campaign in Burkina Faso. A sharp decrease in the overall number of meningitis cases in the countries of the belt has also been observed.

It is expected that the introduction of MenAfriVac in all the 26 countries by 2016 will eliminate meningitis A epidemics, responsible for 95% of meningitis epidemics in the African meningitis belt. This will allow channelling toward other health priorities of public health resources currently used to control meningitis epidemics. It will also alleviate the socioeconomic burden of families, communities and national budgets drained as a result of meningitis control, during hospitalization, funerals and rehabilitation of disabled persons.

Regional strategies for meningitis A elimination

While the vaccine was developed and undergoing clinical trials in India and Africa, an investment case for the period 2009–2015 was submitted for financing in May 2008 to the Global Alliance for Vaccine and Immunization (GAVI). Around US$570.9 million was required to introduce the vaccine in the 26 countries of the meningitis belt. The target population of individuals aged 1 to 29 years old, represented around 70% of the population (350 million people to be vaccinated). GAVI approved US$350 million of the requested amount. The key components of the investment case and their costs are:

- Introducing the meningitis A conjugate vaccine through large-scale preventive mass campaigns (1 to 29 years old): US$443.7 million.
- Ensuring adequate epidemic response through establishment of stockpiles of meningococcal polysaccharide vaccines and improving timeliness of epidemic response during MenAfriVac introduction: US$83.6 million.
- Enhancing country level capacity building to ensure adequate capacity for the implementation of the immunization plans: US$26 million.

These key components of the investment case were then refined and translated into a regional strategy for meningitis A elimination. In April 2010, following the market authorization of MenAfriVac which was granted in December 2009 by the Indian National Regulatory Authority, the Drug Controller General of India (DCGI), the Regional Director of WHO-AFRO convened an informal meeting in Brazzaville to brief staff and refine the regional strategy into three main components as follow:

- Inducing herd immunity through the organization of mass vaccination campaigns in the 26 countries of the belt between 2010 and 2016.
- Protecting birth cohorts through:
  - Introducing MenAfriVac in routine immunization starting 2015 in under one year olds; and
  - Organizing follow-up campaigns every five years, in the under five years old, not covered by routine immunization.
- Strengthen surveillance and epidemic response during the introduction process.

Given the limited production capacity of the manufacturer (SIIL), there was a need to prioritize the countries based on their disease burden and current epidemiological situation, the country’s readiness (introduction plan ready, updated country multi-year plan, adequate cold chain, waste management and logistics, existing and adequate case-based surveillance system with laboratory capacity), and participation in the clinical trials (ethical aspect).

Figure 1 illustrates the roll out of the vaccines with more than 153 million people having been vaccinated in the 12 countries that have introduced the vaccine in mass campaigns.

Early impact on meningitis profile and discussions

Following the large-scale introduction of MenAfriVac in countries between 2010 and 2013, some major impacts on disease morbidity, nasopharyngeal carriage, and a shift in bacteriological profile were observed:

![Figure 1. Map showing the roll out of MenAfriVac 2010–2014](image)
A constant decrease in the overall number of meningitis cases from year to year (see Figure 2). In Burkina Faso where a study was conducted, a 99% decrease in the morbidity of MenA cases was observed. This is also highlighted in the weekly meningitis surveillance bulletin produced by the WHO surveillance team, monitoring the meningitis situation in the countries of the meningitis belt since 2001.

A constant decrease in the overall number of Neisseria meningitidis cases in the belt but more importantly its disappearance in the countries that have conducted MenAfriVac campaigns (see Figure 3). Laboratory data is collected from countries of the meningitis belt on a weekly basis.

The observed increase in the proportion of other causes of meningitis such as Streptococcus pneumoniae and Neisseria meningitidis W135 is due to the decrease in the number of Neisseria meningitidis A which represents 95% of cases during large scale meningitis epidemics before MenAfriVac introduction in the belt. Thus, it is too early to conclude that the vaccine has induced a serogroup replacement (see Table 1).

The disappearance of MenA in the nasopharynx of vaccinated individuals, as observed in a series of carriage

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Table 1. Laboratory results reported by countries from January to June 2014

<table>
<thead>
<tr>
<th>Country</th>
<th>Number CSF</th>
<th>CSF contam.</th>
<th>In process</th>
<th>CSF negative</th>
<th>NmA</th>
<th>NmB</th>
<th>NmC</th>
<th>NmX</th>
<th>NmY</th>
<th>NmW135</th>
<th>Other Nm ind.</th>
<th>S.Pneum</th>
<th>Hib</th>
<th>Other pathogens</th>
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<tr>
<td>Benin</td>
<td>79</td>
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<td>71</td>
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<td>0</td>
<td>0</td>
<td>0</td>
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<td>0</td>
<td>3</td>
<td>0</td>
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</tr>
<tr>
<td>Burkina Faso</td>
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<td>1 135</td>
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<td>0</td>
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<td>Ghana</td>
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<td>0</td>
<td>1</td>
<td>41</td>
<td>0</td>
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<td>27</td>
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<td>Guinea</td>
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<tr>
<td>Nigeria</td>
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<td>Democratic Republic of the Congo</td>
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<tr>
<td>Togo</td>
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<td>0</td>
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<td>4</td>
<td>9</td>
<td>2</td>
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<tr>
<td>Total</td>
<td>3 387</td>
<td>4</td>
<td>196</td>
<td>2 327</td>
<td>5</td>
<td>2</td>
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<td>231</td>
<td>28</td>
<td>505</td>
<td>22</td>
<td>49</td>
</tr>
</tbody>
</table>
In a study conducted in Chad during the 2012 epidemic season, a 94% decrease in crude incidence was observed between the non-vaccinated districts compared with the districts that benefited from the 2011 MenAfriVac vaccination campaign. In addition, the same study found zero percent carriage in the vaccinated individuals compared with non-vaccinated individuals where the Neisseria meningitidis A carriage prevalence was 0.75% before the MenAfriVac campaigns. Thus, they concluded that MenAfriVac was highly effective at preventing serogroup A invasive meningococcal disease and carriage in Chad. But, how long this protection will persist needs to be established. Further studies on antibody persistence are needed to determine the duration of immunity.

- No serious adverse event following immunization was reported during the MenAfriVac campaigns in the 12 countries from 2010 to 2013. During vaccination campaigns, a strong active monitoring surveillance system for any adverse event following immunization (AEFI) is undertaken in all countries. Both minor and severe AEFI are reported to the national expert committee where causality assessment is undertaken. To date, with more than 153 million people vaccinated in 12 countries, no serious AEFI has been linked to the vaccine.

### Conclusion

The successful development of MenAfriVac is a vaccine development model for Africa. This is the first time African leaders have demanded a vaccine to address an unmet major public health need. The creation of the MVP represents a good example of North-South partnership, with the critical role of a developing country vaccine manufacturer, (SIIL), with the state-of-the-art development of an affordable vaccine specifically designed for Africa. The registration of this vaccine will certainly pave the way for innovative regulatory pathways for the registration of new vaccines ahead of their introduction. Finally, MenAfriVac has proved to be a safe and highly immunogenic vaccine. Further studies need to be conducted to ascertain the duration of protective immunity. Following its large-scale introduction in the countries of the meningitis belt, observations made include a decrease in the overall morbidity of meningitis, no case of meningococcal A disease and no nasopharyngeal carriage by immunized individuals. A shift in bacteriological profile in meningitis was observed, but it is too early to conclude on a serogroup replacement. However, the strategies for surveillance and control in the belt have to be revised appropriately, as Neisseria meningitides A cases are dropping to near zero. The next step is to be well prepared for the introduction of MenAfriVac in routine immunization starting in 2016, to protect the birth cohorts and to organize follow-up campaigns to vaccinate those not reached by routine immunization.

### References

Progress towards the elimination of maternal and neonatal tetanus

Messeret Shibeshi, Balcha Masresha, Ahmadu Yakubu, Fussum Daniel, Nestor Shivute, Richard Mihigo, Deo Nshimirimanai

Corresponding author: Messeret Eshetu; e-mail: eshetum@who.int

In the late 1980s, the World Health Organization estimated that about 787,000 new-born babies died from tetanus within the first 28 days of their lives. Following progress in some Member States, in 1989, the World Health Assembly called for the elimination of neonatal tetanus (NT) by 1995. By 1999, 104 of 161 developing countries had achieved elimination. The global maternal and neonatal tetanus elimination (MNTE) initiative was launched by WHO, UNICEF and the United Nations Population Fund (UNFPA) in 1999, and these organizations jointly continue to spearhead the efforts to eliminate maternal and neonatal tetanus (MNT) by 2015, the target date for worldwide elimination of the disease. In line with the global targets, the WHO African Region developed strategic approaches to accelerate the achievement of MNTE in Member States and supported them to develop and implement national plans including validation of the achievement of elimination through neonatal mortality surveys.

WHO defines NT elimination as an annual rate of less than 1 case of NT per 1,000 live births at the district level; maternal tetanus is considered eliminated when NT is eliminated. To achieve the elimination goal of MNT the main strategies recommended by WHO consist of promotion of clean delivery practices, immunization of women against tetanus targeting pregnant women and those in the child-bearing age group (15–44 years) with a tetanus toxoid-containing vaccine (TT) in routine immunization, or provision of at least three doses of TT through supplemental immunization activities (SIAs), targeting women of reproductive age that reside in areas classified as being at high risk for MNT, and case-based surveillance to identify NT cases and deaths as well as the assessment of the risk-status of the area.

However, progress in elimination has been delayed in the Region, due to slow implementation of the recommended strategies with some Member States yet to achieve elimination despite the approaching elimination target year. NT therefore remains a public health problem in 12 countries: Angola, Central African Republic, Chad, Democratic Republic of the Congo, Equatorial Guinea, Guinea, Kenya, Mali, Mauritania, Niger, Nigeria and South Sudan, as well as the Somali region of Ethiopia. It is estimated that the current reporting system captures fewer than 10% of cases. This is because most of the affected rural communities find health care difficult to access; populations rely rather on traditional and spiritual healers for such diseases of sudden onset, and health facilities are only visited as a last resort. This is coupled with the fact that the existing surveillance system is focused more on review of medical records at health facility level with limited community surveillance component.

Methods

To assess the progress towards MNTE targets, the performance was reviewed using reports from the WHO and UNICEF.

Results

According to WHO-UNICEF estimates, coverage with the second dose of tetanus toxoid (TT2+), a proxy for protection at birth (PAB), was estimated at 55% in 2000 as compared with 75% by 2013. As a result of the progress made in routine
immunization and through SIAs using the high risk approach, a total of 2,776 NT cases were reported in 2013 as compared with 5,175 cases reported in 2000 via the WHO-UNICEF Joint Reporting Form, indicating decline of cases. However, skilled delivery remains low and needs to be increased to sustain the gains achieved towards elimination. Skilled delivery is 36% and 42% in Eastern and Southern Africa while it was 36% and 47% in West and Central Africa showing that the skilled delivery rate is still low in African countries.

Discussion

The Member States of the African Region have made remarkable progress towards achievement of the goal of MNTE. Of the 35 countries that attained MNTE between 2000 and June 2014 out of 39 priority countries globally, 25 (71%) are in the African Region. This is in addition to the nine countries that were already classified as having achieved elimination in 1999. These countries are also being supported to sustain their efforts so as to maintain their MNT elimination status. This support and guidance includes a shift from the use of TT-only vaccine to Td vaccine given as a booster in schools and to pregnant women during antenatal care.

The remaining 12 Member States that are yet to attain MNTE have their plans of action as part of the comprehensive multi-year plan for immunization, and are at different levels of strategic implementation of their planned activities to achieve elimination.

To improve coverage with at least two protective doses of TT-containing vaccine, efforts are continuing through the scale up of the RED approach, in Member States where most have adopted the five-dose TT schedule in their immunization programmes. Countries have used the WHO strategic guidance to prioritize the high-risk districts that are likely to harbour NT cases and conduct at least three rounds of TT SIAs targeting women of reproductive age in the African Region received at least two doses of TT vaccine.

Surveillance activities

Integrated Disease Surveillance and Response (IDSR) is the main strategy that is being followed for notification, reporting and action in the Region. Efforts are ongoing to integrate NT surveillance into the active acute flaccid paralysis (AFP) surveillance for polio using the vast infrastructure already in place. However, more cases are being documented through the IDSR than through the case-based surveillance for NT and cases are not followed by the appropriate response. Additionally, a significant number of the NT cases being reported through routine surveillance have been found not to be truly NT cases during programme reviews, pre-validation assessments or validation surveys, but more cases compatible with neonatal infections especially neonatal sepsis.

Promotion of clean delivery practices

Promoting clean delivery is an effective way to reduce maternal and neonatal infections, including tetanus. Improving maternal health has been given high priority by initiatives such as the Safe Motherhood Initiative. But with only 30–40% of births attended by skilled health personnel in the least developed countries, there are still numerous challenges ahead. Distribution of clean delivery kits, community education, and training of skilled birth attendants (midwives, nurses, doctors) are three examples of how delivery practices are being improved.

The shortage of midwives, cultural preferences of location of births, economic factors and attitude of health staff are, among others, some of the reasons for the number of low skilled attendants at birth in African Region. Only one in two births in sub-Saharan Africa and South Asia are attended by a skilled provider.

Conclusions

The goal of eliminating maternal and neonatal tetanus by 2015 has been achieved by 34 out of 47 (72%) of the WHO African Region Member States. The remaining 13 (inclusive of a region in Ethiopia) need to be supported to use the high risk approach, including increasing funding, to achieve the elimination goal while those who have achieved the goal need to sustain their significant achievement through the implementation of appropriate strategies depending on their local context. Additionally, surveillance for NT needs to be strengthened to include local response vaccination in areas where NT cases are identified.

References

Vaccine safety and pharmacovigilance in the WHO African Region

Bartholomew D Akanmori,1 Mutale Mumba,2 Madhav Balakrishnan,3 Isabelle Sahinovic,2 Richard Mihigo2
Corresponding author: Bartholomew D Akanmori; e-mail: akanmori@who.int

Every vaccine has a lifecycle, which starts with discovery, to clinical evaluation, licensure and eventual introduction and use in routine immunization programmes. During clinical trials of new candidate vaccines all adverse events associated with vaccination are monitored. Clinical trials are, however, limited in their ability to detect rare and late occurring adverse events associated with vaccination due to smaller sample size and limited participant follow-up time.1,2,3 Careful, systematic and regular monitoring for possible infrequent but serious adverse events following immunization is thus desirable during the post-marketing, widespread use of any vaccine. An adverse event following immunization (AEFI) is defined as any untoward medical occurrence which follows immunization and which does not necessarily have a causal relationship with the usage of the vaccine. The adverse event may be any unfavourable or unintended sign, abnormal laboratory finding, symptom or disease.4

Vaccine safety and pharmacovigilance has, therefore, assumed more significance in the WHO African Region which has also seen a growth in clinical development of new vaccines as well as their introduction into the national immunization programmes in many countries. Some of the vaccines being introduced include pneumococcal conjugate, conjugate meningococcal A meningitis, human papilloma virus, rotavirus and rubella. For the first time a vaccine against malaria, RTS,S/AS01, is in phase 3 clinical trial in seven countries in the Region, which if licensed and pre-qualified could be added to the list.

SUMMARY—In recent years the WHO African Region has seen a growth in clinical development of new vaccines as well as their introduction into the national immunization programmes of many countries. Recognizing the critical need for vaccine safety and pharmacovigilance, WHO has been supporting individual and institutional capacity building in the Region to strengthen the monitoring and response to adverse events following immunization through implementation of the Global Vaccine Safety Blueprint. This framework is discussed along with general points about the importance of ensuring vaccine safety and the system needed to enable this. The article ends with a brief overview of the status of vaccine safety and pharmacovigilance and the key priorities for countries in the Region for the immediate future.

Voir page 66 pour le résumé en version française.
Ver a página 66 para o sumário em versão portuguese.
Recognizing the critical need for vaccine safety and pharmacovigilance, WHO has been supporting individual and institutional capacity building for the countries of the Region to implement the Global Vaccine Safety Blueprint, a strategic framework for strengthening the monitoring and response to AEFIs.5 Pharmacovigilance is one of the six required regulatory functions of national regulatory authorities (NRAs) for vaccines. In this context, WHO has developed an assessment tool to support institutional capacity building of NRAs, consisting of seven indicators and 28 sub-indicators. This tool allows countries to prepare development plans that guide institutional building efforts and to identify technical support needs for all areas of regulation of medicines, including vaccines.

Why vaccine safety?

Annually, vaccines prevent more than 2.5 million child deaths globally and it is projected that an additional 2 million child deaths could be prevented through immunization with currently available vaccines. Most vaccines are very safe and prevent disease or infection altogether. Vaccines have the special advantage of promoting health, having an expansive reach, significant impact (eradication of smallpox, elimination of polio and reduction in measles-related deaths) and saving lives and resources which would have been spent on managing diseases.

