

Report of the Regional Immunization Technical Advisory Group meeting

Congo-Brazzaville

15–17 January 2019

Executive summary

The January 2019 meeting of the Regional Immunization Technical Advisory Group (RITAG), the principal advisory group to the WHO Regional Office for Africa, was held at the WHO Regional Office in Brazzaville, the Congo, on 15–17 January 2019. The meeting reviewed progress towards the objectives set out in the Regional Strategic Plan for Immunization and included sessions dedicated to yellow fever, polio, malaria, measles, maternal and neonatal tetanus, Ebola, vaccination demand generation, surveillance and National Immunization Technical Advisory Groups (NITAGs).

The meeting noted that considerable progress is being made in reducing the burden of vaccine-preventable diseases in the region, but further efforts are required if regional immunization targets for 2020 are to be met. Stalling immunization levels and frequent infectious disease outbreaks – including measles, yellow fever and circulating vaccine-derived poliovirus (cVDPV) – are clear signs that national immunization programmes are not achieving the population coverage required to control these vaccine-preventable infections.

Among the key themes to emerge from the meeting was the need for countries to assume greater ownership of national immunization programmes – in many cases still funded primarily through support from partners. One specific area where this is required is in polio transitioning planning, where countries need to accelerate efforts to absorb polio assets into national immunization programmes and take on responsibility for their support.

Importantly, strengthening of national immunization programmes should reflect their central importance to primary health care and universal health coverage, as well as to national and global health security. A strategic approach can ensure that health systems strengthening exercises can build more effective and resilient infrastructure for the delivery of immunization and other services and for the surveillance of infectious diseases.

Yellow fever is a resurgent threat requiring stronger commitments to national immunization programmes and more effective campaigns to prevent and control outbreaks. The Eliminating Yellow Fever Epidemics (EYE) initiative, launched in the region in 2018, is providing new impetus to enhance control efforts, with an ultimate target of elimination by 2030. Vaccine shortages have been addressed through ‘fractional dosing’ – use of one-fifth of the normal volume of vaccine – which encouraging data from field studies suggest still provides good protective immunity. Given ongoing supply limitations, fractional dosing may provide an option for preventive campaigns in at-risk populations.

No new wild **poliovirus** cases were detected in the region in 2018, an important milestone on the journey towards polio eradication on the continent – which would be a truly landmark achievement. Countries need to energetically pursue the steps needed to achieve national and ultimately regional certification of eradication, which will be tracked by a new certification scorecard as requested by ministers of health.

Less positively, several **cVDPV outbreaks** in the region have highlighted weaknesses in national immunization programmes, particularly in insecure and inaccessible areas. Extensive vaccination responses are underway to extinguish these outbreaks.

In **malaria**, seven-year follow up of clinical trial participants has confirmed the efficacy of RTS,S/AS01 and found no evidence of significant safety signals seen in earlier studies. A four-dose schedule appears to provide greater benefits, although a modelling study has raised questions about the size of this effect; further data analysis is underway to explore this issue.

A large-scale implementation project – the Malaria Vaccine Implementation Programme (MVIP) – is underway in Malawi, Kenya and Ghana. A joint regulatory review of RTS,S/AS01 was undertaken by the respective national regulatory authorities under the African Vaccine Regulatory Forum (AVAREF). The intervention is being implemented through collaboration between national immunization and malaria control programmes within ministries of health in selected districts with implementation of all major malaria control services. Vaccine introductions are due to start in the first quarter of 2019.

The **Ebola** outbreak in the DRC is the second largest ever recorded. Extensive efforts are being made to control the outbreak, including ring vaccination with the VSV-EBOV vaccine around clusters of infections. VSV-EBOV is not yet licensed but has been approved for compassionate use in accordance with recommendations from WHO's Strategic Advisory Group of Experts on Immunization (SAGE). At the time of the RITAG meeting, more than 60,000 people had been vaccinated, including health workers, and neighbouring countries were preparing their staff in case of cross-border spread. Use of the vaccine in DRC will provide important data on the safety and efficacy of VSV-EBOV, and in addition clinical development of other candidate Ebola vaccines is being encouraged.

The region is off-track to achieve **measles** elimination by 2020, and experienced multiple outbreaks in 2018. The outbreaks point to the need to strengthen national immunization programmes and to improve targeting of underserved populations, and to accelerate the introduction of a second dose of measles-containing vaccine (MCV2). Well-planned and executed supplementary immunization activities (SIAs) are essential, and should be seen as opportunities to deliver additional immunization services and to enhance immunization programmes.

Reliable data are essential for monitoring and evaluating immunization programmes and initiatives, and for prioritizing use of resources. A range of initiatives are underway nationally, regionally and globally to enhance immunization **data quality** and programmatic use of data. Data management should be seen as a core function of national immunization programmes. To avoid incentives to record inaccurate data, rewards for performance and penalties should not be based solely on unverified coverage data.

Vaccine logistics and management is a further crucial function of national immunization programmes, ensuring the timely supply of vaccines to the places they are needed. Countries should continue to ensure they develop and implement plans to reach all populations in need efficiently, looking to integrate supply chains whenever feasible.

Although vaccine hesitancy has not yet emerged as a major issue in the region, it would be highly complacent to assume the region will not be affected. Furthermore, coverage rates will rise if populations are actively seeking vaccination

services and are holding authorities accountable for delivery of such services. National immunization programmes need to embed **vaccination demand promotion** activities within their work, strengthening their links with civil society and developing a deeper understanding of the barriers to and enablers of immunization through community consultation. A demand hub being developed by UNICEF and partners will provide a platform for more coordinated and evidence-based support for demand generation activities.

Surveillance contributes to both immunization and national and global health security. Assessments associated with International Health Regulations (IHR) suggest that integrated disease surveillance systems in the region require significant strengthening efforts and harmonization. A strategic approach could ensure that such strengthening delivers both immunization and health security benefits. The surveillance value report commissioned by the Regional Office, which identifies and quantifies the benefits to be gained from investment in surveillance, will be a valuable advocacy tool.

NITAGs have a critical role to play in countries as independent bodies providing evidence-based advice and assessments to ministries of health and national immunization programmes. The number of NITAGs in the region has shown encouraging growth, although a recent slowing is a cause for concern. Presentations by NITAG representatives identified some of the challenges they face, including ensuring they have sufficient breadth of expertise and adequate financing. There is a need to move beyond process indicators to assess the function and impact of NITAGs, and also to ensure they are adequately funded within national immunization programmes and receive sufficient secretariat support to ensure that they can fulfill their key roles.

Recommendations

YELLOW FEVER

1.1 At-risk countries

At-risk countries yet to introduce yellow fever vaccination into their national immunization programmes should do so as soon as possible

Deliverable/outcome measure and timescale: National introduction or plan for introduction; update to RITAG in January 2020

Main responsibility: Countries; other key stakeholders: WHO Regional Office

1.2 MCV1 synergies

Reasons for differences in yellow fever and national immunization coverage should be explored, to identify possible approaches to increase yellow fever vaccine coverage, and countries should be encouraged to link MCV1 and yellow fever vaccination in national immunization programmes and SIAs

Analysis and communication plan to be presented to RITAG in January 2020

Main responsibility: WHO Regional Office; other key stakeholders: countries

1.3 Host and vector surveillance

Yellow fever surveillance should incorporate monitoring of local primate populations and vector surveillance through One Health partnerships

Communication to at-risk countries by June 2019

Main responsibility: Countries; other key stakeholders: WHO Regional Office, research funders

1.4 Vulnerable populations

Countries should identify potential unvaccinated populations in high-risk areas, such as mineworkers and/or migrant populations, with a view to carrying out targeted yellow fever vaccination campaigns

Communication to at-risk countries by June 2019

Main responsibility: Countries; other key stakeholders: WHO Regional Office, partners

1.5 Serosurveys

Countries should consider the potential use of serosurveys in managing immunization programmes for yellow fever and other targeted vaccine-preventable diseases, to obtain a clearer picture of the size and distribution of immunity gaps in populations

Communication to at-risk countries by June 2019

Main responsibility: Countries; other key stakeholders: WHO Regional Office, partners

1.6 Catch-up campaigns

In the context of limited yellow fever vaccine supply, SAGE should provide advice on use of fractional dosing in preventive catch-up campaigns for vulnerable populations in at-risk countries, and also review use of the term 'fractional dosing' which could mistakenly interpreted as suboptimal dosing

SAGE recommendation by end of 2019

Main responsibility: SAGE; other key stakeholders: countries, WHO Regional Office, partners

1.7 Long-term fractional dosing data

Long-term follow-up data should be collected in the CDC-sponsored trial of yellow fever vaccine fractional dosing in the Democratic Republic of the Congo, and in other trials of fractional dosing, to determine long-term protective efficacy

Published long-term data on efficacy of fractional dosing

Main responsibility: Study funders; other key stakeholders: countries, regulatory agencies

1.8 Fractional dosing in excluded populations

Protective efficacy of fractional dosing should be explored in other special populations, such as children under 2 years and people living with HIV