Vaccines are prepared with different types of antigens, using different scientific methods, which include attenuation, inactivation and recombination DNA technology. In addition, some vaccines have components to enhance immune response, such as adjuvants, while for others protein conjugation to polysaccharide (conjugate vaccines) allows for a stronger immune response. Vaccines can also contain antibiotics, stabilizers and preservatives to reduce contamination during the manufacturing process and to maintain their effectiveness during transport and storage. Because of this variety of excipients regulatory authorities must therefore ensure that all vaccine components, singly and in combination, do not compromise vaccine safety.

Public trust is critical to the success of immunization programmes. In recent years, a number of newspapers, publications and websites have provided unbalanced, inaccurate, misleading and alarming information about vaccine safety, making it more difficult to identify and access reliable sources of information about vaccines. This could adversely erode the significant gains made by immunization programmes in the African Region and slow the progress towards control, elimination and eradication of vaccine-preventable diseases. For these and other reasons it is important for countries to have in place appropriate safety monitoring systems for reporting, analysis, causality assessment and communication of any AEFIs. This will reinforce the confidence in vaccines and immunization programmes.

Figure 1. The surveillance cycle for adverse events following immunization (AEFI)

Requirements of a functional vaccine safety and pharmacovigilance system

The Global Vaccine Safety Blueprint defines the requirements for a functional vaccine safety and pharmacovigilance system. This requires collaboration between the national expanded programme on immunization (EPI), national regulatory authority, national pharmacovigilance centres (NPCs), AEFI review committee and other groups (interagency coordinating committee, national immunization technical advisory group, health professional associations etc.). The system should capture AEFI reports, investigate AEFIs, analyse the data, conduct causality assessment, define corrective actions and follow up the AEFIs and clearly communicate on AEFIs (see Figure 1).

This cycle depicts the steps for an effective AEFI surveillance system,
from identification, to notification, reporting, investigation, analysis, causality assessment, feedback and corrective action.

**WHO Global Vaccine Safety Blueprint**

Recognizing the need to strengthen capacity for vaccine safety especially in low- and middle-income countries, which lack this capacity, WHO and partners developed a strategic framework document on vaccine safety called the Global Vaccine Safety Blueprint, in 2011. The document sets out key indicators that aim to ensure that all countries have at least a minimal capacity to ensure vaccine safety. The Blueprint defines a strategy for strengthening safety activities globally.

The primary focus is to establish national capacity for vaccine safety in countries lacking this capacity through the coordinated efforts of all major stakeholders. The development of the document was achieved through consultations of experts globally and clearly defines its mission, vision and goals.

The Blueprint proposes three priority objectives:

- Establishing minimum capacity for vaccine safety and pharmacovigilance in each country;
- Enhanced approach in special situations; and
- Development of a global technical support network.

The eight strategic objectives of the Blueprint, which are being implemented by countries with the support of WHO are:

- Detection of AEFI;
- Adequate investigation of safety signals;
- Adequate communication of vaccine safety issues;
- Use of appropriate tools and methods;
- Ensuring a regulatory framework is in place;
- Technical support and training;
- Global analysis and response; and
- Public-private information exchange.

Table 1. Template for development of country work plans for vaccine safety and pharmacovigilance

<table>
<thead>
<tr>
<th>Specific activities</th>
<th>Current status</th>
<th>Needs to be addressed by 2015</th>
<th>Estimated cost</th>
<th>Source of funding</th>
<th>Person(s) responsible</th>
<th>Stakeholders and partners</th>
<th>Monitoring and evaluation</th>
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<tr>
<td>Means for assessment of regional and district AEFI committees</td>
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<td>Feedback bulletin</td>
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</table>

The workshops evolved around a template for the development of work plans. The template defines the areas of activity, the baseline or current status, specific plans to fill gaps, estimated cost of achieving the results, source of funding, responsible person(s), partners and stakeholders, and a monitoring and evaluation framework to track progress made. The template is presented as Table 1.

WHO is also training the national AEFI committees for countries, who will in turn train provincial/regional and district committees. WHO has developed tools for causality assessment, training on vaccine safety and pharmacovigilence by countries.
Status of vaccine safety and pharmacovigilance in the WHO African Region

Eight anglophone countries (Ethiopia, Ghana, Kenya, Malawi, Nigeria, Uganda, United Republic of Tanzania and Zambia) and seven francophone countries (Burundi, Côte d’Ivoire, Cameroon, Democratic Republic of the Congo, Guinea, Madagascar and Togo) have been supported to develop work plans for 2014 and 2015. The countries have started implementation of their plans.

Prioritization and advocacy for pharmacovigilance and safety will ensure that it remains firmly on the global, regional public and national health agenda.

Clear definition of roles and responsibilities of each stakeholder institution ensures sustainability and attainment of goals.

Regular monitoring and evaluation of the status of implementation is essential to the success of building capacity for vaccine safety and pharmacovigilance.

Resource mobilization by all stakeholders is critical to success.

Partnerships at all level is also important.

This includes establishment or training of national expert committees, establishment of mechanisms for collaboration between stakeholders, collection, analysis and reporting of AEFI. Evaluation of the status of implementation, and support where required, is ongoing through teleconferences and e-mail exchanges.

The national expert committee for AEFI of the United Republic of Tanzania was trained in the use of the new WHO causality assessment tool by a panel of international experts. In addition, six international participants from Ethiopia, Ghana, Kenya, Malawi, Nigeria and Zimbabwe attended the meeting. Similar workshops will be conducted in their respective countries as part of a regional effort to strengthen national capacity for vaccine safety.

References


Summary

Thirteen years ago, WHO-AFRO proposed the establishment of a sentinel disease surveillance network as part of efforts to improve surveillance for invasive bacterial diseases (IBD) including paediatric pneumonia and meningitis and rotavirus diarrhoea in all Member States as part of surveillance for vaccine-preventable diseases and in line with the regional strategy integrated disease surveillance and response (IDSR). This was prompted by the eminent availability of new and prospective vaccines against Haemophilus influenzae type b (Hib), Streptococcus pneumoniae (S. pneum), Neisseria meningitides (Nm) and rotavirus vaccines. The Regional Office for Africa developed guidelines and tools and standardized methodology, including cases definitions to be used to recruit eligible cases. This article outlines the challenges and results of this initiative to date and aims for the future.

Global surveillance systems monitor the multifaceted syndromes associated with these illnesses to guide choice, and timing of application of various interventions including vaccination against disease responsible for major childhood diseases as part of efforts to decrease childhood mortality to accelerate progress towards attaining Millennium Development Goal 4.

Methods and overview of approaches for implementation of sentinel surveillance

WHO recommends national ministries of health in each country initiate and implement high quality sentinel surveillance supported by a surveillance implementation team, including:

- Ministry of health focal point responsible for VPD surveillance;
- Sentinel hospital focal point – should be a paediatrician;
- Evaluation of the impact of these vaccines post introduction.

Pneumonia, meningitis and diarrhoeal diseases cause significant childhood mortality worldwide, placing an intolerable burden on families, societies and economies, significantly straining scarce national resources such as hospitals and the health system as a whole. Hence, it is imperative that disease surveillance systems monitor the multifaceted syndromes associated with these illnesses to guide choice, and timing of application of various interventions including vaccination against disease responsible for major childhood diseases as part of efforts to decrease childhood mortality to accelerate progress towards attaining Millennium Development Goal 4.
The sentinel site implementation team should have clearly defined roles and responsibilities, including advocating with the hospital administration and coordination of sentinel surveillance at the hospital level on behalf of the ministry of health and the country.

Sentinel surveillance is conducted within the context of childhood vaccination programmes. All children under the age of five years admitted to a sentinel hospital and who meet standardized case definitions as indicated below are recruited and key variables captured using a standard case investigation form.

Case definitions for suspected cases

- **Bacterial meningitis**: any child aged 0–59 months admitted to a sentinel hospital conducting surveillance with sudden onset of fever (>38.5°C rectal or 38.0°C axillary) and one of the following signs: neck stiffness, altered consciousness with no other alternative diagnosis, or other meningeal sign.
- **Bacterial pneumonia**: any child aged 0–59 months admitted to a sentinel hospital conducting surveillance presenting with a cough or difficulty in breathing and displaying fast breathing when calm, as defined by age (0 to <2 months: 60 breaths/minute or more; 2 to <12 months: 50 breaths/minute or more; 12 to <59 months: 40 breaths/minute or more).
- **Rotavirus acute gastroenteritis**: any child aged 0–59 months admitted for treatment of acute (i.e. ≤14 days) watery gastroenteritis/diarrhoea to a sentinel hospital conducting surveillance. Excluded are children with bloody diarrhoea and children transferred from another hospital.

Use of consistent case definitions is critical; not only does it avoid an over- or under- estimation of cases, but consistency is also necessary to standardize data over time, both within a sentinel site and among different sites. All sentinel site surveillance should include children who meet the case definition for suspected meningitis (Tier 1). Some sentinel site surveillance systems will also include children who meet the case definitions for pneumonia or sepsis (Tier 2). Once fully established, this surveillance system for severe paediatric infections can also be adapted to monitor other vaccine-preventable diseases.

WHO recommends that each country conduct sentinel surveillance using at least one major hospital serving children under five years. The sentinel hospital could be either a national public or private facility, as long as it is considered to be the largest hospital in the region, serving the greatest number of patients under five, and has adequate resources for conducting surveillance for vaccine-preventable diseases. For the sentinel surveillance at least one principal hospital serving the greatest number of children in each country is preferred over national surveillance for the following reasons:

- Ministry of health staff can easily perform active surveillance and supervision of surveillance activities, these are critical elements to ensure an ongoing functional and sustainable surveillance system that produces high quality and reliable data.
- The principal hospital will likely have the best clinical practices and laboratory capacity in the country, and thus identifying children likely to have an illness due to these organisms is easier and less expensive than conducting surveillance throughout the country.
- As long as there is consistency in surveillance practices (including use of correct case definition, collection of CSF specimens and blood cultures, stool samples), and the population served by the hospital remains constant, diarrhoea, bacterial pneumonia and meningitis trends can be monitored over time and comparisons can be made before and after vaccine introduction regarding disease occurrence, serotype or strain of the causative organism, and severity of clinical presentation.
- Rapid and timely diagnostic and confirmatory testing for rotavirus and bacterial pathogens is done either at
the hospital or national laboratories whereas WHO-supported regional reference laboratories provide facilities of laboratory quality control and assurance and also further characterization and serotyping using advanced molecular genetic methods.

Children under five hospitalized with severe diarrhoea are enrolled and stool specimens collected for detection of rotavirus strains using a commercial enzyme immunoassay in the case of rotavirus surveillance. Similarly, cerebrospinal fluid (CSF) and blood is collected from under fives with pneumonia and bacterial meningitis for surveillance for invasive bacterial diseases.

Sentinel surveillance data originate from the sentinel hospital. They are forwarded to the ministry of health who compile data provided by different sentinel sites, clean data to remove errors and share harmonized data with WHO.

Results and progress

Currently, 34 sentinel sites in 34 Member States are conducting sentinel surveillance and reporting data monthly on the three most common causes of bacterial meningitis and pneumonia: *Haemophilus influenza*, *Streptococcus pneumoniae* and *Neisseria meningitides*. A similar network, comprising of 26 sentinel sites in 20 countries are conducting surveillance for rotavirus diarrhoea in under fives in the African Region (Figure 1). The countries involved in rotavirus surveillance monitor hospitalizations due to severe diarrhoea in under fives and also the trends of the circulating rotavirus strains and report to WHO and immunization partners. The regional sentinel surveillance network includes sentinel surveillance hospitals and laboratories that report characteristics and specified variables of clinical symptoms and rotavirus testing data for children under five hospitalized with acute gastroenteritis to ministries of health and WHO. In addition to managerial oversight, WHO provides technical assistance to countries, as well as financial support to countries to implement these surveillance activities.

Sentinel surveillance for paediatric bacterial meningitis continues to provide useful data to support the introduction of new life-saving pneumococcal conjugate vaccines (PCV). All 47 countries in the region have successfully introduced Hib containing vaccines into EPI. Additionally, 30 countries (Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Congo, Central African Republic, Democratic Republic of the Congo, Ethiopia, Gambia, Mauritania, Ghana, Kenya, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe) have introduced pneumococcal conjugate vaccines into national immunization programmes; the two vaccines provide additional interventions to avert substantial mortality and morbidity due to pneumonia, meningitis and other deadly childhood diseases caused by the pneumococcus bacterium and Hib. Notably, take up of rotavirus vaccines started slowly in the African Region, with only one country (South Africa) having introduced rotavirus vaccine into national EPI by 2009. However, with the increased awareness of rotavirus diarrhoea, the availability of rotavirus disease burden data provided by sentinel surveillance and support from WHO and other partners, countries in the region started rolling out the vaccine mid-2012 and currently 22 countries (Angola, Botswana, Burkina Faso, Burundi, Cameroon, Congo, Eritrea, Ethiopia, Gambia, Ghana, Kenya, Madagascar, Malawi, Mali, Rwanda, Sierra Leone, South Africa, South Sudan, Togo, United Republic of Tanzania, Zambia, Zimbabwe) have introduced it into EPI. Moreover, the remaining countries are expected to introduce rotavirus vaccine in the near future.
Discussion and challenges

Between 2006 and 2013, data reported to WHO-AFRO through sentinel surveillance show approximately 96,000 cases of suspected bacterial meningitis were reported in children aged under five, caused by three major bacterial meningitis pathogens, with Streptococcus pneumoniae accounting for 20–35%, while Hib is responsible for 1–5% and Nm 2–3%. During the same period, 53,898 children under five were hospitalized for acute diarrhoea in 34 participating hospitals in 20 African countries. Rotavirus accounted for 40.7% of the total diarrhoeal hospitalizations in under fives in the region and approximately 90% of rotavirus diarrhoea occurs in children under two years.

Conducting high quality invasive bacterial diseases surveillance is challenging and also resource intensive and more so if it includes pneumonia and sepsis surveillance with collection of blood specimens for culturing. This is in part due to inherent diagnostic difficulties in identifying the bacteria in specimens taken from patients who had prior antibiotics treatment as well as managing the timely processing of clinical specimens in laboratories.

It is important to note that hospital-based sentinel surveillance focuses on the most severe cases (hospitalized children) of diseases under investigation, and thus the information generated from this system alone may not be extrapolated accurately to quantify the disease burden occurring in the country.

Conclusion and way forward

Robust regional sentinel surveillance has been established building on existing infrastructure for disease surveillance in more than half of the Member States. This sentinel surveillance has contributed high-quality data that have been used to estimate the country or regional specific rotavirus diarrhoeal disease burden in support of introduction of new vaccines. The regional sentinel surveillance network seeks to ensure each country has its own data (i.e. Tier 1 meningitis data) that can be combined with information generated from other sources, for example hospital records and health information management systems, to accurately estimate the country and regional specific disease burden.

The regional long-term vision is to use this surveillance system and abundant data on the circulating rotavirus and pneumococcal strains/serotypes and to build a system for evaluation of vaccination impact and to guide immunization programmes as new vaccines are introduced.

It is important for Member States to increase investment to sustain and further strengthen ongoing sentinel surveillance. There is also need for Member States to accurately document numbers of children vaccinated and vaccine coverage to assess the true value and impact of these new vaccines on the disease burden. Already, the benefits of vaccination with these new vaccines is being demonstrated, for example the introduction of a pneumococcal conjugate vaccine (PCV) in 2009 in South Africa has not only reduced the overall incidence of invasive pneumococcal disease by about two-thirds in infants (the age group vaccinated) and in adults, but has also reduced penicillin-resistant infections in both groups.14

Data from South Africa also point to another benefit of vaccination; stemming a rising tide of antibiotic resistance in the developing world.15 In order to sustain these gains, WHO and partners will intensify advocacy at the global level to further accelerate the introduction of new vaccines and engage key immunization partners to ensure regular and sustainable access to supplies of new vaccines.

References

Overview of the WHO Polio Laboratory Network in the African Region

Nicksy Gumede,1 Alex Gasasira,1 Mbaye Salla,1 Reggis Katsande,2
Charles Byabamazima,1 Annick Dosseh,3 Deo Nshimiriman3
Corresponding author: Nicksy Gumede; e-mail: gumedemoeletsih@who.int

A plan of action was formulated in 1989 detailing laboratory support for the global eradication of poliomyelitis. Its function was to describe the activities needed to establish a three-tiered global network of polio laboratories, each with well-defined responsibilities. Today, at all three levels of the network (national, regional and global specialized), laboratories work together in the largest coordinated public health laboratory network.

The WHO Polio Laboratory Network (LabNet) in the African Region plays a critical role in the global Polio Eradication Initiative (PEI). Timely, accurate laboratory results drive public health action and help shape policies. The mission of LabNet contributes to improving the quality of laboratory services for effective acute flaccid paralysis (AFP) surveillance.

The network that was established in 1993 and provides support to 47 African Region and 1 Eastern and Mediterranean Region countries, with 16 polio laboratories, namely: Algeria, Cameroon, Central African Republic, Côte d’Ivoire, Democratic Republic of the Congo, Ethiopia, Ghana, Nigeria (with two labs), Kenya, Madagascar, Senegal, South Africa, Uganda, Zambia and Zimbabwe, assigned to perform laboratory diagnosis of polioviruses. The three laboratories in Ghana, Central African Republic and South Africa are the regional reference laboratories. The global reference laboratory at CDC Atlanta supports sequencing laboratories in South Africa and in Ghana by further analysing query sequencing and performing a regional level function for the Nigeria and Cameroon laboratories.

The eradication of poliomyelitis will be accomplished only when these laboratories provide convincing diagnostic evidence of the absence of wild poliovirus infections in humans and prolonged circulation in the environment. In addition, because these laboratories store specimens from AFP cases and wild polioviruses isolates, containment of these materials and viruses remains one of the laboratories’ key responsibilities as a pre-requisite for certifying Africa free of polio.

From 2006, LabNet made changes to the laboratory diagnostics protocols and this has improved laboratory performance and reduced the results’ turnaround time dramatically. These changes have necessitated strengthening laboratory quality control and quality assurance systems through the implementation of new algorithms.

There is growing recognition that the quality of LabNet serves as catalyst for the PEI by providing timely results. This article outlines some of the progress, performance and critical support provided by LabNet towards achieving the polio eradication target in Africa.

Methodology

The laboratory performance indicators listed in Table 1 provide information about the capability and the capacity of any laboratory to detect, identify and promptly report wild polioviruses, vaccine-derived polioviruses (VDPV)
and Sabin viruses that may be present in clinical and environmental specimens. These laboratory indicators can further indicate if there is a need for learning opportunities, serve as a mechanism for identifying resources and training, and can be a measure of the progress of a laboratory.

**Laboratory performance**

From 2010 to August 2014, 187,837 samples were received by LabNet for viral isolation (Figure 1) with Nigeria’s Ibadan laboratory processing approximately 50,000 and 50% of labs processing more than 10,000 samples. All laboratories managed to report the isolation results within the 14 days’ turnaround time.

In the same period, 18,097 isolates were received for intratypic differentiation and two laboratories received over 3,000 isolates. The ITD results were reported within the expected time of seven days and the 80% target was reached by all 16 laboratories.

**Virus isolation**

The faecal specimens of AFP cases were processed at the national polio laboratories for virus isolation as per the WHO laboratory manual (version 4). Briefly, tube cultures of cell lines were inoculated with 0.2ml of specimen extract and incubated in the stationary sloped (50) position at 360°C. Cultures were monitored daily using standard or inverted microscopes for the appearance of cytopathic effect (CPE). All cell lines with characteristics of enterovirus CPE were stored at 20°C for a second passage in a tube containing 2ml of medium. Second passage material with CPE were reported as suspected poliovirus and forwarded to regional laboratories for intratypic differentiation (ITD).

**Intratypic differentiation**

Intratypic differentiation assay is used to screen out isolates that are wild polioviruses from those that are vaccine strains. All viral isolates that had shown CPE (infected with virus) in L20B or human rhabdomyosarcoma (RD) cell line were tested using an rRT-PCR (real-time assay) that included separate reactions with specific poliovirus strains, and specific serotype 1, 2 and 3 polioviruses and further screening for vaccine-derived polioviruses (VDPVs).
Results

Samples reported as suspected polioviruses were tested by ITD assay and were identified as wild polioviruses and discordant Sabins. All wild polioviruses and discordant Sabins were further characterized by the sequencing method.

Of the tested isolates, 17,560 isolates identified the following poliovirus strains: wild 1 was identified on 3,089 isolates, 5,147 were Sabin 1, 2 were VDPV1, no wild 2 was identified, 3,073 were Sabin 2, 115 were VDPV2, 346 were wild 3, 5,599 were Sabin 3, 2 were VDPV3 and 187 isolates were identified as non-polio enteroviruses (NPEV) (Figure 3).

All 16 laboratories staff have been trained and are fully competent in performing the ITD assay. This has reduced the turnaround time of results to be reported to the programme. In addition, the sequence capacity has been expanded in order to increase the number of laboratories capable of analysing viruses by sequencing. All laboratories are fully accredited.

Discussion

LabNet is made up of 16 laboratories that perform high-level quality assurance systems to ensure the production of excellent, timely and accurate results. The detection of different poliovirus strains in the Region by LabNet within set turnaround times is an indication of a well-managed network. Successful implementation of new diagnostic technology reduced reporting results times by around 50%, which has greatly assisted the PEI programme.

The results produced by the laboratories have been used to answer epidemiological questions regarding the likely location of endemic virus reservoirs, patterns of virus transmission or source of imported strains and are contributing to the progress towards the eradication of polioviruses.

At the country level, the integration of laboratory networks such as polio, measles, yellow fever, rotavirus and influenza has taken root with resultant shared technologies, shared human resources, joint planning and support of missions. This will ensure that the investment in polio eradication provides public health dividends for years to come.

Conclusion

LabNet has implemented and maintained high standards of performance and set the stage for laboratory integration in Africa. The network has significantly reduced the results’ turnaround time by more than 50%. Genetic sequence information generated suggests regional progress in reducing the wild poliovirus reservoir as evidenced by a reduction in the number of circulating viruses.

References

Summary—Systematic environmental surveillance (ES) for polio virus circulation has been conducted in Africa since 2011. This environmental surveillance has revealed circulating vaccine-derived polioviruses (cVDPVs) and wild polioviruses (WPVs). In addition to acute flaccid paralysis (AFP) surveillance, environmental surveillance can be used to monitor the wild poliovirus and vaccine-derived poliovirus circulation in populations, thus supporting the mission of polio eradication. This report describes the progress and expansion of environmental surveillance in the African Region.

Since the launch of the Global Polio Eradication Initiative (GPEI) in 1988, cases of poliomyelitis have dropped by more than 99 per cent. No type 2 wild poliovirus (WPV2) has been identified since 1999 and the remaining serotype 1 is limited to endemic countries and in outbreak settings.

The World Health Organization strategy for monitoring the wild polioviruses and mutated vaccine polioviruses is to identify virus isolates from AFP (sampling contacts is also supplemental to AFP surveillance). Environmental surveillance (ES) serves as an additional method to monitor the transmission of poliovirus by testing sewage samples, which may contain polioviruses in human faeces.

Environmental surveillance started in the African Region in July 2011 in Kano and expanded later to Sokoto, Lagos, Kaduna, FCT, Kebbi, Katsina and Borno states of Nigeria. In 2013, Kenya started its first environmental sampling as a pilot...
study to supplement AFP surveillance after a Horn of Africa WPV1 outbreak in May 2013. Two sites were identified and sampled in 2013, Kamukunji and Kibera. Furthermore, an expansion to other areas is planned, such as Mombasa in the coastal area, major urban areas of the northeastern counties and other risk areas for WPV transmission (unpublished data). In July 2014, four sites started environmental sampling in Luanda, Angola. This report looks at the progress and the expansion of environmental surveillance in the African Region.

Methodology

Selection criteria

There are a number of factors to determine the prioritization and rationale for selecting countries and sites, and expanding or discontinuing the use of sites, in environmental surveillance for polioviruses. The selection of sites should be informed by whether they are endemic locations; polio-free districts adjacent to endemic districts; in the same or adjacent countries; or areas with recent or recurrent importation, re-establishment of transmission or history of silent transmission in the face of inadequate AFP surveillance indicators.

The country must have a capacity for initial processing of the samples and for transporting them rapidly to the laboratory. The laboratory capacity must first be sufficiently increased to be able to cope with the high workload. Site selection should consider if households are equipped with water closets connected to a converging sewer network allowing collection of downstream samples that represent a large number of people living in the catchment area; absence of chemicals from industrial wastes that may be detrimental to poliovirus stability or be toxic to cell cultures and/or interfere with poliovirus replication; and the selected site should represent selected high-risk populations.

Using these criteria, the following five polio laboratories have been selected to carry out testing of environmental samples: Nigeria, Senegal, Cameroon, Kenya and South Africa. Nigeria will continue serving its population, Senegal will focus on West African countries, Cameroon on Central African countries, Kenya the Horn of Africa and South Africa the southern African countries and countries they serve as their national laboratory for AFP. South Africa will be carrying the sequencing task for the entire Region.

Currently, environmental surveillance is established or being established in five countries, with expansion to other countries in the pipeline for 2015:

- Nigeria – 26 sites in total with two sites added in 2014, Kebbi and Katsina;
- Kenya – a total of five sites in Nairobi;
- Angola – with six sites identified in July 2014;
- Niger – 11 sites identified in September 2014; and
- Cameroon – 15 sites identified in October 2014.

Sample collection and processing

The grab method is recommended by WHO whereby an amount of raw sewage is collected at a selected sampling site with the time of collection noted (preferably early in the morning to avoid heat that might decrease the viability of the virus). The larger the volume of sewage analysed, the higher the theoretical sensitivity to detect poliovirus circulation in the source population. Processing of sewage specimens is performed using the two-phase separation method. A small volume lower phase is created by adjusting the concentrations of the stock solutions and relative volumes of the two polymer solutions. Concentrated elements are attracted to the interphase and lower phases, including polioviruses and several other enteroviruses.

Results

In 2013, environmental surveillance detected 3 WPV1, (Kano 1 and Sokoto 2). A total of 18 cVDPV2 (Sokoto 9, Kano 1 and Borno 8) were also detected. A total of 33 cVDPV2 were identified in states of Nigeria (2 in Kaduna, 8 in Kano, 1 in Katsina, 10 in Sokoto and 12 in Borno). One WPV1 was reported in Kaduna State (Figure 2). In October 2013, a wild poliovirus was identified from a sewage sample collected in Kamukunji sub-county pointing to silent transmission or surveillance gaps. All four sites in Angola revealed no wild poliovirus but 1 NPEV has been identified in Rio Cambamba Bairro (Kilamba Kixi) site (Figure 3).
### Figure 2. Results of ES in Nigeria

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### Figure 3. Results for ES in Angola

<table>
<thead>
<tr>
<th>Luanda, Angola</th>
<th>Preliminary results — Epidemiological Week 2014</th>
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<tr>
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</tr>
<tr>
<td>Rio Cambamba Bairro (Cazenga)</td>
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</tr>
<tr>
<td>Antigo Control Samba (Amostra mixturada)</td>
<td></td>
</tr>
<tr>
<td>Rio Seco (Maianga)</td>
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</tbody>
</table>

Legend:  
- WPV1  
- WPV3  
- cVDPV2  
- WPV1 + cVDPV2  
- Result pending  
- Negative for WPV  
- Scheduled but sample not collected  
- Sampling not scheduled  
- Referred for sequencing
Discussion

As a supplementary method to AFP surveillance for the Global Polio Eradication Initiative, environmental surveillance is of great importance in investigating the circulation of WPV and/or VDPV.\textsuperscript{6} Environmental surveillance has been conducted in the African Region since 2011 in Nigeria and has led to the identification of wild polioviruses and circulating derived polioviruses.

The African Region remains an area of attention with respect to its large susceptible population, with a higher chance of contracting poliomyelitis and greater likelihood of the spread of polioviruses compared with other regions. Vulnerable groups within a population may contribute to poliovirus circulation because of prolonged shedding. The oral poliovirus vaccines (OPV) and the inactivated poliovirus vaccine (IPV) have made poliomyelitis a preventable and eradicable disease, however, they cannot protect against poliovirus infection or shedding.\textsuperscript{7} The screening of sewage material has been recognized as a useful tool for monitoring the circulation of the wild poliovirus and the vaccine-derived polioviruses.

Besides the use of environmental surveillance in the global eradication programme for polio, it can be used in detecting the circulation of other human viruses such as adenoviruses, calciciviruses, rotaviruses and noroviruses.\textsuperscript{8,9,10,11} Environmental surveillance can help assess the efficacy of policy decisions in preventing the spread and transmission of poliovirus and poliomyelitis diseases. The results presented in this report confirm the importance of environmental surveillance in the Global Polio Eradication Initiative Programme.

Conclusion

Experiences from Nigeria confirm that environmental surveillance can detect the introduction and silent circulation of WPV and VDPV. Likewise, ES with its greater sensitivity than AFP surveillance, can monitor ceasing of poliovirus circulation. Furthermore, ES can be used to monitor the efficacy of immunization interventions.

References

Environmental surveillance in Kenya

Keny a introduced a phased environmental surveillance for poliovirus in October 2013, initially with three sites in Nairobi; this was later increased to five. The decision was informed by potential WPV importation to these areas associated with the movement of people from high-risk and outbreak areas.

Methodology

Three initial sampling sites chosen were based on being high risk for WPV occurrence: one in the Eastleigh area of Kamukunji sub-county and two in the locality of Kibera which is an informal settlement in Langata sub-county. In March 2014, an additional two sites were selected in Nairobi: a second site in Eastleigh and one in Mathare of Starehe sub-county. The sampling sites (manholes on main trunk sewers) were identified through sewage infrastructure maps obtained from the Nairobi Water and Sewerage Company.

Environmental samples were collected using the grab sampling methodology, which involves getting a one-time scoop of sample using a one-litre container. The samples are collected on a bi-weekly or monthly basis. Samples were concentrated at Kenya Medical Research Institute (KEMRI) using the standard WHO protocol on two-phase concentration using 22% dextran and 29% polyethylene glycol (PEG). The concentrates were referred to the Centers for Disease Control and Prevention (CDC), USA, for poliovirus isolation.

Sewage concentrates were inoculated onto RD (human rhabdomyosarcoma) and L20B (mouse L cells expressing the human poliovirus receptor, CD-155) cell lines to isolate poliovirus in culture. Cultures exhibiting viral cytopathic effect were tested by real-time polymerase chain reaction (rRT-PCR) to detect polioviruses and determine whether they were vaccine (Sabin-like) or non-Sabin-like (NSL). For viruses that were NSL or those with discordant PCR Sabin results, the sequence of the VP1 capsid region was determined, to genotype the virus as wild, vaccine-like or vaccine-derived (drifted). Procedures for rRT-PCR and sequencing followed previously published standardized procedures.

Results

A total of 28 samples were collected from all sites during 11 visits made between October 2013 and July 2014. WPV1 was detected in the first sample collected on 12 October 2013 from Eastleigh. The detected WPV was most closely linked genetically to a virus that was circulating in Mogadishu in July 2013. The remaining 27 samples collected from the sites in subsequent months were negative for WPV, and only yielded Sabin (vaccine type) viruses or non-polio enteroviruses (Figure 1).

Discussion

The detection of one WPV1 in the environmental sample in the absence of AFP cases is programmatically significant as it represented silent transmission of the virus. WHO guidelines on responding to WPV detected in environmental samples include: enhanced AFP case search, supplementary immunization activities (SIAs) to reach susceptible children in the population, and strengthened routine immunization.
The Kenyan Ministry of Health, working with WHO and other partners, promptly responded to the confirmation of WPV in the environmental sample in Nairobi. Enhanced case search and surveillance did not reveal WPV from AFP cases in Eastleigh or in any other areas of Nairobi, although surveillance gaps were clearly documented. Over this period, the Ministry of Health implemented SIAs that had been scheduled as part of the broader response to the WPV1 outbreak in Dadaab refugee camps and host communities.

The detection of Sabin viruses and non-polio enteroviruses in all samples collected from November 2013 to July 2014 validated the sampling methodology and subsequent procedures for sample processing. It indicates that the system was sensitive enough to pick WPVs if they were present in sampling sites and was a complementary confirmation that indeed outbreak response activities in Nairobi were sufficient to stop further transmission of WPV.

**Conclusion**

The WPV in the environmental sample may have been a result of virus shedding by an on-transit or resident asymptomatic visitor to the area and demonstrates the real dangers of WPV importation to uninfected areas. The absence of WPV detection since then gives an added assurance on Kenya’s polio free status, but it will be prudent for environmental surveillance to continue in Nairobi and other epidemiologically high-risk areas for WPV importation.

**Acknowledgement**

The authors acknowledge the contributions of the following towards Kenya’s polio environmental surveillance, including laboratory support: James Angawa, Ian Njeru, Kibet Sergon, Johnstone Mkuki, Evans Komen, Sara Lowther, Jane Iber, Qi Chen, Charles Byabamazima, Nicky Gumede, Fem Paladin, Ousmane Diop, Sam Okoror and Solomon Mpoke (Director of KEMRI).

**References**


SUMMARY—Community-based surveillance complements the existing surveillance systems in the mission to control and eradicate polioviruses. It is a cost effective method and has a number of benefits. It was introduced in Ethiopia in 2003 and in the South Sudan CORE Group Polio Project areas in 2010. As well as the results obtained from this initiative, the report looks at the challenges, lessons learned and suggests some ways to strengthen the programme.