Published data on efficacy of fractional dosing

Main responsibility: Study funders; other key stakeholders: countries, regulatory agencies

POLIO

2.1 National ownership of polio transition process

The WHO Regional Office should develop a clear advocacy and communications strategy to encourage more active national ownership of the polio transition process, including implementation and domestic financing, and ensure greater commitment to investment in polio asset redeployment to maintain polio-free status and enhance national immunization programmes

Draft advocacy and communications strategy to be presented to RITAG in June 2019

Main responsibility: WHO RO; other key stakeholders: countries, WHO HQ (polio transition team)

2.2 Polio transition planning dashboard

The WHO Regional Office should provide RITAG with a dashboard summarizing national progress in the polio transition process, incorporating the categorization of countries according to their transition plan implementation capabilities

Dashboard to be presented to RITAG in June 2019

Main responsibility: WHO RO; other key stakeholders: countries, WHO HQ (polio transition team)

2.3 Polio vaccine hesitancy

Data on reasons for non-vaccination in cVDPV campaigns should be collated, to determine nature and scale of vaccine hesitancy, to monitor trends, and to identify any need for corrective interventions

Analysis to be presented to RITAG in June 2019

Main responsibility: WHO Regional Office; other key stakeholders: countries, Global Polio Eradication Initiative

MALARIA

3.1 Interdivisional collaboration

MVIP should document factors facilitating coordination of malaria vaccine activities, national immunization programmes and malaria control programmes, to provide guidance on the development of effective interdivisional collaborations involving national immunization programmes

Document to be presented to RITAG in January 2020

Main responsibility: MVIP team; other key stakeholders: countries, WHO Regional Office

3.2 Health-seeking behaviour

MVIP should monitor health-seeking behaviour in intervention and control areas to determine whether the approach to implementation alters caregivers' health-seeking behaviour; in control areas, ongoing monitoring of attitudes and behaviour should be undertaken to detect any unintended programmatic impacts

Update to be presented to RITAG in January 2020

Main responsibility: MVIP team; other key stakeholders: countries, WHO Regional Office

3.3 Key elements of implementation strategy

MVIP should identify the key elements of its approach to implementation, to provide guidance on the introduction of RTS,S/AS01 elsewhere or of other new malaria vaccines

Update to be presented to RITAG in January 2020

Main responsibility: MVIP team; other key stakeholders: countries, WHO Regional Office

3.4 Decision-making tools

Given the links between malaria transmission dynamics, vaccine efficacy and cost-effectiveness, MVIP should develop tools that enable countries to enter local malaria data, conduct subnational analyses and make decisions on vaccine introduction based on the potential impact of different vaccination strategies

Update to be presented to RITAG in January 2020

Main responsibility: MVIP team; other key stakeholders: countries, WHO Regional Office

EBOLA

4.1 Ebola vaccine licensing

To facilitate field use, Merck, licensing authorities and the WHO prequalification team should accelerate their efforts towards licensure of the VSV-EBOV vaccine, including in country of manufacture and in countries where trials and/or licensure might occur

Licensing of VSV-EBOV by 2020

Main responsibility: Merck, licensing authorities, WHO prequalification team; other key stakeholders: national regulatory authorities

4.2 Ebola vaccine candidates

Other Ebola candidate vaccines should continue to undergo clinical evaluation, to provide a range of options and products with additional features (e.g. wider or longer-lasting protection)

Ebola phase II and phase III vaccine trials

Main responsibility: Pharmaceutical industry, WHO, partners; other key stakeholders: countries, national regulatory authorities

4.3 Advice on Ebola vaccine use

WHO should extend guidance on Ebola vaccine implementation to other countries at risk of an outbreak or that send medical, peacekeeping or other personnel to affected regions

Guidance to be developed by June 2019

Main responsibility: WHO Regional Office; other key stakeholders: WHO HQ, countries

4.4 Ebola vaccine use in specific groups

Specific advice should be issued on Ebola vaccine use in specific groups including breastfeeding mothers and infants less than 1 year

Guidance to be developed by June 2019

Main responsibility: SAGE; other key stakeholders: WHO Regional Office, countries

4.5 Community engagement

Guidance on best practice in community engagement during Ebola vaccine deployment in outbreak situations should be shared with countries and other stakeholders

Guidance to be developed by June 2019

Main responsibility: WHO HQ; other key stakeholders: SAGE, WHO Regional Office, countries, manufacturers, academia, vaccine development and evaluation consortia (e.g. EBODAC)

4.6 Research in outbreaks

Research in Ebola outbreaks and other public health emergencies is important but should be aligned with the local strategy and agenda for managing the outbreak, should undergo local regulatory and ethical review, and should be country-led

Main responsibility: Research institutions; other key stakeholders: countries, national regulatory authorities, ethical review committees, AVAREF, WHO Regional Office

REGIONAL STRATEGIC PLAN FOR IMMUNIZATION

5.1 Post-2020 global immunization strategy

NITAGs should be consulted on post-2020 priorities and their input integrated into RITAG submissions to the post-2020 global immunization strategy planning process

Consultation to be completed by June 2019

Main responsibility: WHO Regional Office; other key stakeholders: NITAGs, WHO HQ

5.2 Addis Declaration roadmap

RITAG should have an opportunity to comment on the draft presentation on progress towards the commitments made in the Addis Declaration on Immunization to be presented to heads of state in July 2019

Draft to be provided to RITAG by March 2019

Main responsibility: WHO Regional Office

5.3 Underserved urban populations

Countries should be supported to undertake rapid assessments of underserved urban settings, and to use tools such as the revised Reaching Every District (RED) guidelines and UNICEF urban toolkit to develop, implement and evaluate strategies to enhance coverage

Communication to countries by June 2019

Main responsibility: WHO Regional Office; other key stakeholders: countries, partners, municipal authorities, CSOs

5.4 Resource allocation

Countries should develop multiyear budgets that include dedicated budget allocations for data improvement, vaccine logistics, surveillance, community engagement and NITAGs, and ensure allocated resources are made available in a timely manner

Communication to countries by June 2019; presence of such budget lines to be reported to RITAG in January

2020

Main responsibility: countries; other key stakeholders: WHO Regional Office, partners

5.5 Data accuracy

To avoid perverse incentives and to increase the accuracy of administrative and other data, neither rewards nor punitive measures should be linked to unverified coverage data, with recognition instead given to high accuracy and transparency by all partners

Communication to countries by June 2019

Main responsibility: countries; other key stakeholders: partners

5.6 Data improvement plans

Countries should be supported by WHO and partners to implement national data improvement plans as rapidly as possible, and to commit funds to ongoing data improvement through dedicated national immunization programme funding

Update on implementation of data improvement plans to be presented to RITAG in January 2020

Main responsibility: countries; other key stakeholders: partners, WHO Regional Office

MEASLES AND MATERNAL AND NEONATAL TETANUS

6.1 MCV2 targets

A consultation should be undertaken to develop a regional target and country targets for MCV2 coverage

Draft targets to be discussed at RITAG in June 2019

Main responsibility: WHO Regional Office; other key stakeholders: countries, partners, WHO HQ

6.2 SIAs

When planning SIAs, countries should ensure they take account of existing WHO guidance on use of SIAs to strengthen national immunization programmes and vaccine coverage

Communication to countries by June 2019

Main responsibility: countries; other key stakeholders: WHO Regional Office, partners

6.3 SAGE measles guidance

To provide a clearer basis for operationalization of its latest measles guidance, SAGE should consider clarifying its criteria for categorization of countries with periodic outbreaks and moderate programme capacity to take account of the great diversity of such countries, the need to prioritize national immunization programme strengthening, and the risk that targeted SIAs will leave immunization gaps

Updated guidance provided by June 2019

Main responsibility: SAGE; other key stakeholders: WHO Regional Office, partners

6.4 Age range

Countries should use local epidemiological data to define target age ranges and geographical scope for measles SIAs and mobilize resources accordingly

Communication to countries by June 2019

Main responsibility: countries; other key stakeholders: WHO Regional Office, partners

6.5 SIA planning

Countries should place greater focus on pre-campaign preparation to ensure the quality of measles SIAs, drawing on WHO, partner support and successful practices adopted in other WHO regions, such as the South-East Asia Region

Communication to at-risk countries by June 2019

Main responsibility: countries; other key stakeholders: WHO Regional Office, partners, other WHO regions

6.6 Year 2 platform

To encourage use of MCV2 and other second-year vaccines, the ‘fully immunized child at 24 months’ should be introduced and monitored as a national immunization programme indicator

Number of countries using indicator to be reported at RITAG January 2020 meeting

Main responsibility: countries; other key stakeholders: WHO Regional Office, WHO HQ

6.7 Combining HPV and Td vaccination

To improve efficiency and drive uptake of human papillomavirus (HPV) vaccine use, countries should consider combining HPV and a Td booster in a school-based vaccination programme

Number of countries combining HPV and Td vaccines to be reported at RITAG January 2020 meeting

Main responsibility: countries; other key stakeholders: WHO Regional Office, WHO HQ