The Horn of Africa experienced an outbreak of wild poliovirus type 1 (WPV1) in 2013 with the epicentre in Somalia; it then spread to Kenya and Ethiopia. Somalia recorded 194 cases and Kenya and Ethiopia had 14 and 9 cases respectively. The 7th Horn of Africa Technical Advisory Group (TAG) had convened in 2012 and warned that the area was at great risk of polio outbreak by potential importation of virus due to three reasons:

- Clear evidence of undetected circulation of WPV in countries (confirmed WPV case in Rongo district, Kenya, 2011, genetically linked to the 2010 Uganda outbreak; WPV was not detected in Somalia between 2010 to 2012 despite AFP surveillance meeting standards but detected in 2013 when outbreak erupted);
- Large populations of susceptible children; and
- Inaccessible areas due to security issues.

A year after the warning an outbreak occurred. Massive and frequent vaccination campaigns were conducted to control the outbreak.

Recognizing the need to expanded acute flaccid paralysis (AFP) surveillance to ensure no poliovirus circulation goes undetected, TAG recommended the use of community-based surveillance (CBS) to improve the sensitivity of AFP surveillance. Community-based surveillance is operational in several Horn of Africa countries under different names and forms.

WHO Horn of Africa and the CORE Group Polio Project (CGPP) have collaborated in establishing, implementing and evaluating CBS in the area. This...
article describes CBS in Ethiopia and South Sudan with a focus on process, results and challenges.

Methods

Community-based surveillance complements the existing facility-based surveillance system. It is an ongoing activity conducted at community level by community volunteers (CVs) and includes active case searches during house-to-house visits, religious and traditional healing sites (holy water, prayers, church, mosque) visits, with kalicha (Muslim traditional healers) and reporting to the nearby health facilities.

Community-based surveillance was initiated in Ethiopia in 2003 and in the South Sudan CGPP project areas in 2010. In Ethiopia 6,465 community volunteers in 81 districts (woredas) of CGPP areas cover a population of more than 5.1 million people. In South Sudan, there are 742 community surveillance volunteers covering a population of 1.2 million – mostly remote, hard to reach and migratory communities.

Community volunteers are trained for three days initially and refreshed on the case definition, reporting and roles of volunteers and facility workers in notification, investigation and response. The CBS is an integrated one that covers AFP, measles and neonatal tetanus (NNT) and other health conditions and events. The community volunteers work under the guidance and support of health facility workers in their respective areas, to whom they submit monthly reports.

The volunteers are not paid but they receive non-monetary incentives such as gowns and umbrellas embossed with the project logo, as well as bags in which to carry supplies and educational materials. Since they come from the communities they serve, they are well accepted and trusted.

Results

Community-based surveillance contributes significantly to AFP surveillance. In Ethiopia 30% to 59% of AFP cases reported annually between 2008 and 2014 were attributed to CBS as indicated in (Figure 1).

In South Sudan too, the percentage of AFP cases reported by CBS ranged from 31% to 44% between 2012 and 2014 (Figure 2).

Further, the programmes reported and number of other positive results:
- Improved AFP surveillance in remote, hard to reach and migratory populations;
- High detection of suspects and paralysis cases that were unlikely to visit health facilities due to taboo; and
- Reduced costs as CBS was integrated with other diseases and medical conditions and events and promoted community participation and positive health behaviour.

Challenges

The challenges implementing CBS include nominal leadership by ministries of health, inadequate motivation of community health volunteers and limited capacity of community health volunteers. Lack of resources for CBS programme management: incentives, supervision, information system, planning and review are a hurdle too. There are challenges documenting specific attribution to overall AFP surveillance performance because of inadequate information systems and limited integration of CBS within the formal AFP surveillance system.

Ways forward

To strengthen CBS and realize its benefits, there should be increased government ownership by enacting CBS policies, integrating of CBS within the national AFP surveillance to enhance rapid response and providing of motivational packages for volunteers. A set of performance indicators for CBS should be developed and the information system should be developed to capture CBS data adequately so that its benefits can be well documented.

General references
Immunization monitoring and vaccine-preventable diseases surveillance data management in the African Region

Alain Poy, Balcha Masresha, Keith Shaba, Reggis Katsande, Goitom Weldegebriel, Blanche Anya, Joseph Okeibunor, Richard Mihigo, Alex Gasasira, Deo Nshimirimana
WHO Regional Office for Africa, Brazzaville, Congo
Corresponding author: Alain Poy; e-mail: poya@who.int

Countries in the WHO African Region have adopted and are working towards various goals including the eradication of polio, the elimination of measles, neonatal tetanus and epidemic meningitis, and the control of yellow fever. These initiatives rely on the provision of vaccination services in routine immunization, in supplementary immunization activities (SIAs) and outbreak response campaigns, as well as the conduct of intensive disease surveillance to monitor the progress and determine the impact of interventions. Access to timely, high-quality information is essential for effective immunization. Critical information includes process indicators that allow programmes to monitor their performance and take corrective action, and outcome indicators that measure the impact of programmes.

Monitoring and use of data for action is one of the pillars of the Reaching Every District (RED) approach, which aims to increase district capacity building to address common obstacles to increasing immunization coverage, with a focus on planning and monitoring.1 The immunization and vaccine-preventable disease (VPD) control programmes in countries across the African Region have been utilizing a structured data management system for more than a decade now. This data management system was built with WHO support, in such a way as to create a standard and uniform system across the Region.

All the data generated from country level programme implementation is fully owned by the countries, and is primarily kept and utilized by the national programmes. However, the various datasets are shared with the WHO for purposes of monitoring the coverage and disease trends across the Region. WHO provides the necessary policy guidance and technical support to standardize the approaches, methodology and tools used for data management by the national programmes, and to ensure that these norms and standards are applied and maintained in the day-to-day handling of data.

This article gives a basic overview of the immunization monitoring and surveillance data management systems in place within the countries in the African Region, discusses the key challenges, and outlines the activities undertaken to improve data quality.

Data quality is defined as: timely and up-to-date, complete, representative, clean, accurate, consistent, and provides relevant information on the epidemiological situations and/or population immunity within a defined geographic unit, and a specific time period, responding to the programmatic needs and objectives of national immunization and vaccine-preventable disease control programmes.

Methods

The national immunization and disease control programmes generate various types of programme data on a day-to-day basis. The denominator data for the

SUMMARY—Countries in the WHO African Region have well-established national immunization programmes and disease control programmes working towards the different goals for the control of vaccine-preventable diseases, and generating coverage and surveillance data. WHO provides technical support to standardize the approaches, methodology, and tools used for data management. The datasets are shared with WHO for purposes of monitoring the coverage and disease trends across the Region. WHO provides the necessary policy guidance and technical support to standardize the approaches, methodology and tools used for data management by the national programmes, and to ensure that these norms and standards are applied and maintained in the day-to-day handling of data.

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Methods

The national immunization and disease control programmes generate various types of programme data on a day-to-day basis. The denominator data for the
various programmes are the population data within the different target age brackets. These population denominator data are often generated from projections based on latest census figures.

The administrative method of routine immunization coverage monitoring is in place in all countries. Data generated at the point of service delivery are captured using health facility registers and daily service tally sheets. These data are summarized monthly at health facility level and are shared with the district level, from where they are aggregated up to the national level on a monthly basis. The administrative immunization coverage monitoring data are corroborated by regular data quality validation exercises and periodic coverage surveys.

Immunization monitoring data collected from the service delivery sites (during routine immunization services or during SIAs) are primarily used at district and national levels, to determine levels of population immunity, and identify geographic areas and populations with service gaps; to help design and implement appropriate strategies to reach unreached populations; to drive decisions in the immunization programme related to vaccine demand forecasts and to determine the allocation of resources.

During SIAs the number of people receiving interventions is monitored using tally sheets at the point of service delivery. These data are then summarized at the district level and aggregated up to the national level.

The reporting of data on the epidemiological situation of the vaccine-preventable diseases is done from the peripheral health facilities (polio, measles, yellow fever, neonatal tetanus, meningitis) or from sentinel sites (diarrhoea with severe dehydration, paediatric bacterial meningitis), using paper forms which then are sent to the district and then to the national level, along with laboratory specimens as applicable. Immediate reporting of cases is done through the case-based surveillance system, while aggregate summary reporting (including zero reporting) is done on a weekly or monthly basis through the integrated disease surveillance aggregate reporting system. The case-based data are entered into a database at the national level using standard computerized data management tools.

Data from the various case-based surveillance, laboratory and aggregate reporting systems are primarily used to identify and characterize the epidemiological situation within a geographic area and to monitor the impact of the immunization programme activities; to identify and characterize circulating strains of pathogens, and to monitor chains of transmission including importations across boundaries; to identify outbreaks timely enough to undertake response activities; to identify and characterize geographic areas and populations with immunity gaps, in order to prioritize for programme actions; to monitor the impact of vaccination activities and overall strategies for the control of VPDs; and to monitor progress towards disease control goals.

Countries share their population data with WHO at the start of every calendar year. Administrative routine immunization coverage data are shared
with WHO on a monthly basis while official coverage information is reported annually to WHO-UNICEF through the Joint Reporting Form (JRF). In SIAIs, administrative coverage data is shared with WHO within a few weeks of the end of the SIAs. Countries share their polio and measles surveillance and lab data weekly with WHO, and monthly for the other disease control databases.1,8

At the WHO regional and subregional level, the national programme data are merged, cleaned and analysed on a regular basis. Depending on the schedule of data flow for the specific type of data, WHO provides regular written feedback to the countries on data quality, programme performance indicators as well as epidemiological trends and patterns.

Annually, WHO and UNICEF generate national coverage estimates for each antigen based on the administrative coverage data received from countries, but also taking into consideration various other sources of data including coverage surveys.3

For this article reports were reviewed from data quality audit exercises done in six countries between 2012 and 2014, as well as immunization and surveillance programme reviews conducted across the Region between 2006–2014, and discussion papers and presentations made at WHO regional and subregional level were also consulted in order to identify the challenges with data quality in the Region.

Results

The various types of databases and the number of country datasets that the WHO Regional office handles on an annual basis are shown in Table 1.10

All 47 Member States in the African Region compile and report these databases regularly, with the exception of the following: yellow fever and measles case-based surveillance are established in only 23 and 44 countries respectively; rotavirus and paediatric bacterial meningitis sentinel surveillance sites are present in 32 countries; polio virological laboratories are present in 16 countries; measles-rubella national serological laboratories are present in 44 countries. There are three regional polio referral laboratories, three measles-rubella and one yellow fever regional referral laboratories in the Region.

The database structures contain provisions for minimizing data entry errors. WHO provides regular training for people involved in database and programme management to help improve the capacity at country level, and regularly monitors the quality of data and programme outputs.

Common problems

Some commonly observed problems with the quality of immunization monitoring data include:

- Inaccurate population denominator data; reported coverage figures in excess of 100%;
- Problems of internal consistency of data from various sources;
- Data not shared timely;
- Missing data;
- Discrepancies in coverage data as they are shared from the operational level to the next higher administrative levels;
- Poor archiving of data;
- Gaps in the ownership and managerial oversight of data within national immunization programmes; and
- Poor use of available data at all levels.

The most frequently encountered issues with the quality of vaccine-preventable disease surveillance data are:

- Missing or erroneous entries at the point of capture of data;
- Problems of internal consistency of data from various sources;
- Data not shared timely;
- Missing data;
- Gaps in the ownership and managerial oversight of data within national disease control/surveillance programmes; and
- Inadequate use of data for decision-making.

Root causes

An informal review of reports from surveillance and immunization programme reviews conducted across the Region between 2006–2014, from data quality audit exercises done between 2012 and 2014, as well as observations and documentation at WHO-AFRO level related to data quality indicate a number of root causes for these gaps in data quality:

- Limited technical skills and programme experience of data entry clerks

Table 1. Type and format of immunization and surveillance databases handled at WHO African Region level

<table>
<thead>
<tr>
<th>Database</th>
<th>Frequency of data sharing with WHO</th>
<th>Format of database</th>
<th>Number of datasets expected per year at WHO-AFR level</th>
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<tr>
<td>Population data</td>
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<td>Routine immunization coverage</td>
<td>Monthly</td>
<td>MS-Access database</td>
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<td>District vaccine data management tool</td>
<td>Weekly</td>
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<td>WHO-UNICEF Joint Reporting Form: coverage and incidence data</td>
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<tr>
<td>SIAs coverage data</td>
<td>Activity related</td>
<td>Excel spreadsheet</td>
<td>Ad hoc</td>
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<td>SIAs independent monitoring data</td>
<td>Activity related</td>
<td>Excel spreadsheet</td>
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<td>SIAs lot quality assurance survey data</td>
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<td>Polio lab data</td>
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<tr>
<td>Integrated disease surveillance data</td>
<td>Weekly/monthly</td>
<td>MS-Access database/Excel spreadsheet</td>
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handling the aggregate hard copy and electronic data at various levels within the national programmes;
- Lack of institutionalized data handling procedures and protocols at country level;
- Lack of regular supportive supervision from the national to the subnational levels that includes a focus on the quality of data;
- High turnover of staff and work overload;
- Failure of national programme managers to assume 100% responsibility for the oversight of the quality of programme data;
- Use of population projections based on old census data and the use of crude population projection methods;
- Unreliable internet connectivity for data transmission;
- Lack of a structured methodology and analytical tools to triangulate among various data sources in order to critically assess data quality.10

Currently, the immunization coverage data and surveillance data are used by national programmes and at regional and global levels for the programmatic monitoring of coverage and disease trends, as well as for epidemiological description. However, because of the gaps in data quality, the interpretation of these data is done cautiously with the added consideration of data from coverage surveys and disease modelling in some cases.

WHO support
The WHO Regional Office for Africa has been working systematically to support countries to improve the quality of immunization monitoring and surveillance data. The activities that have been, and are being implemented at country and other levels within the Region include:
- Advocacy: Promoting direct programmatic linkage between national immunization programmes and national statistic offices; encouraging national dialogue on the initiation of capturing vital events; promoting discussions on data quality within the task forces of the interagency coordination committees; encouraging national authorities to ensure that data management is supported by appropriate staff within the national immunization programmes; promoting the establishment of national task forces for the generation of national best coverage estimates for annual JRF reporting; using the WHO-UNICEF national coverage estimates in preference to the national reported coverage figures for programme planning.
- Capacity building: On-the-job and workshop training sessions; promoting the conduct of structured monthly data review and data harmonization meetings at country level; empowering immunization programme managers to critically look at the quality and sources of data for their programme indicators.
- Technical inputs into the data management system: Standardizing the utility, database and shape files; standardizing the data management tools, and upgrading the data management software and tools; regularly cleaning the regional databases and providing feedback to national programmes and reporting laboratories.
- Monitoring data quality: Conducting regular data quality audit exercises; supporting countries to do data quality self-assessments; leading surveillance and immunization programme reviews in priority countries; supporting information management system assessment exercises.10,11

Achievements
Since 2007, when WHO-AFRO started to document and provide systematic and regular feedback on timeliness of data sharing as well as on the data entry errors and missing entries within the submitted databases, there have been significant improvements in various quality aspects of the data, with improved timeliness and completeness of data sharing, reductions in the internal inconsistency within databases, and a significant reduction in the proportion of datasets with missing variables, erroneous entries, etc.

Discussion
Strategic objective 4 of the Global Vaccine Action Plan 2011–2020 clearly identifies high quality data as a pillar of strong immunization systems.13 In addition, the Regional Strategic Plan for Immunization 2014–2020 indicates that focusing on strengthening the quality of data and their use will be one of the key approaches to attaining universal immunization coverage within the WHO African Region.13

Countries in the African Region are generating large volumes of immunization and disease control programme data within a context of limited skilled manpower, and increasing expectations in terms of the data quality. There are various mechanisms in place to standardize and assure the quality of programme data, and WHO continues to provide the critical technical assistance to countries towards this end. However, as a result of weaknesses in the health systems, recurrent data quality gaps are documented. In addition to the programmatic documentation at country level and with the partner agencies, various published papers have referred to the discrepancy between officially reported coverage as compared with household surveys.10,14,15

Most of the challenges with data quality can be handled through continuous training, supervision and adherence to data management protocols. WHO provides ongoing capacity building efforts through the provision of technical guidelines and tools, advocacy and training, as well as on-site support for data management. However, the major area of intervention in terms of improving data quality has to be upstream, through regular on-the-job training of health workers and immunization service delivery staff to improve the recording and data handling practices at the point of initial data capture.

Over the past few years, WHO and the CDC have helped to update the front-end analysis features of most of the existing computerized databases in use at country level, with a view to improve the cleaning and analysis of data. However, considering the continued occurrence of data entry errors, there is room for further updates in the check codes and data cleaning features to enable accurate and complete capture of information once it gets to the national level.