DEMAND

7.1 Benchmarking regional practice

A review should be undertaken of demand and behaviour change activities adopted in the African Region, to identify successful strategies, key contextual factors influencing effectiveness, evidence gaps, and potential interventions for wider implementation

Draft review to be discussed at RITAG January 2020 meeting

Main responsibility: WHO Regional Office; other key stakeholders: countries, partners, CSOs, academic partners

7.2 RITAG agenda

Vaccination demand generation should be a standing item on the agenda for RITAG’s annual review meeting

Standing item to be introduced at RITAG January 2020 meeting

Main responsibility: WHO Regional Office; other key stakeholders: partners, CSOs

SURVEILLANCE

8.1 Surveillance advocacy

Given the dependency of vaccine-preventable disease surveillance on polio funding, the importance of maintaining vaccine-preventable disease surveillance activities should be strongly emphasized in Addis Declaration feedback to heads of state and in polio transition planning discussions

Surveillance incorporated in Addis Declaration feedback

Main responsibility: WHO Regional Office; other key stakeholders: countries, partners

8.2 Surveillance value report

Detailed comments from RITAG members should be taken into account during revision of the surveillance value report

Surveillance valuation report finalized by June 2019

Main responsibility: WHO Regional Office; other key stakeholders: Deloitte

8.3 Alignment with regional and global initiatives

The revised surveillance value report should include discussion of alignment with other regional surveillance initiatives (e.g. under the umbrella of the Africa Centres for Disease Control and Prevention, including national public health institutes) as well as relevant global initiatives including Integrated Disease Surveillance and Response

Surveillance valuation report finalized by June 2019

Main responsibility: WHO Regional Office; other key stakeholders: Deloitte

NITAGs

9.1 Committee glossary

To promote clarity in roles and responsibilities, a glossary should be developed of all the national committees relevant to national immunization programme function, their terms of reference and interrelationships

Draft glossary presented to RITAG in June 2019

Main responsibility: WHO Regional Office; other key stakeholders: NITAGs, EPI Programme Managers

9.2 NITAG indicators

NITAG functional indicators should be developed to complement the core six process indicators, including robust evidence-based decision-making processes and uptake of recommendations by national immunization programmes

Draft indicators to be presented to RITAG in June 2019

Main responsibility: WHO Regional Office; other key stakeholders: NITAGs, WHO HQ

9.3 NITAG resourcing

Ministries of health and national immunization programmes should ensure they have a dedicated annual budget for NITAG operations, including adequate secretariat support, and for NITAG set up where appropriate

NITAG budget lines included in comprehensive multiyear plans by end of 2020

Main responsibility: countries; other key stakeholders: NITAGs, partners, WHO Regional Office

9.4 Academic expertise

NITAGs should explore and exploit collaborative opportunities with local academic and research institutes to strengthen national vaccination policy-making and, when local expertise is not available, liaise with the WHO Regional Office to identify suitable resources

Communication to NITAGs by June 2019

Main responsibility: NITAGs; other key stakeholders: academic partners, WHO Regional Office

Introduction

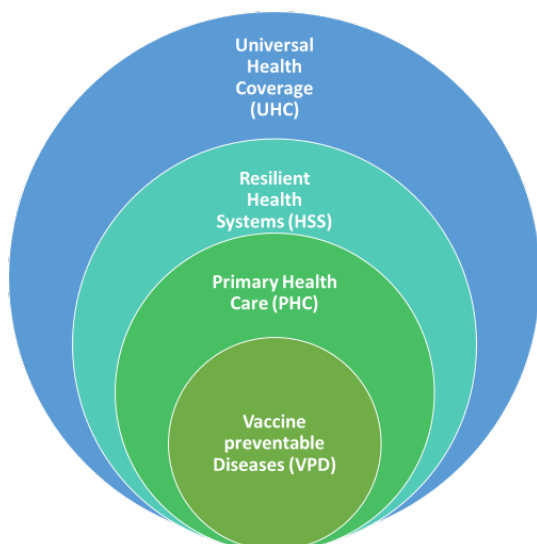
The Regional Immunization Technical Advisory Group (RITAG) serves as the principal advisory group to the WHO Regional Office for Africa, providing strategic guidance on regional immunization policies and programmes. It holds two meetings a year; the January 2019 RITAG meeting took place at the WHO Regional Office, the Congo, on 15–17 January 2019.

On behalf of WHO Regional Director **Dr Matshidoso Moeti**, **Dr Felicitas Zawaira**, Director of the Family and Reproductive Health Cluster, opened the meeting and welcomed delegates. The meeting was notable for its emphasis on integration and partnerships. In attendance at various points of the meeting were senior staff from other areas of the WHO Regional Office, including Raul Thomas, Director, General Management and Coordination Cluster, Dr Francis Kasolo, Director of the Office of the Regional Director, and Dr Soce Fall, Director, Health Securities and Emergencies Cluster. RITAG also welcomed the new head of WHO's Immunization, Vaccines and Biologicals Department, Dr Kate O'Brien, as well as representatives from the African Union Commission and other partners.

RITAG chair **Professor Helen Rees**, Founder and Executive Director of the Wits Reproductive Health and HIV Institute at the University of Witwatersrand, Johannesburg, South Africa, highlighted some of the major issues facing global health, as well as the social and political challenges facing the region. RITAG's role was to consider recommendations made by global bodies such as WHO's Strategic Advisory Group of Experts on Immunization (SAGE) and how they might be implemented within a regional context, providing an independent body offering advice and holding people accountable for implementation, monitoring and evaluation. RITAG also provides a channel through which national concerns and the views of National Immunization Technical Advisory Groups (NITAGs) can feed into global discussions.

Dr Zawaira emphasized how immunization benefited children, families and countries' economies more generally – delivering a US\$44 return for each US\$1 invested. While much progress has been made, and millions of lives are saved each year by vaccination, much remains to be done. One in five children in the region still do not gain the benefits of immunization.

Future progress would be based on partnerships Dr Zawaira suggested. Stakeholders such as partners and civil society are crucial to the development of better immunization services, which are increasingly seen as integral components of primary healthcare systems and contributing to universal health coverage.



The close relationship between immunization, primary healthcare and universal health coverage.

It was critical for countries in the region to assume greater responsibility for their immunization systems. Having made concrete commitments in the 2011 Addis Declaration on Immunization, national political leaders now had to be held accountable – with a heads of state meeting in July 2019 providing an opportunity to review progress and advocate for accelerated efforts to reach regional immunization goals.

Dr Richard Mihigo, Immunization, Vaccines and Biologicals Programme Manager, went on to provide an overview of progress in the implementation of previous RITAG recommendations and some of the priority areas for immunization in the Regional Office. The December 2017 and June 2018 RITAG meetings had made more than 50 recommendations, most of which were still in progress.

Among the most notable recent developments were the major commitments being made to immunization in priority countries, including Nigeria, the Democratic Republic of the Congo (DRC) and Chad, all discussed later in the meeting. Close engagement with the African Union Commission was laying the ground for a progress report on the Addis Declaration for the heads of state meeting in July 2019.

Improving the **quality of data** and national use of data for decision-making was a further regional priority. Use of subnational data will be crucial in tackling inequities in access to immunization services within countries. Various activities had been undertaken to improve surveillance for **cholera** and to mitigate the risk of outbreaks. A global investment case has been developed to mobilize resources to achieve **maternal and neonatal tetanus elimination**.

Various activities are underway to prepare for wider use of **typhoid conjugate vaccine** in the region, to control outbreaks and through integration into national immunization programmes. Significant efforts have also been made to enhance preparedness for **influenza pandemics** and to promote an evidence-based approach to vaccination against **seasonal influenza**. The Regional Office has also been supporting efforts to control the **Ebola outbreak** in the DRC, where vaccination is being used as part of control efforts, and to prevent its spread to neighbouring countries. The Regional Office is also supporting activities to control cVDPV outbreaks in the DRC, Nigeria and Niger.

During 2018, a **regional immunization research strategy** was finalized and published. A key aim has been the strengthening of links between the Regional Office, national immunization programmes and academic institutions, to develop research programmes to enhance the delivery of immunization services.

YELLOW FEVER

African Region update on progress in implementation of the Eliminate Yellow Fever Epidemics strategy

Laurence Cibrelus, Kausik Banerjee, EYE Secretariat, WHO

In 2016, Angola and the DRC were hit by a major linked yellow fever outbreak. More than 950 cases were confirmed, leading to 137 deaths. Cases were exported to other African countries, as well as to China. More than 30 million people were vaccinated in mass campaigns. The outbreaks provided clear evidence that populations had not been adequately protected by earlier vaccination campaigns.

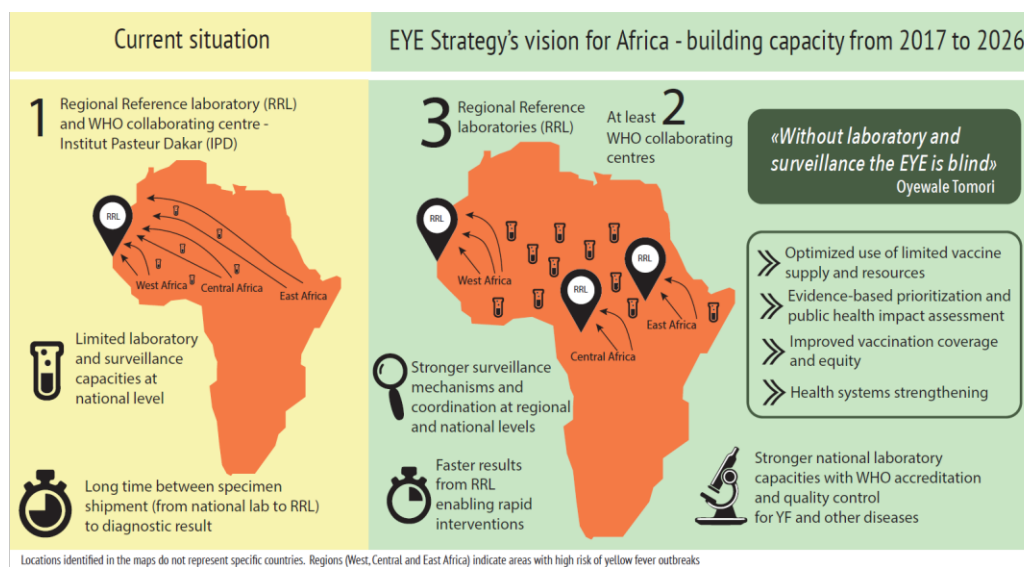
Since then, other countries in the region have been affected by sporadic yellow fever outbreaks. Multiple requests were made in 2018 to the global yellow fever vaccine stockpile, which was replenished on several occasions. A total of 50 million vaccine doses were provided during the year.

In 2017, Nigeria was affected by a major yellow fever outbreak which is still ongoing. Approximately 4000 suspected cases have been reported. Population movements and urbanization increase the risk that the infection will be introduced into urban centres and potentially disseminated internationally; worryingly, the outbreak is gradually moving south towards Lagos. A mass vaccination campaign has immunized 36 million people in at-risk areas (see Box).

Protection against yellow fever is dependent on high coverage in immunization programmes following mass vaccination, but only five countries are achieving coverage of greater than 80%. Subnational variation in coverage is also a concern, creating pockets of vulnerable unimmunized people.

The **Eliminate Yellow Fever Epidemics (EYE)** initiative was launched in 2016, with the goal of eliminating yellow fever outbreaks globally by 2026. As the infection cannot be eradicated, the focus is on control of infection risk. A regional framework for implementation of EYE was formally launched in April 2018.

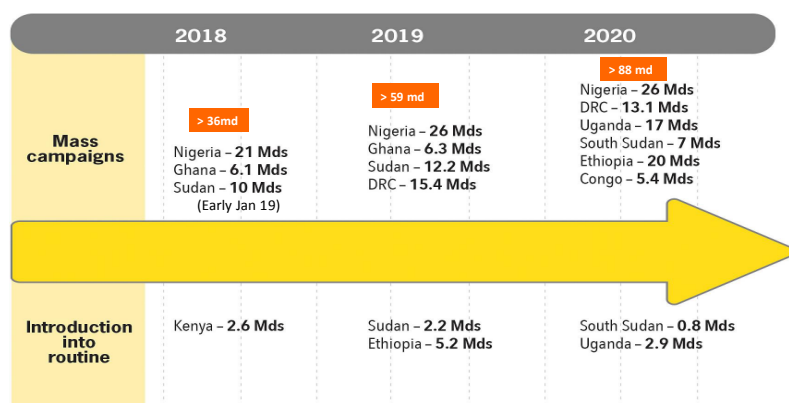
The EYE initiative focuses on four areas. Risk prioritization activities identify countries, and areas within countries, on which preventive action should be focused. Supply and demand activities aim to map out likely future vaccine needs and manufacturing capacity, and have revealed potential future shortfalls in vaccine supply. A laboratory capacity workstream is building national and regional laboratory capacity in yellow fever, to reduce the reliance on the Regional Reference Centre in Dakar, Senegal. Finally, immunization operational guidelines and an EYE country guidance toolkit provide practical advice on campaigns.



EYE's capacity-building strategy for yellow fever detection.

EYE has short-term aims of controlling and containing current outbreaks, alongside a longer-term approach to reduce outbreak risks. Extensive country engagement has been undertaken to raise political awareness, with several countries responding with requests to the global stockpile for vaccine for use in immunization programmes and/or mass

campaigns. The EYE programme has adopted a three-pillar preventive approach based on preventive mass campaigns, strengthening national immunization programmes and use of targeted catch-up campaigns. Despite the importance of high coverage in national immunization programmes, yellow fever coverage often lags behind MCV1 coverage and four at-risk countries have still to introduce yellow fever into their immunization programmes.



Executed and planned yellow fever vaccination campaigns in the region.

One-year follow-up of fractional-dose yellow fever vaccine recipients: Kinshasa summary results

Rebecca Casey, CDC

The yellow fever vaccine is generally given in 0.5 ml doses, which confers lifelong immunity. It has been part of the DRC immunization programme since 2003, but the country nevertheless experienced a major yellow fever outbreak in 2015. Targeted vaccine campaigns were launched to control the outbreak, which led to a depletion of the global vaccine stockpile. In response, in 2016, SAGE recommended that fractional dosing – vaccination with 0.1 ml doses, which evidence suggested should still provide protective immunity – should be used in outbreak situations and when vaccine supplies were limited.

In the DRC, 7.6 million children and non-pregnant adults received a fractional dose (0.1 ml) of vaccine. To evaluate the impact of fractional dosing on yellow fever protective immune responses, the CDC organized a trial at six sites in Kinshasa, integrated within the vaccination campaign. The study collected blood samples from people 2 years and older before vaccination, and at one month and one year after vaccination, testing for the presence and levels of virus-neutralizing antibodies.

Data from one month have been published¹ and suggest that the fractional dose elicits good antibody production; 98% of initially seronegative children converted to seropositivity and no significant differences in seroconversion rates were seen between age groups or sexes. For people with pre-existing yellow fever antibodies, immunization boosted antibody production fourfold (considered a protective response) in 66% of recipients, although increases depended on the age of recipients (increases were smaller in the 50+ age group) and baseline antibody levels (the greatest responses were seen in those with the lowest initial antibody levels).

¹ Ahuka-Mundike S *et al.* Immunogenicity of Fractional-Dose Vaccine during a Yellow Fever Outbreak - Preliminary Report. *N Engl J Med.* 2018 Feb 14. doi: 10.1056/NEJMoa1710430. [Epub ahead of print]

New data on responses at one year revealed that seropositivity across the study population as a whole was very high – 97%. Again, no significant differences were seen across age groups or between sexes.

The new data suggest that fractional dosing of yellow fever vaccine is eliciting protective immunity for at least one year. The data provide reassurance that fractional dosing in response to vaccine shortages can contribute to outbreak control. Although they raise the possibility that fractional dosing could be adopted more widely, for example in national immunization programmes, these remain the only data reported so far at one year, and no evidence is yet available on longer-term protection. Furthermore, no data are available for other prequalified vaccines or for responses in children under 2 years.

Implementation of the EYE strategy: challenges and perspectives at country level

Bassey Okposen Bassey, MoH Nigeria

Nigeria experienced significant yellow fever outbreaks in the early 1990s. It introduced yellow fever vaccination into its immunization programme in 2004 and undertook a national risk assessment exercise in 2008, identifying 20 high-risk states. During 2013–14, mass vaccination campaigns were organized in three out of 20 states, vaccine shortages limiting population coverage.

Nevertheless, a major yellow fever outbreak began in 2017 and is ongoing, affecting 14 states, with 67.3 million people at risk. The outbreak is affecting all ages but children and young adults are bearing the brunt – 80% of cases are in individuals younger than 26.

As well as hosting the launch of the global EYE strategy in April 2018, Nigeria developed a national EYE strategy with four key objectives: protection of populations at risk, organization of preventive and reactive campaigns, strengthening of surveillance and laboratory support, and prevention of international spread.

A risk analysis undertaken in 2018 identified 18 high-risk states with a total population of over 60 million. In these areas, low immunization coverage put large numbers of people at risk.

Preventive mass vaccination campaigns in 2018 reached nearly 29 million people, while 7.8 million people were vaccinated in reactive campaigns in 2017/18. Efforts have also been made to develop yellow fever laboratory capacity, with the country hoping to expand its network from four to seven sites and to establish a Regional Reference Laboratory; currently, all cases are confirmed by the Regional Reference Laboratory in Dakar, Senegal.

Current challenges include ongoing vaccine shortages, and delays between detection and confirmation of cases. Surveillance and laboratory services are often affected by resourcing and materials shortages. The control programme also faces many operational challenges, including insecurity.

Moving forward, multiple actions are being taken to strengthen the outbreak response. These include upgrades to laboratory capacity, repurposing of polio assets, support for a national centre for disease control, further Gavi-supported preventive mass vaccination campaigns in 2019–21 and strengthening of the immunization programme through the NERICC initiative (see page xx).