Recommendations
Many national immunization and surveillance programmes do not have capable professional persons handling...
their data. Moreover, most programme managers and epidemiologists do not engage adequately in the monitoring of data quality. Some possible approaches to consider in addressing this problem could involve:

- Increasing the profile of data managers within the structure of the national immunization and disease control/surveillance programmes;
- Ensuring that national programme managers take full responsibility for the quality of data as a critical part of their terms of reference;
- Strengthening the terms of reference of national immunization technical advisory groups (NITAGs) to include data quality reviews;
- Developing mechanisms and tools for regular district-level data quality review to be integrated with daily monitoring activities;
- Developing relevant and sensitive indicators to monitor the intrinsic quality of the data, and to measure the impact of the measures implemented to improve data quality;
- Developing better metrics to measure the consistency between data sources and among datasets at different administrative/operational levels;
- Systematically utilizing a set of core indicators for monitoring data quality, as included in the regional guide for implementing the RDE approach; and
- Reviewing, systematically, the findings from data quality audit and data quality self-assessment exercises, and taking opportunities for similar programme reviews to document and address gaps in the quality of data.

Conclusions

The quality of programme data is one of the pivotal elements in immunization and disease control programmes. WHO-AFRO continues to provide technical support to Member States to standardize data management and address problems with the quality of immunization monitoring and surveillance data. Some of the key challenges with assuring high quality data result from the lack of skilled manpower and from the gaps in the managerial oversight of the data coming out of the national immunization and disease control programmes. Supportive supervision of field activities and sensitization of surveillance officers and immunization staff to improve on recording practices as well as training of data managers, and updating of the data management software, will need to continue in order to build capacity within countries.

In addition, more systematic implementation of data quality audit and self-assessment exercises, as well as critical analysis of the results from these exercises, will be important to address country specific issues with the verifiability of coverage data. The incorporation of data validation methods needs to be considered in the monitoring of coverage and surveillance activities at district level so as to be able to minimize the bias created by inaccuracies in denominators, and errors or gaps in data capture.

However, without due attention to the policy and managerial aspects of data quality within the national programmes, it will be impossible to address the challenge more effectively.

Acknowledgements

The authors would like to thank all health workers and surveillance medical officers in the frontline health service delivery sites in the countries across the African Region who work in the immunization and vaccine-preventable diseases control programmes, and generate huge volumes of programme data on a day-to-day basis. We also like to acknowledge the work of programme staff at district, provincial and national levels who handle these data.

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Cross-border initiative on polio eradication in the Horn of Africa

Samuel Oumo Okiror, Anthony Kisanga, Bal Ram Bhui

Corresponding author: Samuel Oumo Okiror; e-mail: okirors@who.int

The Horn of Africa was hit by a wild poliovirus (WPV1) outbreak in April 2013 with a record number of cases: 194 in Somalia, 14 in Kenya and 9 in Ethiopia. While the outbreak occurred primarily in Somalia, it spread into bordering areas of Kenya and Ethiopia. At around the same time the Global Polio Eradication Initiative (GPEI) had entered a new phase with a significant reduction in case counts in endemic countries and a heightened recognition of the risk for the international spread of the virus. To combat the international spread, in May 2014, WHO declared polio a public health emergency of international concern and issued recommendations requiring proof of polio vaccination for travel to and from countries experiencing polio cases.

At the 7th Horn of Africa Technical Advisory Group (TAG) meeting held in February 2012, it was noted that the risk of significant WPV outbreaks was primarily due to evidence of undetected circulation of WPV in countries, large pools of susceptible children, and geographically inaccessible areas due to security issues. In addition, because of the large number of pastoralists affected by or at risk for polio in the Horn of Africa, the TAG stressed the need for better cross-border initiatives as a compelling strategy for polio eradication in the region.

In response to these recommendations, WHO and the CORE Group Polio Project (CGPP) launched cross-border initiatives in Horn of Africa countries. In August 2012, cross-border meetings were held at four sites in Ethiopia bordering with Somalia, Djibouti, Kenya, South Sudan and Sudan. Since then, over 28 cross-border counties/districts/regions have collaborated and initiated cross-border discussions and activities.

The objective of these cross-border meetings is to coordinate efforts to strengthen surveillance, routine immunization and supplementary immunization activities (SIAs) for polio eradication among bordering areas. Specifically, the initiative aims to improve information sharing between countries on polio eradication, identifying and addressing immunity gaps in migrant and hard to reach populations along borders, and planning for synchronized SIAs along borders.

### Table 1. Countries and border areas engaged in cross-border initiatives

<table>
<thead>
<tr>
<th>Country</th>
<th>Border Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>South Sudan: Morobo</td>
<td>Democratic Republic of the Congo: Adi; Uganda: Koboko</td>
</tr>
<tr>
<td>South Sudan: Maiwut, Akobo, Kapoeta East</td>
<td>Ethiopia: Gambela; Kenya: Turkana</td>
</tr>
<tr>
<td>South Sudan: Kajo Keji</td>
<td>Uganda: Yumba, Moyo</td>
</tr>
<tr>
<td>South Sudan: Magwi</td>
<td>Uganda: Adjumani, Amuru, Lamwo</td>
</tr>
<tr>
<td>Ethiopia: Amhara, Benishangul, Tigray</td>
<td>Sudan</td>
</tr>
<tr>
<td>Ethiopia: Somali, Dire Dawa city</td>
<td>Somalia: Punt Land; Eritrea: Djibouti</td>
</tr>
<tr>
<td>Ethiopia: Somali, Oromia, SNNPR</td>
<td>Kenya: Moyale; Somalia</td>
</tr>
</tbody>
</table>

SUMMARY—In response to the WHO-declared polio public health emergency and the 2013 outbreak of wild poliovirus in the Horn of African – occurring in a region with previously undetected circulation of WPV, large pools of susceptible children, geographically inaccessible areas, and large numbers of pastoralists – the need for better cross-border initiatives to tackle polio eradication in the region was identified. This article summarizes this initiative, its results and aims for the future.

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Outcomes

The meetings verified that there is significant movement of population between countries for trade, employment, pastures, health care and cultural reasons. In addition, refugees and those affected by clan conflicts also frequently move across borders. These border areas vary in terms of socioeconomic status, health infrastructure, and health seeking behaviour of the population and there has been a lack of information sharing between health management across borders. Polio eradication activities, coordination and synchronization of SIAs and acute flaccid paralysis (AFP) surveillance have also been lacking. In general, the border communities are hard to reach, underserved and at high risk for polio.

This cross-border initiative has brought together border stakeholders to discuss and plan ways to jointly combat the circulation of polio. Joint action plans, which focused on activities to be carried out in individual countries, activities needing synchronization, sharing of information, and joint review and planning, have been developed. Cross-border coordination committees have been formed and focal persons on both sides of the border have been designated. At some crossing points, static polio vaccinations team have been established and have vaccinated thousands of children. The action plans also call for resource mobilization to ensure implementation.

Conclusions

The implementation of these cross-border initiatives is going well despite some critical challenges. A major challenge is the lack of resources from collaborating governments. As a result, government ownership and leadership is minimal. The cross-border initiative is designed based on a coordination model where parties enjoy autonomy and independence, use their own resources to carry out committed activities, and come together regularly to review and improve further partnership. The governance structure for the cross-border initiative is informal and weak, in part due to a lack of a comprehensive framework and guidelines to inform its planning, implementation and monitoring and evaluation.

WHO-AFRO has developed draft guidelines, which provide a clear framework for improving the success of cross-border initiatives. WHO and the CORE Group will review its current cross-border initiatives using these guidelines and will advocate for and provide support to countries for improved effectiveness.

General references

The national Stop Transmission of Polio (STOP) programme in Uganda 2012–2014

Annet Kisakye, Emmanuel Tenywa
Corresponding author: Annet Kisakye; e-mail: kisakyea@who.int
WHO Country Office, Uganda

In Uganda the last laboratory confirmed indigenous wild poliovirus case was reported in October 1996. However, in February 2009, an importation of WPV from Sudan affecting Amuru and Pader districts in northern Uganda bordering South Sudan was confirmed, with a total of 8 confirmed cases; later followed by another importation of WPV in October 2010 from Kenya affecting Bugiri District in eastern Uganda. The World Health Assembly on 26 May 2012 declared the completion of polio eradication as a programmatic emergency following the persistence of endemic WPV transmission and a recurrence of outbreaks in polio free countries, Uganda not being spared. The World Health Assembly therefore requested partners to develop a comprehensive plan. A new plan was developed – the Polio Eradication and Endgame Strategic Plan 2013–2018 – with the aim of achieving a polio free world by 2018. Strategic objective one focuses on poliovirus detection and interruption in real time through enhanced global poliovirus surveillance. Polio cases are detected through surveillance of acute flaccid paralysis (AFP) cases and subsequent testing of stool specimens for poliovirus at WHO-accredited laboratories.

Methodology

Since August 2012 Uganda has established a pool of national STOP (Stop Transmission of Polio) volunteers (students) identified from the School of Public Health, Field Epidemiology Laboratory and Training Programme (FELTP) finalists. The volunteers undergo a three-day intensive technical training in Kampala conducted by WHO and Ugandan Ministry of Health central surveillance teams. The volunteers are then immediately deployed to low performing districts to strengthen the surveillance system for a period of one week per assignment. On average three volunteers are assigned per district depending on the number of health facilities. The volunteers visit all health facilities in the assigned district unlike the international volunteers who focus on high and selected medium priority health facilities. This is done for a period of three consecutive months annually, usually during the second half of the year depending on the availability of funds. The volunteers are supported with a per diem, transportation costs, fuel costs for field running and costs for district or health subdistrict officers who work with the volunteers during the active surveillance visits at the health facility level. Financial support is from Centers for Disease Control and Prevention (CDC), Atlanta, through AFNET. A feedback meeting with the volunteers and central teams is held in Kampala after each assignment.

Achievements

The national STOP programme has aided the national Polio Eradication Initiative to create a pool of 41 volunteers with a diverse mix of health profession skills from the School of Public Health who concurrently support implementation of the polio endgame and other public health activities. The national STOP programme has assisted the subnational staff to strengthen surveillance regarding two core components of detection and reporting (see Table 1), with more cases detected during the week of deployment, and routine immunization strengthening.
This means active surveillance is done beyond AFP cases and also focuses on other priority diseases. In addition to surveillance activities, the volunteers have built capacity of operational health workers in basic skills of routine immunization.

**Conclusion**

STOP has made a great contribution towards the implementation of objective one of the polio endgame through capacity building to improve case detection and is an additional human resource for the national level. In 2014, the field assignments focused on low performing districts (silent, districts with a non-polio AFP rate of less than 0.5 and districts with low reporting rate of health facilities on a weekly basis). In 2015 the mission will be expanded further to include follow up and verification of detected AFP cases during the supplementary immunization days in January – an opportunity that will be used to strengthen better documentation of detected cases during the house-to-house strategy. The same opportunity will be used to strengthen community-based disease surveillance. A special training session will be conducted in preparation of this activity. An evaluation of the national STOP programme is being undertaken by CDC, Atlanta, and the results will be published in due course.

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**Table 1. Case detection and reporting by district and week of deployment of STOP, 2013–2014, eight weeks prior to and post deployment**

<table>
<thead>
<tr>
<th>Subregion</th>
<th>Eight weeks prior to deployment of STOP</th>
<th>Eight weeks post deployment</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8</td>
<td></td>
</tr>
<tr>
<td>Arua</td>
<td>0 0 0 2 0 0 0 0 0 0 0 0 0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>Lira</td>
<td>0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>Masaka</td>
<td>0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>Mbarara</td>
<td>0 0 1 1 1 1 0 0 4 0 1 1 0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>Soroti</td>
<td>1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>Karamonja</td>
<td>0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0</td>
<td></td>
</tr>
<tr>
<td>Total cases</td>
<td>2 1 7 3 3 3 2 4 28 3 8 8 1 3 4 2</td>
<td></td>
</tr>
</tbody>
</table>

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SUMMARY—in response to a number of outbreaks of polio since 2006 (following nearly two decades being free of the disease), Kenya launched an all-age group vaccination campaign in the five main outbreak areas, which were, mostly, close to border regions with Somalia. The campaign had to overcome a number of difficulties, which the article outlines, along with the methods employed. Key lessons learned can be taken from this campaign, which Kenya continues to run, and which should be of use in developing initiatives in similar settings in other countries.

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All-age group polio supplementary immunization activities, Garissa County, Kenya

Since the inception of the Global Polio Eradication Initiative (GPEI) in 1988, Kenya has enjoyed a relatively polio free status until 2006 when two imported cases from Somalia were confirmed in a refugee camp in the Garissa District. Since then, four outbreaks have occurred: 2009 (19 cases); 2011 (one case); 2012 (two circulating vaccine-derived polioviruses (cVDPVs); and 2013 (14 cases). Eighty per cent of the five outbreak districts were in close proximity to border countries with existing cases. The response to each outbreak was according to WHO guidelines: immediate outbreak investigation, vaccination response around the case(s), strengthening acute flaccid paralysis (AFP) surveillance and enhancing routine immunization.

Epidemiology of the 2013 outbreak showed equal occurrences in the refugee camps (50%) and host communities (50%) close to border districts with Somalia (which had 194 cases in 2013). Controlling the outbreaks among the under fives cohort proved difficult, due to population dynamics – people who are largely nomadic, who owe allegiance to ethnicity and who are living in security prone areas with many informal border crossings. Moreover, the involvement of polio outbreaks outside the predominant cohort of under 15 years with a case fatality ratio (CFR) of 14.3% necessitated extension of outbreak response to the adult population. In July 2013 pilot all-age group polio supplementary immunization activities (SIAs) were implemented in the Dadaab refugee camps and adjoining host communities. The following month the project was extended to the high-risk districts of Garissa and Wajir counties. Expanded age group vaccination has been targeted many times in the African Region including Namibia which had an outbreak among adults with a CFR of 32%.

Process

The multi-agency team brainstormed operational strategies and considered the constraints of previous rounds and the gains of the pilot all-age SIAs in Dadaab. Preparatory activities reviewed all areas of SIA requirements and implementation. Special references were made regarding access strategies to nomads, refugees, children in Islamic schools, religious sects, informal border crossings, hard to reach, overlapping transit points and poorly covered areas for both surveillance and routine immunization. Implementation commenced with a launch conducted by the county governor among other dignitaries and vaccination of 485 people of all ages with oral polio vaccine (OPV) at Garissa town and eventual implementation accessing all the population. Post implementation activities, consisting of independent monitoring (IM), and district and county reviews, highlighted strengths and weaknesses, and charted a way forward for future activities.

The achievements in the three districts of Garissa are shown in Figure 1. The information sources through which mothers were reached varied. Out of...
299 people interviewed, 84 (28%) sourced messages from the radio, 64 (21%) from health workers, 38 (13%) religious leaders, 34 (11.5%) local leaders, 34 (11.5%) neighbours, 33 (11%) by public address system and 12 (4%) from TV. Reasons for missed persons, out of the 384 sampled, were: 196 (51%) due to absence of household members when teams came, 144 (38%) to non-compliance, 18 (5%) house not visited by teams, and 44 (12%) to others (mainly among children) which included caretakers’ absence, no consent to vaccinate, child sleeping and mother didn’t want to be disturbed. Independent monitoring coverage in the October 2013 SIA targeting the under fives achieved almost the same outcomes (93% in Fafi to 95% in Garissa) as compared with the all-age pilot in August.

Discussion

Executing a campaign for an all-age group in a mainly nomadic population is difficult. It requires extensive planning and reaching out to many groups through effective and continuous advocacy, communication, sensitization and mobilization (ACSM) throughout the period. Garissa County, a predominantly (99%) Muslim society, required that the key religious heads and Islamic scholars, among many other groups, were thoroughly sensitized and brought into the picture at all stages of the activities to gain their consent, support and participation. Apparent and misunderstood areas (frequent polio SIAs, populations in proximity to Somalia frequently targeted for polio SIAs, issues on OPV being impregnated with infertility agents and human immunodeficiency virus (HIV), were clarified before consent and announcement at Friday prayers preceding the campaign. Logistics, prepositioning of materials and assessment of state of preparedness, with scores of more than 90% in all the districts, were met. Logistics and in-process monitoring, which drove the campaign, progressively reduced the percentage of missed people from 50%, 36% to 14% on the second, third and fourth days respectively. At review meetings, agreements reached were applied in subsequent days. The fifth day was used for mop-up, deployment of independent monitors and implementation of the end process.
It is estimated that, since inception, GPEI has resulted in more than 10 million people walking today who otherwise would be paralysed. This fact alone emphasises the importance of initiatives such as that described in this article.

**Challenges**

- Insecurity impeded access to areas bordering Somalia;
- Need for consent from guardians before pupils in Islamic schools could be vaccinated;
- Inadequate vaccine carriers;
- Recruitment of habitual non-performers in teams due to immense need;
- Dry season spell influencing nomadic migration stressing social mobilization;
- Poor house marking despite team training and supervision; and
- Confusion about marking the right rather than left small finger among the adult population in view of religious leanings created obvious challenges.

In view of these challenges some vaccination teams and supervisors viewed all-age polio SIAs as hectic and energy sapping activities that required intricate planning for almost everything, despite the documented gains in Garissa.