Discussions noted that yellow fever spanned different areas of interest – including health emergencies and global health security as well as immunization – and the importance of ensuring joint and coordinated responses was stressed. It was also suggested that yellow fever had not been sufficiently prioritized in the past, and that the EYE initiative was beginning to galvanize action.

It was argued that it was important to understand whether low coverage rates reflect issues related to immunization programmes or more specifically to yellow fever vaccination, with the situation likely to differ from country to country. The potential to link measles and yellow fever vaccination campaigns was noted, as well as to use campaigns to improve national immunization programmes and coverage, as recommended by WHO. Although this presents practical challenges, the experience of several countries suggests it can be achieved.

It was noted that poor past coverage, plus factors such as migration and urbanization, creates pockets of vulnerable populations in high-risk areas, including migrants and mineworkers. It was also suggested that serosurveys could be used to provide a more accurate picture of vaccine coverage, although their significant cost is an obstacle to their widespread use.

The importance of developing national surveillance and laboratory capacity was stressed, including clarity on the capabilities and performance standards required of laboratories and Regional Reference Laboratories so countries have a clear developmental roadmap. The need to consider surveillance within a wider context was also highlighted. For example, through One Health partnerships, monitoring of additional hosts such as primates and of vectors could also contribute to surveillance activities.

Additional areas of discussion included the degree of community engagement in yellow fever-related activities, as well as the potential contribution of vector control to outbreak prevention and control.

The research on fractional dosing was seen as providing vital data. It was recognized that data on the long-term effects of fractional dosing were limited, so any introduction into national immunization programmes might be premature. However, with limited supplies of vaccine, plus projected future shortfalls and little surge capacity, there could be a case for greater use of fractional dosing, for example in catch-up campaigns targeting vulnerable populations in high-risk areas. Collecting more data on long-term protection, as well as on fractional vaccine use in children under 2 and people living with HIV, should also be a global priority.

It was also noted that the term ‘fractional dosing’ was potentially misleading. Due to variation between different products, vaccine dosing varies, so ‘fractional volume’ would be a more appropriate term. In addition, use of the term fractional dosing could undermine community confidence in vaccination, despite the evidence of effective protection. Terms such as ‘appropriate’ or ‘efficient’ dosing might be preferred.

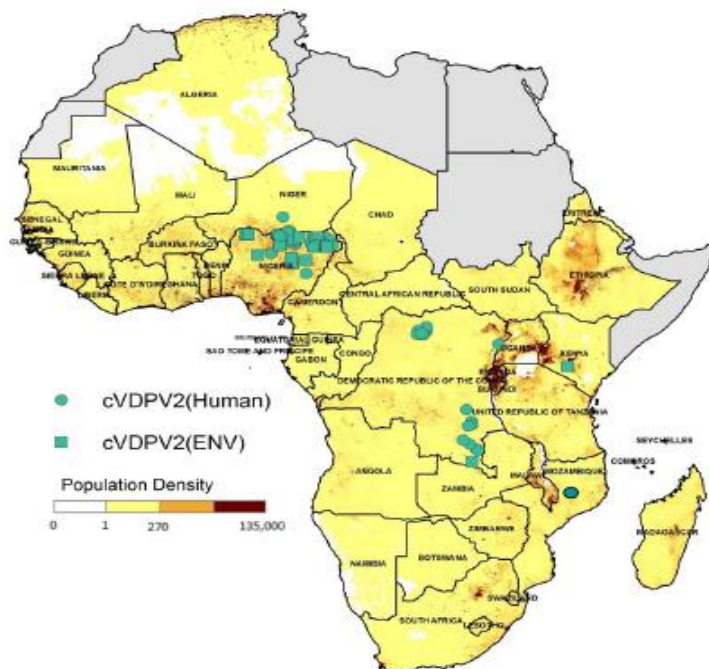
POLIO

Polio eradication in the African Region: progress towards certification

Ticha Johnson, WHO

Africa continues to edge closer to eradication of wild poliovirus. The last confirmed case of wild poliovirus was detected in northern Nigeria in August 2016, and extensive efforts have been undertaken in a challenging environment around Lake Chad to immunize local populations.

However, a spate of cVDPV outbreaks in the region is a significant cause for concern. During 2018, 63 human cases and 40 positive environmental samples were detected across several countries. Control efforts have faced multiple challenges, including low levels of population immunity, a declining number of districts hitting coverage targets and a growing number of silent districts, a lack of country commitment, and practical difficulties associated with areas of challenging terrain and insecurity.



cVDPV outbreaks in the Africa Region.

Multiple subnational outbreak responses and vaccination campaigns have been organized in DRC, Nigeria and Niger, using monovalent vaccine (mOPV2). Surveillance activities have also been strengthened, including greater use of technological innovations such as GIS-enabled systems for mapping health facility visits (Integrated Supportive Supervision, ISS, and eSurv) and the AVADAR audiovisual system in remote areas. Environmental surveillance has also been extended to 22 countries, with plans for further expansion.

Work towards certification of laboratory containment has also progressed. Phase 1 has been completed, although updates are due from countries that have been using mOPV2 in cVDPV responses. In all, 40 countries have submitted documentation to the African Regional Certification Commission (ARCC), seven are pending and one is due to resubmit. South Africa is the sole site planning to be a polio essential facility holding wild poliovirus samples, and will be supported by ARCC in its application.

Future priorities include continuing efforts to interrupt transmission in the Lake Chad area and in countries affected by cVDPV, supported by increasing use of new surveillance tools. Countries will continue to be assisted in their

documentation of polio-free status, with the aim that all countries will have their documentation accepted by the ARCC by the end of 2019.

A framework for certification of polio in the African Region was endorsed at the 68th session of the WHO Regional Committee for Africa, held in Senegal in September 2018. It sets out the steps that need to be taken to ensure timely certification of polio eradication. In October 2018, the Global Commission for the Certification of Poliomyelitis Eradication (GCC) recommended a process of sequential certification of wild poliovirus eradication and confirmation of the absence of cVDPV.

cVDPV outbreak in the Horn of Africa

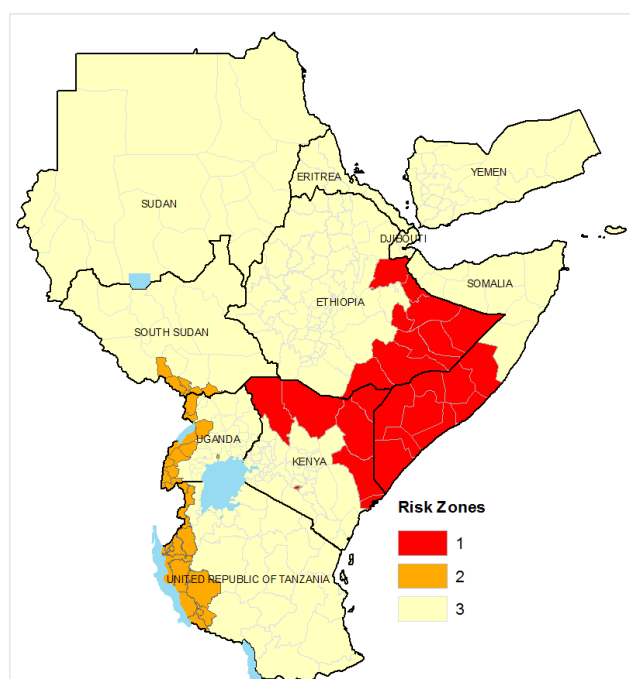
Chris Kamugisha, WHO

Multiple activities have been undertaken to control a cVDPV2 outbreak in the Horn of Africa. Centred on Somalia, the outbreak presents multiple challenges. The affected area spans WHO regions, includes highly insecure areas, and population mobility is high. Population immunity is low and there are concerns about the quality of SIAs and surveillance. A single positive environmental sample in Kenya may represent an import from further north.

Priorities in 2018 were to interrupt transmission using mOPV2 SIAs and to enhance surveillance. These additional surveillance activities identified circulating cVDPV3, necessitating use of bivalent vaccine (bOPV) in some areas.

Synchronized vaccination campaigns were organized in Somalia, Kenya and Ethiopia, achieving high coverage (although vaccination teams were not able to reach some communities owing to security concerns). Subsequent Outbreak Response Assessment (OBRA) and Technical Advisory Group (TAG) reviews noted that progress had been achieved and made a number of recommendations for further action.

The priority for phase 2 activities will be to vaccinate populations not yet reached, with a focus on inaccessible areas and special populations such as migrants and the urban poor. Further efforts will be made to enhance surveillance. Three zones have been identified, including the outbreak area, countries on the eastern border of the DRC and other countries at risk.



cVDPV risk zones in the Horn of Africa.

Further SIAs and opportunistic immunization activities will take place in zone 1, with enhanced surveillance and emphasizing cross-border collaboration. Zone 2 activities are planned to enhance preparedness, with increased surveillance and population immunity in high-risk areas and in displaced populations. Zone 3 activities will focus on risk assessment, preparedness and enhancing population immunity in high-risk areas and among special populations.