**Best practices**

- Adequate preparation;
- Effective social mobilization and sensitization of religious leaders, live call-in sessions replayed in the local Somali language and media sensitization increased acceptance, enhanced participation and demand for vaccination from those who would otherwise have rejected it;
- Adequate transport facilitated the movement of logistics and use of two supervisors per location ensured all teams were effectively supervised throughout the period;
- A combined house-to-house and place-to-place with transitional access strategy combed places of large gatherings, work settings, religious buildings, water points, river banks and nomadic enclaves; and
- Strict usage of in-process monitoring tools and daily review meetings increased day-to-day data driven implementation reducing missed opportunities.

**Lessons learned**

- Identify influential individuals in a community and engage wider section of various media groups;
- Continuous social mobilization prior to and throughout the campaign;
- Use of a culturally acceptable information, education and communication materials;
- Usurping local event opportunities were found to be critical for the success of all-age group polio SIAs;
- Knowledge of movement patterns of special target groups incorporated with their mapping is important in reaching isolated groups with service delivery;
- Good coordination among partners contributes to effective supervision and monitoring;
- Strict adherence to in-process monitoring employed a user friendly, one-page, rapid assessment convenient survey questionnaire that was simple to analyse and interpret prompting information for daily review meetings to correct implementation gaps. This was very important in improving SIA quality;
- Manner of team’s recruitment could make or mar SIAs;
- Positioning vaccination points at the entrances to refugee camps’ food distribution zones was more effective than at the exits;
- Setting up vaccination points for travellers at the middle or intersections of roads was more effective than at departure or arrival places; and
- Cross-border synchronization of SIA activities is inevitable.

**Conclusion**

Despite the significant challenges the successful implementation of all-age group polio vaccination targeted at core districts of known polio outbreaks in Kenya has exemplified teamwork, commitment, technical and administrative leadership and overall, been a great success. It has kept Kenya polio free 13 months from the date of onset of the last WPV case (14 July 2013).

**References**

Role of operational research in accelerating progress towards attainment of poliomyelitis targets in the African Region

Joseph Okeibunor, Martin Ota and Alex Gasasira
Corresponding author: Joseph Okeibunor; e-mail: okeibunorj@who.int
WHO Regional Office for Africa, Brazzaville, Congo

The African Region has achieved considerable progress towards attainment of the poliomyelitis target. Twelve countries in the African Region had active wild poliovirus transmission with a total of 337 cases in 2011, but these had decreased to only 16 cases in four countries by the end of July 2014. Previous importation countries have been able to contain importation and transmission of poliovirus. Angola, for instance, has remained poliovirus free since 7 July 2011. The last WPV case in Chad was recorded on 14 June 2012.

Operational research has contributed to this progress and is defined as the discipline of applying advanced analytical methods to help make better decisions in programme implementation. It is the search for knowledge on interventions, strategies or tools that can enhance the quality, effectiveness or coverage of programmes in which the research is being conducted. Operational research is increasingly recognized as the bedrock of evidence-based programming for targeted disease control and prevention activities. It has a key role in bridging the gap between what we know and what we do in terms of attaining programmatic goals. In the commercial sector, OR is widely used to improve service delivery. Its application to health programming is also gaining prominence as it becomes increasingly obvious that “Discovering ways to increase access to, and delivery of, interventions is a major challenge.” Remme, for instance, attributed the success of onchocerciasis control in Africa to the critical contribution of research in providing answers to the question of where, when and how to apply the interventions.

The progress made in polio eradication has been due to implementation of four major strategies:
- High coverage in routine immunizations;
- Supplementary immunization activities (SIAs);
- Surveillance of acute flaccid paralysis (AFP) and;
- Mop-up activities.

However, the impact of these proven effective interventions was initially slow due to a number of challenges encountered in their implementation. The PEI responded to these challenges by embracing OR to identify mitigating solutions.

Much OR was conducted, especially in priority countries including Angola, Chad, Democratic Republic of Congo and Nigeria, not only to provide information on the key aspects of the epidemiology but also to generate evidence-based communication interventions to address the behavioural concerns encountered in the implementation of the four pillars of PEI. For instance, reporting on the independent review of polio communications research in Nigeria, Peters noted that Nigeria’s polio eradication programme has a wealth of research studies and data collected surrounding poliovirus, its transmission...
patterns, regional “hotspots”, and the mapping, logistics and cold chain for immunization campaigns. The programme relied on these studies to guide strategic decision-making and practice regarding communication and improvement of vaccination coverage in high-risk areas with low coverage rates.

The role of OR in accelerating progress towards attainment of poliomyelitis targets in the African Region has been fundamental, and there are many lessons to be learned from this experience. This article gives an overview of some of the studies conducted and the impact on the PEI strategies since the declaration of polio in Africa as programmatic emergency.

OR in poliomyelitis eradication programme in the African Region

Operational research in the PEI programme in the African Region has focused on two core areas, namely: optimization of the use of polio vaccines, and strengthening surveillance for AFP. These two areas are critical in the PEI considering that adequate immunization coverage is required to produce the desired herd immunity to break transmission of the virus, while sensitive AFP surveillance is required to evaluate the epidemiology. Although a number of important studies have been conducted along on two core areas, space only allows us present a few of them in this review.

Case studies of OR in poliomyelitis eradication in the African Region

**ANGOLA: Reasons and circumstance for late notification of AFP cases in health facilities**

Timely detection of AFP cases is important as stool samples have to be collected within two weeks to be able to detect poliovirus. The detection of poliovirus in such cases will trigger a cascade of intervention measures such as supplementary immunization in the affected community and beyond. A number of AFP cases were presented at health facilities way beyond the window period for investigating if poliovirus was the cause of the paralysis. This major gap in the PEI led to a study with the main objective to understand the reasons behind late notification of cases of AFP in health facilities.

Parents of the affected children were interviewed to elicit the reasons for reporting late via an in-depth interview guide. The health workers in the health facilities were also interviewed. The results of the study revealed that parents were ignorant and had the wrong perception of the etiology of AFP. They were also dissatisfied with the level of care at public health facilities. For these reasons, and given the anxiety associated with such dramatic paralysis of children, parents often opt for the quick and more responsive alternative approaches. Therefore, a majority of them sought alternative health care such as traditional healers and spiritualists. Unfortunately, these alternative health care providers were unaware of the AFP reporting and investigation procedures, hence the delay.

The few, who made it to public health units were faced with ill-equipped rural health workers who waited for the arrival of more qualified staff, which could take several days.

This study led to strengthening the AFP surveillance processes beyond the conventional health facilities, and the rate of AFP reporting and timing of stool sample collection have improved dramatically.

**CHAD: How to explain the refusal of some Chadian parents to vaccinate their children – an ethnocultural study**

Persistent outbreak of polio in localized areas in Chad led to the discovery of low vaccination coverage rates due to refusal of parents to allow vaccination. Following this finding a study was conducted to identify reasons behind parents' refusal to get their children vaccinated during SIAs. This study used qualitative tools of inquiry, namely in-depth interviews and focus group discussions, for data collection. Religious and community leaders as well as local political chiefs were engaged via in-depth interviews to ascertain their disposition to childhood vaccination. Parents of children under five years were engaged in a series of focus group discussions to ascertain their perceptions of, and attitude to, childhood vaccination in the communities. The results revealed:

- A number of interrelated factors were involved such as rumours about the unclear intentions of government and vaccination officials;
- Doubt about efficiency given the repetitive nature of polio vaccination with even persons already vaccinated suffering paralysis of limbs;
- Belief in having more potent traditional ways of ensuring protection against diseases, which are as effective as modern-day vaccination; and
- Unprofessional conduct of the vaccinators, which discouraged a significant proportion of the population.

The results of this study helped in formulating appropriate communication messages that addressed these concerns of the community, and training for vaccinators. The impact was a dramatic reduction in the proportion of parents refusing vaccination for their children, and polio transmission has been interrupted since July 2012.

**NIGERIA: Vaccine perceptions – a comparative study of vaccine acceptors and refusers**

Nigeria had communities that differed slightly from Chad, by having both vaccine refusals and acceptors in the same communities. A study to determine vaccine perceptions in these two groups was conducted using in-depth interviews of 72 parents, including both groups and community leaders. The interview assessed vaccine acceptance, social and personality factors. Perceived benefits of vaccines as well as susceptibility to infection with poliovirus were found to influence OPV acceptance. Those who had experienced paralysis of any type in the family also showed positive disposition towards polio vaccines. The implications of this study include the investigation of vaccine acceptance in a high-risk population.

**NIGERIA: AFP awareness among health workers in Sokoto State**

Delayed arrival of AFP cases and stool samples were also observed in some states of Nigeria. Following the results from the Angola study described earlier, a study was conducted in Sokoto State, Nigeria, with the aim of ascertaining
A significant proportion of clinicians in public and private health facilities, were interviewed. A significant proportion of clinicians in the private health facilities were unaware of the AFP case definition compared with their counterparts in public polio-reporting facilities (Figure 1). Similar gaps in the knowledge in the investigation and reporting processes were also observed. The finding from this study led to massive training of clinicians in all the private health facilities in the state and beyond. Flyers and posters were distributed widely in both private and public health facilities as well as public places like churches, markets, mosques, etc. Encouragingly, the rate of delayed reporting of AFP cases and collection of stool samples dramatically reduced.

**Figure 1. Awareness of AFP case definition in public and private polio-reporting facilities**

<table>
<thead>
<tr>
<th></th>
<th>Doctor</th>
<th>Nurse</th>
<th>CHEW</th>
<th>CHO</th>
</tr>
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<tbody>
<tr>
<td>Public</td>
<td>100%</td>
<td>100%</td>
<td>70%</td>
<td>90%</td>
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<tr>
<td>Private</td>
<td>50%</td>
<td>40%</td>
<td>52%</td>
<td>74%</td>
</tr>
</tbody>
</table>

**Discussion**

The central theme of the Polio Eradication and Endgame Strategic Plan 2013–2018 includes sensitive and timely detection of circulating poliovirus and achieving high population immunity through vaccination with OPV. However, despite these initiatives poliovirus continued to circulate for longer than anticipated, which led to the question as to why these proven effective interventions were not working in this setting. The examples given above provided answers that addressed the challenges allowing a positive impact to be made. This clearly indicates the crucial role OR has played in accelerating progress towards attainment of poliomyelitis targets in the African Region.

Polio eradication requires much community participation to be successful. These studies identified factors that led to the development of communication strategies on these interventions, which improved community involvement in planning and participation in immunization. It also caused programme managers to adjust the planning of both routine immunization and SIAs, and warranted training/retraining of health professionals on how they conduct their duties.

Research for health has been, and will continue to be, the tool that provides solutions that improve delivery of health care services, including immunization. Interest in OR on immunization is growing, largely in recognition of the contribution it can make to maximizing the beneficial impact of immunization services. Unfortunately, the awareness and the essential skills to conduct OR are limited in the African Region. The impact of these studies presented above underscores the need to not only embrace OR in resolving operational issues but also embed OR in our programmes. It should also be remembered that in most cases the audience for this research in not another researcher but a non-specialist programme manager in need of clear, evidence-based analysis that can form the basis of decision-making. This calls for researchers and programme implementers to come together to generate important operational questions that need answers from research. With this approach, OR is best prioritized, designed and implemented, and the results translated into practise, when the point of view of programme officers and decision-makers is considered.

Various advisory bodies, including the Task Force on Immunization (TFI), have emphasized the need for OR in the African Region for the obvious reasons of better implementation of public health strategies. WHO has conducted a number of workshops and provided guidelines to support countries in undertaking OR to address the different challenges that they encounter in the implementation of their activities.

**References**

The WHO Regional Office for Africa, in collaboration with partners, organized a series of consultations on a comprehensive approach to cervical cancer prevention and control between May 2012 and March 2014. Pretoria, South Africa, was the venue for the first consultative meeting held in May 2012, followed by the second, from 19 and 22 February 2013 in Ouagadougou, Burkina Faso.

Both meetings brought together participants from 15 countries from WHO subregions and partners including BMGF, PATH, IARC, PRRR, GAVI and JHPIEGO. In the light of interest shown in these meetings and the decision by Global Alliance for Vaccines and Immunization (GAVI) to support more countries to introduce human papilloma virus (HPV) vaccine, WHO-AFRO organized a further regional consultation from 24 to 26 March 2014 in Yaoundé, Cameroon. The main objective of the Yaoundé consultation was to assist countries in making informed decisions on the prevention of cervical cancer.

Experts presented their views and perspectives on the epidemiology of cervical cancer and HPV approaches to screening and treatment and how cervical cancer prevention programmes are operating at the country level. Lessons learned in implementing cervical cancer prevention programmes were shared with representatives from other countries and action steps for strengthening programmes were discussed.

The meeting generated enthusiasm about the potential of HPV vaccines to combat cervical cancer especially among countries planning to introduce them. However, participants realized, from experiences shared by country teams on implementing cancer/cervical cancer control plans, that challenges for the successful and sustainable implementation efficacy of prevention programmes must be resolved before HPV vaccine can be introduced in their countries and that in order to have a successful control programme, interdisciplinary stakeholders need to be involved and solid in-country coordination is required by the ministries of health in the African Region. Some of the key implementation challenges and questions to be tackled include:

- What are the optimal and sustainable delivery strategies?
- Who is the target population?
- How large is the target population?
- How can the target population be accessed?
- Are there adolescent health service infrastructures or partners for creating health system synergies with HPV vaccination?
- What are the communication challenges and solutions?
- How much does a national HPV vaccination programme cost and how can it be resourced?

In conclusion, country teams observed that they were better prepared to work with key decision-makers and other stakeholders in their respective countries, and to identify priorities and work on implementing some of the proposed actions leading towards a comprehensive national approach to preventing cervical cancer. This may be achieved with support from WHO, international donors, and other agencies that provide technical assistance.

Cervical cancer remains a leading cause of cancer mortality among women in Africa. With 528 000 new cases every year, cervical cancer is the fourth most common cancer affecting women worldwide, after breast, colorectal and lung cancers; it is most notable in the lower-resource countries of sub-Saharan Africa. It is also the fourth most common cause of cancer death (266 000 deaths in 2012) in women worldwide.

More than 99% of cervical cancer cases are related to genital tract infection HPV. In Africa, HPV infection prevalence is estimated at 24.9%, with significant subregional variations (35.8% in East Africa, 21.0% in West Africa and 21.0% in Southern Africa). The infection is acquired mostly through sex and peak age of infection is during adolescence. Most HPV infections do not result in cancer. However, major risk factors for cervical cancer mortality include tobacco use and lack of screening and adequate treatment of precancerous lesions. In addition, HPV and human immunodeficiency virus (HIV) co-infection accelerates progression towards cancer. Various efforts have been made to prevent and control the condition in the African Region.

More than 80% of global cervical cancer deaths occur in less developed regions where it accounts for almost 12% of all female cancers. In sub-Saharan Africa, 34.8 new cases of cervical cancer are diagnosed per 100 000 women annually and 22.5 per 100 000 die from the disease. These figures compare with 6.6 diagnosed and 2.5 deaths per 100 000 women in North America. The drastic difference in the burden and mortality between sub-Saharan Africa and North America can be explained by lack of access to effective screening and to services that facilitate early detection and treatment in sub-Saharan Africa. Cervical cancer can have devastating effects with a very high human, social and economic cost, affecting women in their prime. However, the disease should not be a death sentence, even in poor countries. Low-tech and inexpensive
screening tools exist and could significantly reduce the burden of cervical cancer deaths in Africa.

These realities flag the need to implement the tools already available for cervical cancer, notably HPV vaccination combined with well-organized national programmes for screening and treatment into sharp focus. In order to prevent cervical cancer, which has been shown to exert significant socioeconomic psychosocial impacts on African populations, two approaches have been recommended: primary prevention through immunization and screening for pre-cancerous lesions, and provision of early treatment to prevent progression of pre-cancerous lesions to cancer.

Two HPV vaccines – Cervarix® (bivalente) and Gardasil®/Silgard® (quadrivalent) – are currently available, widely licensed and in use in about 100 countries and are WHO prequalified: both vaccines are highly efficacious in preventing infection with virus types 16 and 18, which are together responsible for approximately 70% of cervical cancer cases globally. They are also highly efficacious in preventing precancerous cervical lesions caused by these virus types. One of the vaccines, Gardasil®/Silgard® (quadrivalent), is also efficacious for prevention of anal and genital warts. The primary target group in most of the countries recommending HPV vaccination is young adolescent girls.

Pool of consultants prepared for introduction of inactivated poliovirus vaccine into routine immunization in the African Region

On 26 May 2012, the World Health Assembly (WHA) declared the completion of poliovirus eradication as a programmatic emergency and requested WHO Director-General to undertake the development of a comprehensive polio eradication and endgame strategy (WHA65.5). The Polio Eradication and Endgame Strategic Plan 2013–2018 was drawn up in response to this declaration. Among other things, the endgame plan calls on countries to introduce at least one dose of inactivated poliovirus vaccine (IPV) into routine immunization schedules, strengthen routine immunization, and withdraw oral polio vaccine (OPV).