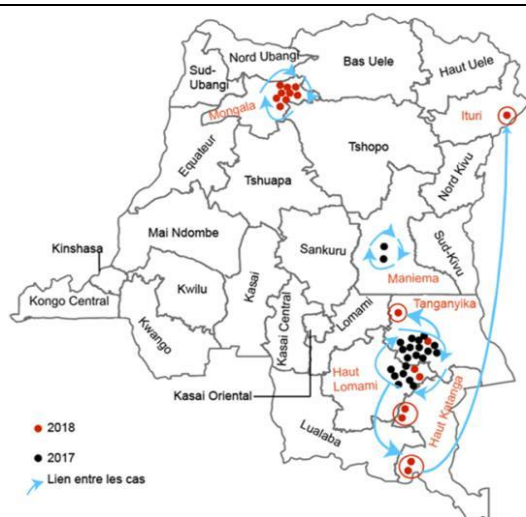
cVDPV outbreak in DR Congo: where are we now?

Guillaume Ngoie Mwamba, MoH DR Congo

The cVDPV outbreak in the DRC encompassed 42 cases in six provinces, representing four distinct outbreaks.

Transmission is thought to have been interrupted and the latest case from late 2018 is not thought to be linked to previous outbreaks.

In response to the outbreak, state governors signed the Kinshasa Declaration committing themselves to the mobilization of resources and coordination to interrupt transmission. SIAs were organized in 16 provinces over two phases, targeting a population of nearly 11 million, although activities in one area have been disrupted by the DRC's Ebola outbreak. An OBRA is planned for February 2019.



cVDPV clusters in the DRC.

Follow-up surveys identified a range of reasons for lack of vaccination, including some outright refusals and the frequent absence of children from the home during visits (potentially a form of ‘passive resistance’). Lot quality assurance sampling (LQAS) identified some improvement in coverage in phase 2 compared with phase 1.

Following these activities, two cases were detected in September 2018 and two in October 2018, unrelated to the earlier outbreaks. Further SIAs are planned for February 2019 and surveillance is being strengthened.

Lessons learned include the value of LQAS for identifying gaps in coverage and informing corrective actions, the importance of involving state governors to ensure subnational political commitment, and a strong partnership with the Ministry of Health. Challenges include the difficulties reaching insecure areas and special populations, the impact of the Ebola outbreak, and an incomplete understanding of the distribution of local settlements.

Refusal levels are a cause for concern, while weaknesses have been identified in areas such as microplanning and surveillance. Strengthening of surveillance activities and introduction of new approaches such as AVADAR and environmental surveillance will be an important focus moving forward.

Polio transition planning: update

Claudio Politi and Aschalew Dadi, WHO

A key objective of the polio transition process is to ensure that polio resources are utilized to enhance more general health services, including immunization programmes. All seven priority countries in the African Region have developed polio transition plans endorsed by Interagency Coordinating Committees (ICCs), while Nigeria is developing a business case. However, none of the transition plans has yet been implemented.

Key barriers to progress include a lack of government commitment and ownership, limited resource mobilization capacity, and a lack of clear plans of where polio assets would be housed. To catalyse action, a polio transition team has been created at WHO HQ, incorporating staff with relevant skills seconded from other departments.

The revised Global Polio Eradication Initiative (GPEI) will support polio positions in 2019. Funds will begin to be withdrawn in selected countries in 2020, followed by a further group in 2021. The ramp down in funding will continue through 2022–23, with closure by the end of 2023.

Following approval of a Strategic Action Plan on Polio Transition by the World Health Assembly in May 2018, a transition team has been established at WHO HQ. It is responsible for liaison with partners and with focal and national focal points. It has begun to undertake joint planning missions in priority countries, with representatives from multiple WHO divisions and partners such as Gavi, to finalize transition plans and to support the development of resource mobilization plans.

The team participated in a stakeholder consultation on surveillance, organized by the African Regional Office and held in Kigali. A polio stakeholder meeting involving GPEI donors and others was held in Montreux, to discuss the Strategic Action Plan on Polio Transition and challenges associated with transition. A working group has been set up to continue discussions on the preservation of essential functions over the transition period.

It was concluded that the focus on individual countries was essential, and that funding remained a key issue. The GPEI extension has created breathing space, but may be discouraging countries from progressing their transition plans. It was noted that transition needed to take account of country context, and three distinct categories of countries could be distinguished – fragile states, lower risk countries where implementation could start, and countries with strong systems that could readily take on responsibilities.

Future activities will include further country visits, provision of technical support to complete transition plans, preparation of communication and advocacy plans, and monitoring of implementation.

Discussions emphasized the critical importance of **completing polio eradication** – enormous progress has been made over the past 20 years and the ultimate goal is now within reach. Certification of polio eradication in Africa would be a huge achievement for the region. Ministers of health have identified a need for a scorecard illustrating countries' progress towards certification in the final stages of eradication and verification. RITAG was highly supportive of this advocacy tool and asked to receive regular updates on national progress towards certification.

Other expert committees have oversight of wild poliovirus eradication and cVDPV outbreak control, so RITAG felt it was inappropriate to be offering further detailed technical recommendations. However, it noted with concern the numbers of active vaccine refusals and absence of children from home during vaccination visits (which could represent a form of 'passive refusal'). Analysis of data from cVDPV campaigns could provide a clearer picture of this issue in the region and the potential need for interventions to address it. cVDPV outbreak response campaigns were also seen as a potential route for the delivery of other vaccination services, or other healthcare services or water, sanitation and hygiene interventions.

The vital role of strong national immunization programmes and surveillance in **prevention and control of cVDPV outbreaks** was repeatedly stressed. The difficulties of confirming the eradication of wild poliovirus and cVDPV circulation in inaccessible and insecure areas with limited surveillance was widely recognized. It was suggested that a specific committee might be needed to consider this specific issue.

The **slow pace of polio transition planning** was a continuing cause for concern. The GPEI extension was felt to have further discouraged countries from pressing ahead with transition planning in a timely manner. It was also felt that global eradication efforts had led countries to adopt a recipient mentality, and a new mindset was required emphasizing country ownership and national governments' responsibilities for the health of their populations. It was also noted that financial commitments to immunization could be framed as investments in the future that deliver substantial economic as well as health benefits.

RITAG suggested that countries should continue to be encouraged to proceed with polio transition planning as a matter of urgency, leveraging commitments made in the Addis Declaration. A dashboard tracking progress in transition planning and implementation, incorporating the country categorization developed by the WHO polio transition planning team, was felt to be helpful.

A crucial step was felt to be rigorously costed national business cases for sustainable transitioning that maintain essential functions and integrate polio assets to enhance national immunization programmes. The goal was not necessarily to preserve existing approaches and structures but to transfer ownership to countries, and to absorb and rationalize assets to ensure they are repurposed to meet national needs. Importantly, transitions also need to be considered within a wider national context, including health systems strengthening, emergency preparedness, and national and global health security initiatives.

MALARIA

Update on MVIP: current status and timelines

Mary Hamel, WHO

In phase III trials, the malaria vaccine RTS,S/AS01 showed modest efficacy but had the potential for high impact. In 2015 it received a positive scientific opinion from the European Medicines Agency (EMA). Subsequently, SAGE and the Malaria Policy Advisory Committee (MPAC) recommended a phased introduction in three to five countries, to gather further evidence on efficacy, safety and feasibility.

Results from a phase III pivotal trial found that a four-dose schedule provided optimal benefits, protecting against severe and cerebral malaria; a three-dose schedule protected against clinical but not severe or cerebral malaria. However, a three-dose schedule could be integrated into existing immunization or other healthcare schedules, a four-dose schedule would require a new visit to be introduced into an immunization programme.

A recent three-year follow-up at three sites after three additional years (seven years in total), at sites of differing transmission intensity, confirmed the additional protection offered by the four-dose schedule. It also found no evidence of safety signals seen in more preliminary analyses (an increased risk of meningitis and cerebral malaria) or of a rebound in malaria cases, suggesting that vaccination is protecting children through the period when they are most at risk of malaria.

Determination of efficacy can be challenging, as simply enrolling in a trial is associated with a substantial mortality benefit, owing to the quality of care provided in a trial setting. The pilot Malaria Vaccine Implementation Programme (MVIP) studies will provide key data on mortality benefits in a programmatic setting, as well as on safety and feasibility.

For the pilot implementation studies, ministries of health were invited to submit expressions of interest. Three countries – Malawi, Kenya and Ghana – were selected on the basis of a range of criteria, including presence of a strong national immunization system and malaria programme, high transmission, high mortality and prior experience with the vaccine. A joint regulatory review involving AVAREF and national regulatory agencies was undertaken, with authorization provided in May 2017.

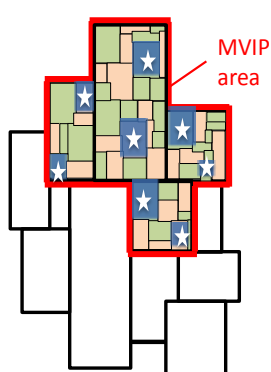
In the three countries, RTS,S/AS01 is being introduced in a selection of districts, and outcomes will be compared in those in neighbouring control districts. Ministries of health will monitor introduction as they would for any new vaccine and routine malaria monitoring will continue. In addition, an independent WHO-sponsored evaluation is being carried out, alongside a geographically separate post-licensing study sponsored by the manufacturers (GlaxoSmithKline, GSK).

The WHO-sponsored evaluation will be observational, with data collection at sentinel hospitals on meningitis, cerebral malaria and severe malaria. Community-based surveillance will be strengthened and household surveys used to assess coverage.

The GSK-led study forms part of a risk management plan agreed with the EMA. It will be carried out in four districts in each country, and will involve a prospective study of 30,000 children to monitor all medical events. In addition, a PATH-led qualitative assessment and economic analysis will examine obstacles to and enablers of implementation, and carry out a cost-effectiveness analysis.

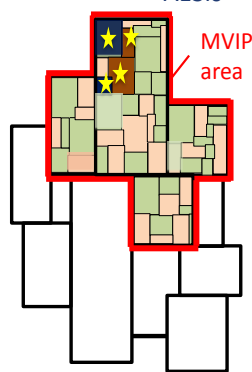
MVIP safety evaluation for RTS,S

Pilot evaluation in-patient surveillance
Focus on meningitis and cerebral malaria



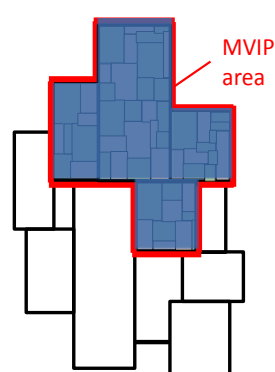
4-8 sentinel hospitals

Phase IV in-patient surveillance
Focus on meningitis, cerebral malaria and AESIs



4 sentinel hospitals
+ home visits

MoH routine PV AEFI/AESI reporting
Focus on rare and unexpected AEFI



Strengthened in all areas

Safety surveillance in the MVIP malaria vaccine implementation project.

The project also includes a data and safety monitoring board to ensure timely monitoring of data from all sources, which will liaise closely with national regulatory authorities. A further important component is an extensive stakeholder and community engagement programme, coordinated with PATH and ministries of health. The pilots are due to start at the beginning of March 2019 in Ghana and late March in Kenya and Malawi.

Vaccine introduction planning: current status, timelines, challenges and opportunities of integrating RTS,S into immunization and child health programmes

George Bonsu, MoH Ghana

Malaria is a major health challenge in Ghana. Nearly 8 million cases occurred in 2017, with 10,900 deaths; malaria is responsible for 30% of all hospital admissions. This burden remains high despite extensive use of malaria control tools, such as insecticide-treated bednets, insecticide spraying and chemoprevention during pregnancy. Ghana also has impressive immunization coverage figures, with first-year coverage exceeding 90% and MCV2 coverage of 79%.

Ghana established a Malaria Vaccine Technical Working Group in 2009 and participated in RTS,S/AS01 vaccine trials in 2009–14. It developed a technical brief in 2015–16 and its Ministry of Health communicated an expression of interest in 2016.

The national immunization programme has taken a lead role in the planning of implementation, based on approaches adopted for other new vaccine introductions. With partners, coverage will be monitored and a post-introduction evaluation will be carried out.

The pilot project was approved by the Ghanaian national regulatory authority, the Food and Drugs Authority. The schedule has been integrated with the country's vitamin A supplementation and other vaccine delivery schedules, with a new visit introduced at 7 months. Training materials have been developed, and recording and monitoring tools adapted to accommodate the new vaccine. Pharmacovigilance has been strengthened and a stakeholder engagement plan developed, including media engagement.

Challenges include the need to generate demand for all four doses, as well as communicating the unusual nature of the implementation. The complexity of the pilot has also led to some delays. The pilot is also providing an opportunity to catch up on missed vaccinations and other interventions.

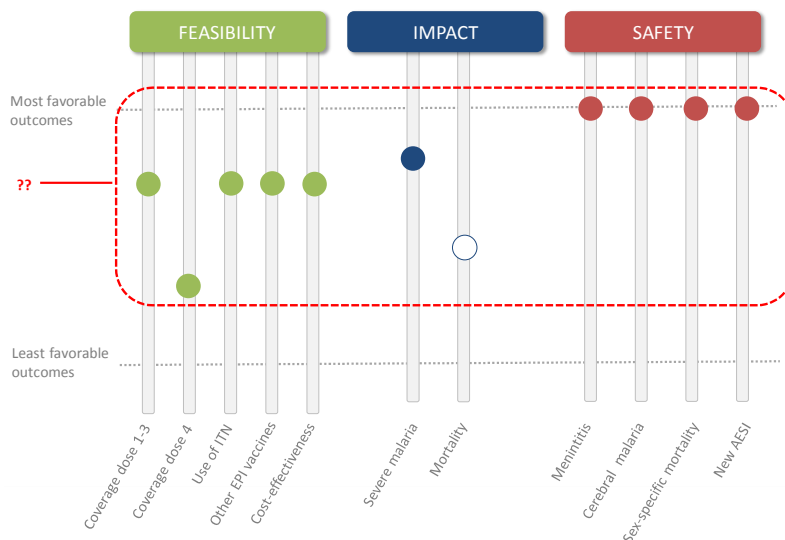
Among the lessons learned are the importance of high-level political commitment, the value of a technical working group, and the need for effective partnerships. Ethics and regulatory bodies have been engaged from an early stage, while partners have made important contributions. Detailed planning and budgeting was also carried out early in the process, based on a shared understanding of objectives.

Framework for policy decision

Mary Hamel, WHO

At the request of SAGE and MPAC, a framework for policy decisions is being developed to provide scope for emerging data to influence policy decisions, and to generate a shared understanding in advance of how MVIP data will be used to inform decision-making. A joint SAGE MPAC working group has been established, including modellers, which will report to SAGE and then to RITAG.

The framework will facilitate evidence-based decision-making and provide clarity on the use of data. This is important for programme managers, funders and for manufacturers, ensuring that supply can be matched to likely demand.



Assessment framework for the RTS,S/AS01 malaria vaccine.

The working group is considering feasibility, impact and safety, exploring scenarios in which each of these elements falls along a spectrum from most favourable to not favourable. It is applying a hierarchy in which resolution of safety signals is highest priority, followed by confirmation of impact in immunization programmes and feasibility of the fourth dose. Furthermore, initial modelling studies suggest that the impact of the fourth dose may have been overestimated – further work is being undertaken to explore this issue in collaboration with the manufacturers. Given the practical challenges associated with use of a fourth dose, it was recognized that this issue was a key one to resolve.

In discussions, it was noted that the project was associated with **strong collaborations** between national immunization programmes and national malaria control programmes, interdivisional interactions that do not always go smoothly. Documenting the factors underlying this effective collaboration could support more effective working practices in other implementation sites. Good existing relationships and embedding of national immunization programmes within wider maternal and child health programmes were seen as critical to this close working relationship.

It was noted that vaccination could be seen as an alternative to other means of malaria control, such as use of bednets. It would be important to ensure vaccine use was communicated as an **addition to rather than replacement** for these interventions. Before and after cross-sectional surveys will be used to explore impacts on such behaviours in MVIP.

It was also suggested that introduction of the vaccine might **influence caregiver behaviour in control areas**. Caregivers may seek out health facilities in which the vaccine is available, potentially affecting analyses of efficacy data or increasing the risk of stockouts. The fact that vaccination will largely be integrated into existing health facility visits may mitigate this risk, but monitoring of caregiver behaviour would be important. A further risk is that caregivers in control areas may resent not having access to the new vaccine.

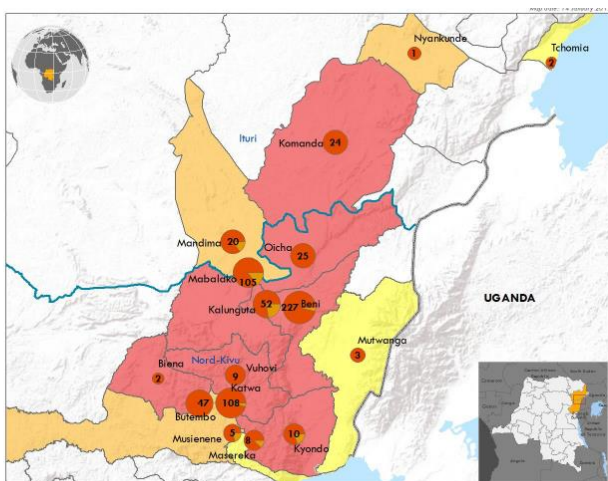
The implementation project is complex and unlikely to be feasible for all new vaccine introductions. It would be important to identify the **critical policy elements**, such as communication, that are central to effective implementation.