In furtherance of this goal, the WHO Regional Office for Africa, in collaboration with the United Nations Children’s Fund (UNICEF), organized two workshops in April 2014 for participants drawn from the English- and French-speaking countries. Each workshop lasted for two days. The overall objectives of the workshops were to equip participants with key technical information and up-to-date references to guide the interaction with decision-makers and programme managers; and to train a critical mass of consultants who will be available to support country planning activities and training sessions for the introduction of IPV. Specifically, the workshops aimed at providing the participants with a basic understanding of poliovirus disease, eradication efforts, existing and expected vaccines as well as the various polioviruses and the endgame strategy. Participants were also taken through a review of logistical, operational, regulatory and communication issues relevant to IPV. Furthermore, the workshop provided a platform for taking the participants through an overview of routine immunization as one of the three interventions in the fight to eradicate poliovirus disease in the African Region. Participants were taken through routine immunization system strengthening and trained on how to leverage polio infrastructure and resources to strengthen routine immunization systems for a sustainable fight against polio and other vaccine-preventable diseases. They were also oriented on the policies and operational procedures of GAVI as well as the process of making applications to GAVI for the introduction of IPV into the routine immunization systems of countries.

In his opening address, the Director of the Immunization, Vaccines and Emergencies Cluster of WHO-AFRO, Dr Deo Nshimirimana, thanked the participants for responding to the invitation to attend the workshops and reflected on the importance attached to them. He reminded participants of the crucial role they have been invited to play in the fight against polio in Africa. He reiterated the major goals of the Global Polio Eradication Initiative (GPEI); the significance of the WHA decision to declare the completion of poliovirus eradication as a programmatic emergency and the development of the Polio Eradication and Endgame Strategic Plan 2013–2018 – the final phase of the fight against the disease worldwide.

Dr Nshimirimana also spoke of the need for all countries to introduce IPV into their vaccination programme before the end of 2015, and the importance of strengthening the pool of trained staff to enable them to support their own countries and other African countries, as required. This would strengthen the technical capacity of countries in the Region in the implementation of the introduction of IPV, Dr Nshimirimana said.

At the end of the workshops, participants felt equipped to face the task ahead. Both participants and facilitators expressed satisfaction with the training methodology, with participants declaring their willingness to support countries in their drive to introduce IPV into their routine immunization systems and be on course with global best practices.
As part of the polio endgame strategic plan, countries in the African Region plan to introduce the injectable inactivated polio vaccine, and replace the trivalent oral polio vaccine (tOPV) with bivalent oral polio vaccine (bOPV) in 2016. Also in the plan is the eventual removal of the bOPV between 2019 and 2020 leaving only injectable (IPV) as recommended by the Strategic Advisory Group of Experts (SAGE) on immunization. This will foster the eradication of the wild polioviruses (WPVs) and circulating vaccine-derived polioviruses (cVDPVs) and reinforce immunity against the three types of wild poliovirus in the African Region.

To facilitate the introduction of the IPV vaccine in the African subregions WHO, in collaboration with UNICEF, organized three peer review workshops for countries planning to submit applications to the GAVI for funding support in September 2014. Each peer review workshop brought together countries within each of the four subregions. Although the workshops targeted GAVI-eligible countries, some countries in this category with plans to submit applications to GAVI could not attend the peer review workshops. For instance, Sierra Leone, a GAVI-eligible country with plans for GAVI support, did not make it because of the Ebola situation in the West African subregion. Other countries, together with some GAVI non-eligible countries like Algeria, participated and took advantage of the platform in preparing their applications, which they submitted to other funders.

Broadly, the objective of the workshops was to improve the technical quality of the documents for submission to GAVI through peer evaluation. Specifically, the workshops provided opportunities to analyse country documents on the introduction of IPV for compliance with GAVI requirements. Issues like GAVI policy, application guidelines and forms, decision letter among others, were reviewed. Suggestions to improve the documents for submission were given; strengths and weaknesses of the documents and writing processes were highlighted; and steps for submitting the application before the GAVI deadline discussed.

The adult learning technique was adopted as the workshop methodology. Each country reviewed and presented another country’s proposed plans or application on IPV introduction to be submitted to GAVI in September. The presentations were reviewed at plenary and comments made to improve the quality of the applications submitted. Group work sessions were used for the improvement of applications. This methodology was very useful as it afforded countries the opportunity to learn from the documentation of countries other than theirs.

The aims of the workshops were achieved and all participating countries went back with a reasonable level of completion of their IPV introduction plan application document.
Routine immunization in the WHO African Region: Progress, challenges and way forward

Vaccination systématique dans la Région africaine de l'OMS : avancées, défis et perspectives

Parte I: Prestação de serviços de vacinação e introdução de novas vacinas na Região Africana OMS

Parte I: Vaccination systématique dans la Région africaine de l'OMS : avancées, défis et perspectives

RéSUMé—D'immenses progrès ont été accomplis au cours des quatre dernières décennies en matière de développement de la vaccination dans la Région africaine. Associée à d'autres interventions de soins de santé primaires et de développement, la vaccination a eu un impact notable sur la réduction de la mortalité annuelle des enfants de moins de cinq ans. Cependant, selon des estimations, quatre pays de la Région africaine (Afrique du Sud, Éthiopie, Nigeria et République démocratique du Congo) abritent 22 % (soit 4,3 millions) des nourrissons non vaccinés dans le monde. Des défis restent à relever pour vacciner tous les enfants de la Région, et atteindre les quelque 20-30 % d'enfants qui échappent encore à la vaccination. En plus des vaccins disponibles de longue date (antitétanique-antipoliomyélite-anticoquelucheux, antirougeoleux, antipoliomyélite et antituberculeux), des vaccins plus récents, tels que le vaccin anti-hépatite B, sont introduits dans la Région, mais leur utilisation et leur diffusion restent lents et inégaux au sein, et entre, des pays. Le nouveau plan stratégique régional pour la vaccination 2014-2020 vise à fournir des orientations politiques et programmatiques aux États Membres, conformément au Plan d'action mondial pour les vaccins 2011-2020, afin d'optimiser les services de vaccination et d'aider les pays à renforcer leurs programmes de vaccination.

Vacinação de retina na Região Africana OMS: Progressos, desafios e perspectivas

SUMáRIO—Ao longo das últimas quatro décadas, tem-se realizado enormes progressos no que toca a expandir a vacinação na Região Africana. E a vacinação, juntamente com outras intervenções no domínio dos cuidados de saúde primários e do desenvolvimento, tem tido um impacto significativo no número anual de mortes nos menores de cinco anos. Contudo, calcula-se que 22% (4,3 milhões) das crianças a nível mundial ainda por vacinar se encontram em quatro países da Região Africana (República Democrática do Congo, Étiópia, Nigéria e África do Sul), subsistem desafios no que toca a alcançar 20% a 30% das crianças da Região. Para além das vacinas tradicionais (contra a DTP; o sarampo, a poliomielite e a tuberculose), novas vacinas, como a da Hepatite B, estão a ser introduzidas na Região, mas a adesão e a cobertura é lenta e irregular, tanto no interior dos países como entre estes. O novo plano estratégico regional para a vacinação 2014–2020 pretende fornecer orientações programáticas e em matéria de políticas aos Estados-Membros, em sintonia com o GWP 2011–2020 (Plano de Ação Mundial para as Vacinações), por forma a optimizar os serviços de vacinação e auxiliar os países no reforço dos seus programas de vacinação.

Rotavirus disease burden in Africa and the need to accelerate introduction of vaccines

RéSUMé—Il est important d'évaluer le fardeau des infections à rotavirus avant et après l'introduction d'un vaccin antirotavirus. Les efforts régionaux étaient axés sur la création d'une base de données factuelles sans équivalence sur la diarrhée à rotavirus, en vue d'éclairer la prise de décision et d'investir durablement dans l'introduction de nouveaux vaccins. L'OMS recommande l'utilisation systématique de vaccins antirotavirus dans tous les pays, en particulier dans ceux où le taux de mortalité imputable aux maladies diarrhéiques est élevé. L'introduction du vaccin est fortement recommandée dans les pays où les décès dus à la diarrhée représentent plus de 10 % de la mortalité des enfants âgés de moins de cinq ans. Le présent article passe en revue la littérature disponible et résume le nombre estimatif d'enfants de moins de cinq ans décédés des suites d'une diarrhée à rotavirus dans la Région africaine de l'OMS. Sur la base des données disponibles, on peut conclure que le fardeau des infections à rotavirus est très élevé et qu'il faudrait accélérer l'introduction de vaccins antirotavirus dans la Région.

O fardo do rotavirus em África e a necessidade de acelerar a introdução de vacinas

SUMáRIO—É importante estabelecer o fardo do rotavirus antes e após a introdução da vacina contra o rotavirus. Os esforços regionais têm-se concentrado na construção de uma base de evidências inequívocas sobre a diarreia provocada pelo rotavirus para apoiar a tomada de decisões e o investimento suscitado na introdução de novas vacinas. A OMS recomenda o uso sistemático de vacinas contra o rotavirus em todos os países, sobretudo naqueles com mortalidade elevada atribuível à doença diarréica. Nos países onde as mortes por doença diarréica causam mais de 10% da mortalidade entre os menores de cinco anos, a introdução da vacina é vivamente recomendada. Este artigo analisa a literatura disponível e resume o número estimado de mortes nos menores de cinco anos atribuível à diarreia causada pelo rotavirus na Região Africana OMS. Com base nos dados disponíveis, pode-se concluir que o fardo da doença causada pelo rotavirus é muito elevado e que a introdução de vacinas contra o rotavirus deve ser acelerada na Região.

Inactivated poliovirus vaccine campaign in Kenya: Lessons learned

RéSUMé—Même s'il est exempt de poliomyélite depuis 2006, le Kenya a connu un certain nombre d'épidémies de poliovirus sauvage dans les années qui ont suivi. En décembre 2013, en réponse à l'une de ces épidémies qui sévissait à Dadaab, le vaccin antipoliomyélitique inactif (VPI) a été administré conjointement avec le vaccin antipoliomyélitique oral, ce qui constituait une mesure plus efficace pour combler les lacunes. Une campagne de vaccination de cinq jours a été organisée, suivie par une enquête sur la couverture vaccinale dans les camp de réfugiés de Dadaab et les communautés d'accueil avoisinantes. Quantité de défis opérationnels se sont posés, car le nombre d'établissements de santé, les séances de sensibilisation, les ressources humaines et la logistique de la chaîne du froid étaient sous-optimales dans la zone visée par la campagne, dont la population est épars et le mode de vie, nomade. Toutefois, malgré les difficultés, l'enquête a montré que la couverture était excellente. Les leçons tirées prouvent que le vaccin antipoliomyélitique inactif peut être administré dans des milieux géographiques similaires et qu'une formation systématique adaptée aux besoins, une planification opérationnelle et une microplanification réalisées avec temps voulu et fondées sur les capacités, ainsi qu'une communication et une mobilisation sociale reposant sur des bases factuelles, peuvent donner des résultats probants.

Campanha de vacinação com poliovirus inativo no Quênia: Lições aprendidas

SUMáRIO—Mesmo estando livre da poliomielite desde 2006, o Quênia sofreu vários surtos de poliovirus nos anos seguintes. Em Dezembro de 2013, em resposta a um desses surtos em Dadaab, a vacina com o poliovirus inativo (VAP) foi administrada juntamente com a vacina oral da poliomielite como uma medida mais eficaz para colmar lacunas na vacinação. Montou-se uma campanha de vacinação com duração de cinco dias, seguida por um inquérito à cobertura vacinal nos campos de refugiados de Dadaab e nas comunidades circundantes onde existe o vírus. Enfrentou-se vários desafios operacionais — o número de unidades de saúde, actividades de proximidade e recursos humanos e logística das cadeias de frio foi inferior ao que seria normal na zona da campanha, com a sua população dispersa e padrões nômade de vida. Contudo, e apesar dos desafios, o inquérito demonstrou que se conseguiu uma cobertura excelente. As lições aprendidas demonstram que a VAP pode ser administrada em contextos geográficos semelhantes e que a formação sistemáticamente adaptada, o micro-planeamento oportunou com base nas capacidades existentes e a comunicação baseada em evidências científicas, e a mobilização social podem levar a resultados de sucesso.
Éradication de la poliomyélite dans la Région africaine: Progressos e perspectivas

SUMÁRIO—Em 2012, a declaração de erradicação do poliovírus ao nível mundial enquanto enquanto eliminação programática para as metas de saúde pública resultou na definição de objetivos e de um calendário para a erradicação. Foram adoptadas abordagens inovadoras para lidar com a situação da poliomyélite na Região Africana. As actividades suplementares de vacinação, planeamento, monitorização e vigilância foram todas incrementadas, e empregaram-se avanços tecnológicos como GPS e uso de painéis de controlo da poliomyélite para monitorizar dados fundamentais sobre o desempenho. Foram definidos como alvos países e comunidades prioritários (incluindo grupos nomades). Foram documentados grandes progressos; por exemplo, a vacinação de rotina aumentou de menos de 10% em 1980 a 77% em 2013. Contudo, ainda restam desafios a vencer, nomeadamente os surtos de poliovírus salvagem e os três focos restantes de transmissão — na Nigéria, na sub-região da África Central e no Comor de África. Este artigo apresenta os passos tomados e a acção continuada que é necessária à consecução da meta de erradicação da poliomyélite.

Elminação do sarampo na Região Africana OMS: Progressos e desafios

SUMÁRIO—Em 2001, os países da Região Africana adoptaram as estratégias de redução da mortalidade causada por sarampo recomendadas pela OMS e UNICEF. Em 2011, na sequência da redução significativa dos casos de sarampo e mortos por sarampo com a implementação das estratégias, a Região Africana adoptou o objectivo de eliminação do sarampo para 2020. Para avaliar o progresso, revisou-se o desempenho utilizando estimativas sobre a primeira dose de vacinas anti-sarampo na vacinação de rotina de mortes (MCV1), a cobertura notificada relativamente as actividades suplementares de vacinação (AVS), bem como dados de vigilância. Durante o período 2011–2013, a cobertura regional da MCV1 estagnou em torno dos 74%, enquanto aproximadamente 215 milhões de crianças foram incluídas em AVS relacionadas com o sarampo com 43 países. A cobertura regional da vacinação contra o sarampo não aumentou e a incidência do sarampo manteve-se elevada nos últimos três anos. São necessários esforços intensivos para assegurar que a vacinação de rotina e as AVS forneçam imunidade elevada às populações e para aumentar a sensibilidade da vigilância anti-sarampo.

Update on elimination of epidemic meningitis in the African Region

Mise à jour sur l’éradication de la méningite épidémique dans la Région africaine

RÉSUMÉ—À la demande des ministères de la Santé africains, le Serum Institute of India Limited (SII) a mis au point un nouveau vaccin conjugué contre la méningite à méningocoque A, le germe responsable de plus de 95% des épidémies de méningite en Afrique, grâce à un partenariat entre l’OMS et le programme de technologie appropriée pour la santé (PATH), et avec le concours financier de la Fondation Bill & Melinda Gates. Le vaccin est introduit dans les 25 pays de la région de la méningite depuis 2010, et le sera jusqu’en 2016. Jusqu’à présent, 153 millions de personnes ont été vaccinées dans douze pays. Le vaccin est efficace; en effet, aucun cas de méningite à méningocoque A n’a été notifié au sein des populations vaccinées, ni au cours des études de portage menées après la campagne. Le nombre total de cas de méningite a fortement diminué pendant les saisons épidémiques dans les pays de la ceinture. Le vaccin sera introduit au moyen de la vaccination systématique d’ici la fin de 2015.

Actualização sobre a eliminação da meningite epicémica na Região Africana

SUMÁRIO—O pedido dos ministérios africanos da saúde, uma nova vacina conjugada foi desenvolvida pelo Serum Institute of India Limited (SII) contra a meningite meningocócica A, que foi patogénico por mais de 95% das epidemias de meningite em África, através de uma parceria entre a OMS e a PATH, e com o apoio financeiro da Fundação Bill & Melinda Gates. A vacina está a ser introduzida em todos os 26 países da “ceinture da meningite” entre 2010 e 2016. Até ao momento, 153 milhões de pessoas foram vacinadas em
Progress towards the elimination of maternal and neonatal tetanus.

Progrès accomplis vers l’élimination du tétanos maternel et néonatal

RÉSUMÉ — Au cours des 25 dernières années, des progrès importants ont été accomplis en matière d’élimination du tétanos maternel et néonatal dans le monde entier, y compris dans la Région africaine. En 1999, une initiative mondiale a été lancée pour éliminer totalement cette maladie, avec pour cible mondiale l’année 2015. Le présent article examine les progrès accomplis et les défis à relever dans la Région africaine, ainsi que les stratégies mises en œuvre pour les pays qui n’ont pas encore atteint cet objectif.

Progressos na eliminação do tétano materno e neonatal

SUMÁRIO — Ao longo dos últimos 25 anos, tem-se realizado grandes progressos na eliminação do tétano materno e neonatal por todo o mundo, incluindo na Região Africana. Em 1999, foi lançada uma iniciativa ao nível mundial para eliminar completamente, com data prevista para 2015. O artigo incide sobre os progressos na Região Africana e os desafios que persistem, bem como as estratégias que estão a ser implementadas para os países que ainda não alcançaram esse objetivo.

Vaccine safety and pharmacovigilance in the African Region

Innocuité des vaccins et pharmacovigilance dans la Région africaine

RÉSUMÉ — Au cours des dernières années, la mise au point clinique de nouveaux vaccins s’est amplifiée dans la Région africaine de l’OMS, tout comme l’introduction de ces vaccins dans les programmes nationaux de vaccination de nombreux pays. Consciente du besoin crucial de garantir la sécurité des vaccins et des systèmes qui les dispensent, l’OMS soutient le renforcement des capacités individuelles et institutionnelles dans la Région afin d’améliorer la surveillance des manifestations postvaccinales indésirables et d’intervenir, s’il y a lieu, dans le cadre du projet stratégique Global Vaccine Safety Blueprint. L’article analyse cette initiative, tout comme les questions d’ordre général telles que l’importance de garantir la sécurité des vaccins et les systèmes nécessaires pour y parvenir. Il se termine par un aperçu de l’état de la sécurité des vaccins et de la pharmacovigilance et par la définition des priorités essentielles pour les pays de la Région dans un avenir immédiat.

Segurança das vacinas e vigilância farmacêutica na Região Africana

SUMÁRIO — Em anos recentes, a Região Africana da OMS testemunhou um crescimento no desenvolvimento clínico de novas vacinas bem como a sua introdução nos planos nacionais de vacinação de muitos países. Reconhecer a necessidade crítica de segurança das vacinas e de vigilância farmacêutica, a OMS tem apoiado o desenvolvimento de capacidades individuais e institucionais na Région para reforçar a monitorização e resposta aos eventos adversos subsequentes à vacinação, através do Plano Mundial para a Segurança das Vacinas (Global Vaccine Safety Blueprint). Ce cadre est discutido juntamente com pontos gerais sobre a importância de garantir a segurança nas vacinas e os sistemas necessários para tal. O artigo termina com uma breve panorâmica do estado da segurança das vacinas e da vigilância farmacêutica, e das prioridades-chave para os países da Région no futuro imediato.

PART III

Part III: Vaccine-preventable disease surveillance in the WHO African Region

Partie III : Surveillance des maladies évitables par la vaccination dans la Région africaine de l’OMS

Parte III: Vigilância das doenças evitáveis pela vacinação na Região Africana da OMS

Overview of the Global Vaccine Safety Blueprint

For new vaccines: Progress, challenges and way forward

Surveillance for diseases targeted by new vaccines: Progress, challenges and perspectives

RÉSUMÉ — Dans le monde entier, y compris dans la Région africaine, les progrès réalisés dans le domaine de la surveillance des maladies évitables par la vaccination et conformément à la stratégie régionale de Surveillance intégrée de la Maladie et Riposte (SIRIM), en accord avec l’OMS, ont permis de définir des critères pour surveiller la circulation du poliovirus sauvage et de poliovirus dérivés d’une souche vaccinale au sein de la région, et de contribuer ainsi à la mission d’éradication de la poliomyélite. Il présente un aperçu des progrès réalisés dans le domaine de la surveillance épidémiologique et de l’intervention en Région africaine.

Situação da vigilância ambiental da Região Africana

SUMÁRIO — A vigilância ambiental sistemática da circulação do poliovírus tem sido realizada em África desde 2011. Esta vigilância ambiental revelou a circulação do poliovírus selvagens e derivados de vacinas entre os países da região, incluindo casos de introdução da circulação do poliovírus selvagens e derivados de vacinas entre os países da região. O artigo apresenta os desafios e resultados desta iniciativa até a data e aponta caminhos para o futuro.

Status of environmental surveillance in the African Region

État de la surveillance environnementale dans la Région africaine


Environmental surveillance in Kenya

RéSUMé — La surveillance environnementale en Kenya a montré que la circulation du poliovirus est toujours présente au Kenya, mais qu’il s’agit d’une circulation dispersée et non généralisée. Le report décrit les progrès réalisés dans le domaine de la surveillance épidémiologique en Région africaine.

Surveillance environnementale au Kenya

RÉSUMÉ — La surveillance de poliovirus constitue l’une des trois principales stratégies adoptées par l’Initiative mondiale pour l’éradication de la poliomyélite (IEP) de l’OMS. Le dépistage et l’investigation des cas de poliomyélite aiguë (APA) constituent la norme de référence pour détecter le poliovirus, mais ils peuvent
être complétés par la détection du poliovirus chez les contacts proches des cas de PPA et dans les échantillons environnementaux. La détection du poliovirus sauvage à partir d’échantillons environnementaux peut indiquer une transmission silencieuse et aider à cibler les réponses vaccinales à apporter pour en stopper la propagation 1

Le présent article rappporte l’expérience relative à la surveillance environnementale à Nairóbi (Kenya).

**Vigilância ambiental no Quênia**

**SUMÁRIO** —A vigilância do poliovirus é uma de três estratégias-chave adoptadas pela Iniciativa Mundial de Erradicação da Poliomielite (IEP) da OMS. A deteção e investigação de casos de paralisia flácida aguda (PPA) é a regra de ouro da deteção de poliovirus mas pode ser complementada pela deteção de poliovirus em contatos estreitos com casos de PPA e em amostras ambientais. A deteção de poliovirus selvagens (PVS) em amostras ambientais pode apontar para a transmissão silenciosa e ajudar a definir respostas de vacinação para impedir que a transmissão alastrê. Este artigo descreve a experiência de vigilância ambiental em Nairóbi, no Quênia.

**Community-based surveillance on polio eradication in the Horn of Africa**

**Surveillance à base communautaire en vue de l’éradication de la poliomyélite à la Corne de l’Afrique**


Vigilância baseada na comunidade para a erradicação da poliomielite no Corno de África

**SUMÁRIO** —A vigilância baseada na comunidade complementa os sistemas de vigilância existentes na missão de controlar e erradicar os poliovirus. É um método economicamente eficaz e tem várias vantagens. Foi introduzida na Étiópia em 2003 e nas áreas abrangidas pelo CORE Group Polio Project do Sudoeste do Sul em 2010. Além dos resultados obtidos desta iniciativa, o relatório descreve os desafios, as lições aprendidas e sugere algumas formas de reforçar o programa.

**Immunization monitoring and vaccine-preventable diseases surveillance data management in the African Region**

**Gestion des données relatives au suivi de la vaccination et à la surveillance des maladies évitables par la vaccination dans la Région africaine**

RÉSUMÉ — Les pays de la Région africaine de l’OMS disposent de programmes de vaccination nationaux et de programmes de lutte contre les maladies bien établis qui s’emploient à atteindre les différents objectifs de lutte contre les maladies évitables par la vaccination et génèrent des données relatives à la couverture et à la surveillance. L’OMS fournit un appui technique pour normaliser les approches, les méthodes et les outils utilisés en vue de la gestion des données. Les ensembles de données sont partagés avec l’OMS afin de surveiller la couverture et les tendances de la maladie dans la Région. Le présent article passe en revue les méthodes employées par l’OMS pour renforcer les capacités de gestion des données dans Région, les réalisations qui en découlent et les lacunes à combler. En dépit des améliorations récentes de certains aspects relatifs à la qualité des données, des lacunes majeures subsistent sur les plans stratégique, technique et managérial, qu’il faudrait sommermer afin de garantir de la qualité optimale des données issues de ces programmes nationaux.

**Monitorização da vacinação e gestão de dados sobre as doenças evitáveis pela vacinação na Região Africana**

**SUMÁRIO** — Os países da Região Africana da OMS têm programas estabelecidos de vacinação a nível nacional e programas de controlo das doenças, trabalhando com objectivos diferentes para controlar as doenças evitáveis pela vacinação, que produzam dados sobre a cobertura e a vigilância. A OMS fornece apoio técnico para padronizar as abordagens, a metodologia e as ferramentas utilizadas para a gestão de dados. Os dados recolhidos são partilhados com a OMS para monitorizar a cobertura e tendências das doenças na Região. Este artigo analisa os métodos que a OMS emprega para desenvolver capacidades nestes campos de gestão de dados por toda a Região e os êxitos, bem como as lacunas, que daí resultam. Apesar das melhorias recentes em certos aspectos da qualidade dos dados, persistem lacunas importantes no que diz respeito às vertentes técnica e de gestão, e em matéria de políticas, que devem ser colmatadas por forma a assegurar que os dados gerados por estes programas nacionais sejam de óptima qualidade.

**PART IV**

**Part IV: Other special efforts to accelerate progress in prevention and control of vaccine-preventable diseases**

**Partie IV : Autres efforts particuliers visant à accélérer les progrès en matière de prévention et de contrôle des maladies évitables par la vaccination**

**Parte IV: Outros esforços especiais para acelerar os progressos na prevenção e controlo de doenças evitáveis pela vacinação**

**Cross-border initiative on polio eradication in the Horn of Africa**

**Initiative transfrontalière relative à l’éradication de la poliomyélite dans la Corne de l’Afrique**

RÉSUMÉ — En réponse à l’urgence de santé publique concernant la poliomielite, déclarée par l’OMS, face à l’épidémie de poliovirus sauvage qui a sévi dans la Corne de l’Afrique en 2013 — une partie du continent où la circulation du poliovirus sauvage n’avait pas été détectée auparavant et qui réclait de grands bassins d’enfants à risque, des zones géographiquement inaccessibles et un grand nombre de pasteurs —, le besoin s’est fait sentir d’améliorer les initiatives transfrontalières visant à éradiquer la poliomielite dans la Région. Le présent article résume l’initiative, ses résultats et ses objectifs pour l’avenir.

**Iniciativa transfronteriza para a erradicação da poliomielite no Corno de África**

SUMÁRIO — Em resposta a declaração feita pela OMS de que a poliomielite representa uma emergência de saúde pública e ao surto de poliovirus selvagem no Corno de África em 2013 — que ocorreu numa região onde não tinha sido detectada ainda a circulação de PVS, em grandes grupos de crianças susceptíveis, zonas geograficamente inacessíveis e grandes números de populações pastoris — identificou-se a necessidade de existirem melhores iniciativas transfronterizas para lidar com a erradicação da poliomielite na região. Este artigo apresenta um resumo desta iniciativa, dos seus resultados e objectivos para o futuro.

The national Stop Transmission of Polio (STOP) programme in Uganda 2012–2014

Le programme national STOP à la transmission de la poliomyélite 2012-2014 en Ouganda

RÉSUMÉ — En 2012, l’Ouganda a constitué une réserve de bénévoles nationaux STOP (Stop à la transmission de la poliomyélite), qui assistent le personnel infranational dans le renforcement de la surveillance — dépistage et notification. En plus des activités de surveillance, les bénévoles ont renforcé les capacités des agents de santé opérationnels en ce qui concerne les compétences essentielles requises pour la vaccination systématique. Le présent article donne un bref aperçu de l’initiative et de ses réalisations remarquables.


SUMÁRIO — Em 2012 e 2013 Ouganda criou um grupo de voluntários nacionais STOP (Stop Transmission of Polio, Travar a Transmissão da Poliomielite), que auxiliam o pessoal a nível infranacional no reforço da vigilância — deteção e comunicação. Para além das actividades de vigilância, os voluntários desenvolveram a capacidade operacional dos profissionais de saúde no que toca a competências básicas para a vacinação de rotina. Este artigo apresenta uma breve panorâmica da iniciativa e dos êxitos notáveis que está a obter.

All-age group polio supplementary immunization activities, Garissa County, Kenya

Activités de vaccination antipoliomyélitique supplémentaires pour tous les groupes d’âge dans le comté de Garissa, Kenya

RÉSUMÉ — En réponse à un certain nombre d’épidermies de poliomyélite survenues depuis 2006 (après près de deux décennies d’absence de la maladie), le Kenya a lancé une campagne de vaccination pour tous les groupes d’âge dans les cinq principales zones d’éclatement, situées pour la plupart près de la frontière somalienne. L’article évoque un certain nombre de difficultés qu’il a fallu surmonter pendant la campagne, ainsi que les méthodes utilisées. Des enseignements clés peuvent être tirés de cette campagne qui se poursuit au Kenya, et ces leçons devraient permettre d’élaborer des initiatives que d’autres pays pourraient appliquer dans des contextes similaires.
Actividades suplementares de vacinação contra a poliomielite em grupo para todas as faixas etárias, Condado de Garissa, Quénia

SUMÁRIO — Em resposta a vários surtos de poliomielite ocorridos desde 2006 (apos quase duas décadas livre da doença), o Quénia lançou uma campanha de vacinação para todas as faixas etárias nas cinco zonas principais afectadas pelo surto, que, na sua maioria, fazem fronteira com a Somália. O artigo enuncia os inúmeros desafios enfrentados pela campanha, bem como os métodos empregados para ultrapassá-los. Podem ser retiradas diversas lições desta campanha ainda em curso no Quénia, que deverão ser úteis no desenvolvimento de iniciativas em países e contextos semelhantes.

Role of operational research in accelerating progress towards attainment of poliomyelitis targets in the African Region

Rôle de la recherche opérationnelle dans l’accélération des progrès visant à atteindre les objectifs d’éradication de la poliomyélite dans la Région africaine

RÉSUMÉ — Des progrès remarquables ont été accomplis dans le cadre de l’Initiative pour l’éradication de la poliomyélite afin d’atteindre les objectifs fixés en matière de lutte antipoliomyélitique dans la Région africaine. La recherche, parmi d’autres activités, a joué un rôle essentiel à cet égard. Le présent article donne un aperçu de la contribution de quelques-unes des activités de recherche opérationnelle menées. Celles-ci concernent principalement la recherche sociale visant à comprendre et à changer les comportements afin de favoriser une compréhension efficace des interventions.

Papel da investigação operacional na aceleração dos progressos no sentido da consecução das metas para a poliomielite na Região Africana

SUMÁRIO — A Iniciativa de Erradicação da Poliomielite (IEP) tem realizado progressos significativos com vista a atingir as metas para a poliomielite na Região Africana, e a investigação, entre outras actividades, desempenhou um papel de importância crucial. Este artigo apresenta uma panorâmica geral da contribuição gerada por um grupo restrito de actividades de investigação operacional. Está-se também sobretudo com a investigação social orientada para a compreensão e alteração de comportamentos para motivar a adoção efectiva das intervenções. Também se discute as lições aprendidas com esta intervenção no que toca ao planeamento e à implementação das intervenções.

AIM
To provide universal immunization coverage within the WHO African Region by 2020.

OBJECTIVES
• To improve immunization coverage beyond the current levels.
• To complete interruption of poliovirus transmission and ensure virus containment.
• To attain the elimination of measles and make progress in the elimination of rubella and congenital rubella syndrome.
• To attain and maintain elimination/control of other vaccine-preventable diseases.

TARGETS
Objective 1: To improve immunization coverage beyond the current levels
• DTP3 vaccine coverage to reach 90% region-wide by the end of 2020
• All countries to introduce PCV by the end of 2020
• At least 37 countries to introduce the rotavirus vaccine by 2020
• At least 35 countries to introduce HPV by the end of 2020
• At least 25 countries to introduce a birth dose of hepatitis B vaccine by the end of 2020
• All countries to regularly report adverse events following immunization by the end of 2020

Objective 2: To complete interruption of poliovirus transmission and ensure virus containment
• All countries to interrupt transmission of wild poliovirus by 2014
• All OPV-using countries to introduce at least one dose of inactivated polio vaccine by 2015
• All polioviruses to be laboratory contained and the Region certified polio free by the end of 2018
• A regional polio legacy plan to be finalized by the end of 2015

Objective 3: To attain the elimination of measles and make progress in the elimination of rubella and congenital rubella syndrome
• All countries to achieve an incidence of confirmed measles of less than 1 case per million population by 2020
• MCV1 coverage to be at least 95% at the national and district levels and SIA coverage to be 95% in all districts
• At least 25 countries to introduce rubella-containing vaccine by 2020

Objective 4: To attain and maintain elimination/control of other vaccine-preventable diseases
• All countries to attain and validate elimination of maternal and neonatal tetanus by 2020
• All high-risk countries to attain yellow fever immunization coverage of 90% or higher by 2020
• All countries within the meningitis belt to introduce MenAfriVac through campaigns, and 15 of them to have the vaccine in routine immunization by 2020
• Seroprevalence of HbsAg among children younger than 5 years to be less than 2% by 2020
The African Health Monitor is a quarterly magazine of the World Health Organization Regional Office for Africa (WHOAFRO). It is a multilingual publication with peer reviewed articles in English, French and Portuguese.

The aim of the African Health Monitor is to promote and facilitate evidence-based policy and decisions to strengthen programmes for health promotion, protection and restoration in the African Region. In order to achieve its aim, the Monitor publishes articles that monitor health situations across the region, discuss trends and track progress toward the health-related Millennium Development Goals and other internationally agreed-upon goals. It disseminates relevant and scientifically rigorous public health information and interventions carried out in the Member States with the cooperation of AFRO technical programmes.

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