It was also noted that vaccine efficacy is highly dependent on **malaria transmission dynamics**. As well as integration into other vaccination or health intervention schedules, a malaria vaccine schedule will need to be sensitive to issues such as local seasonality in malaria transmission. Potentially, a tool could be developed to enable countries to assess their need for and design of a malaria vaccine schedule based on their local malaria data.

Update on Ebola virus vaccines

The Ebola outbreak that began in the DRC in 2018 is the second largest ever recorded. Disease control efforts include use of Merck's rVSVΔG-ZEBOV-GP vaccine (also known as VSV-EBOV), which was deployed in the latter stages of the 2014–16 West African Ebola outbreak.

Unlicensed developmental vaccines can be introduced in the context of clinical trials, while licensed and prequalified vaccines are typically made available in implementation studies with national regulatory authority approval. In October 2018, SAGE recommended use of the VSV-EBOV vaccine in the DRC Ebola outbreak through a compassionate use mechanism, using an agreed protocol and with adherence to GCP procedures and informed consent, and with appropriate national regulatory authority and ethical review committee approvals. As contact tracing is challenging in insecure areas, a ring vaccination strategy has been adopted around villages or clusters of cases.



Distribution of Ebola cases in the DRC.

Pregnant women are at particular risk of death from Ebola infections, but limited data are available on the safety of Ebola vaccination in this group. With effective ring vaccination, pregnant women are likely to benefit from herd immunity, and risk of transmission is primarily associated with contact with health facilities. Given the complexity of benefit–risk assessments in this group, decision-making has been entrusted to national regulatory authorities and ethical review committees.

The vaccine strategy has been deployed in North Kivu and Ituri, with the support of the DRC government and partners. More than 400 rings have been vaccinated, surrounding 90% of confirmed cases. A total of 60,000 people have been vaccinated, including 20,000 healthcare workers and frontline workers and 14,500 children and young people. Overall coverage has been in excess of 90%.

A vaccination strategy has also been developed for neighbouring countries, with more than 25,000 healthcare workers vaccinated in Uganda and vaccination plans developed for South Sudan, Rwanda and Burundi.

Key future challenges include the need to build capacity in GCP and use of Ebola vaccines in at-risk countries, as well as maintaining momentum in regulatory approval processes. SAGE has recommended that WHO work with national regulatory authorities to identify appropriate pathways for evaluation and approval of Ebola vaccines.

RITAG members commended this work, carried out under highly challenging circumstances, noting the effective collaboration between countries, WHO and partners. The exceptional commitment of healthcare workers and other frontline workers was also noted. The lead role being played by national governments was recognized, as well as the close collaboration between national immunization programmes and health emergency teams.

Discussions focused on the need to obtain more data on **vaccine use in pregnant women and infants under 1 year**. **Breastfeeding women** were felt to be a separate category in which vaccine use could be appropriate, particularly given anecdotal evidence that women may be stopping breastfeeding in order to be vaccinated.

It was argued that every effort should be made to **accelerate licensure of the VSV-EBOV vaccine** to simplify its introduction, with the recognition that further data on long-term efficacy are required. It was also important to **continue development and evaluation of additional vaccines**, to avoid supply bottlenecks and vulnerabilities and to deliver products offering longer protection or defence against a wider range of strains. SAGE is due to consider the design of trials of other vaccine candidates and a framework for product selection, although final choices on use in the field will be made at a country level.

While vaccination plans have been developed for countries neighbouring the DRC, it was suggested that advice should also be developed for **other countries at risk of importation** or likely to send healthcare workers or peacekeeping forces to affected areas.

It was also suggested that **ring vaccination should be emphasized as the optimal strategy for containment**. It is likely to represent a better use of resources than mass vaccination, and is not being used as a vaccine-sparing strategy. Given the

challenging circumstances, it is also important that lessons are learned about effective **community engagement** to inform activities in future outbreaks.

The occurrence of multiple seemingly independent clusters was noted. However, for a range of reasons – including conflict, economic insecurity and mistrust of health services – affected populations are highly dynamic, leading to the dissemination of cases. Subsequent analyses have linked cases into a much smaller number of clusters. The possibility of using new tools such as portable genome sequencers to provide real-time information on infections is being examined.

It was also stressed that, while **research in emergency situations** is vital, outbreaks should not be used opportunistically by researchers. Accepted regulatory and ethical approval mechanisms should be followed, and research projects should not interfere with emergency disease control responses. Research responses should be coordinated, led by a local public health agenda, and have strong involvement from national governments.

REGIONAL PROGRESS

Progress and challenges in improving coverage and equity in the African Region

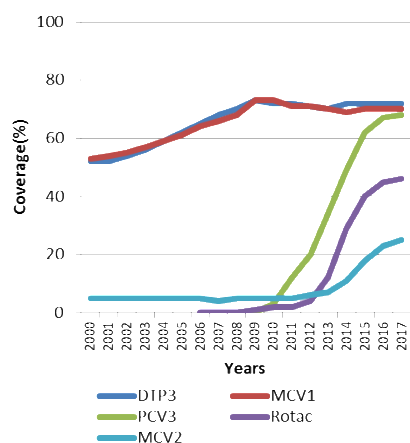
Richard Mihigo, WHO

Delivering an annual review of immunization in the region, Dr Mihigo noted some of the most notable developments of 2018. These included the launch of the Regional Office's Business Case for Immunization, outlining the approach to be taken by WHO in support of countries, as well as the development of the 'maturity grid' approach for categorizing countries, providing a framework for establishing the nature and intensity of support to be provided.

Other notable events included the launch of the WHO's 13th Global Programme of Work, identifying its 'three billion' aims – 1 billion more people with health coverage, 1 billion more people made safer, and 1 billion more lives improved by 2023 – to which immunization will make a key contribution. In addition, Gavi has launched a consultation exercise to gather input into the latest iteration of its strategy ('Gavi 5.0').

Within the region, a succession of infectious disease outbreaks has drawn attention to shortcomings in national immunization programmes, with inadequate coverage creating pockets of vulnerable under-immunized individuals.

In terms of progress towards the objectives of the Regional Strategic Plan for Immunization, DTP3 coverage continued to plateau at 72%, although encouraging progress was seen in PCV3 and MCV2 coverage levels. Moreover, due to the increasing size of birth cohorts in Africa, the actual number of children immunized has increased significantly. Inequities within countries remain a significant concern, with factors such as location (urban or rural), wealth and education all having a significant impact on coverage levels, although the exact situation differs markedly between countries. Conflicts and insecurity are also of concern in the region, contributing to the numbers of unimmunized people in the region.



Vaccine coverage trends in the Africa Region.

Work is ongoing to support the switch over to new rotavirus vaccines, following the withdrawal of RotaTeg and supply shortages with Rotarix. Although multiple countries have expressed interest in HPV immunization, vaccine shortages and practical challenges have limited its introduction. MenA vaccination has almost completely eliminated meningococcal A meningitis epidemics, and a roadmap is being developed to control all bacterial meningitis by 2030.

Looking forward, systemic issues with immunization system performance remain a major obstacle to progress. Further key issues include a lack of country ownership, governance and accountability shortcomings, frequent health emergencies, multiple population movements, and insufficient attention to demand generation. There are also broader health systems limitations whose effects on immunization are often under-recognized.

The Addis Declaration remains a key route through which national governments can be held accountable for their commitments to immunization. A presentation to the African Union in July 2019 provides an opportunity to report on progress with implementation and present a scorecard. The presentation will emphasize the importance of the new differentiated approach of country support, the importance of coordination with partners beyond health (for example through one health initiatives), and the key roles to be played by CSOs in ensuring accountability and in demand creation.

Other important future goals include emphasizing the intimate relationship between immunization and universal health coverage, primary health care, and health system strengthening, and providing input into the post-2020 global immunization strategy following the end of the Decade of Vaccines.

Urban Immunization: diagnoses and preliminary solutions - reflections from Ghana, Kenya and DR Congo

Lora Shimp, JSI

Urban populations present a major and growing challenge to national immunization programmes, as they are increasingly characterized by under-vaccinated populations. It is important to understand both the obstacles to and enablers of access to vaccination in these populations, to support the design of interventions to improve the delivery of immunization services.

A mixed methods study led by JSI and partners in Ghana, Kenya and the DRC has examined some of these obstacles and enablers. The project incorporated both a review of existing material as well as focus groups with people living in urban settlements.

The findings suggest that issues affecting take up of services are complex and context-specific. Across the sites, multiple barriers are associated with the planning and coordination of services. Additional common themes included a lack of trust in health services, concerns about the quality of services delivered, and a lack of community engagement.

Potential ways forward include the design of services that are more suited to the lives of families in urban settlements, as well as greater attention to the quality of services and the importance of interactions with health service providers. Other possible strategies include greater social engagement with communities and more effective collection and use of data.

More generally, the study highlights the potential to undertake rapid assessments of urban settlement dwellers' needs and attitudes, as a basis for refining and redesigning service delivery. A range of resources exist that could inform the design of such interventions, including the Reaching Every District (RED) guide and Tailoring Immunization Programmess (TIP), which could be rapidly adapted in partnership with communities and with other health and municipal service providers, then trialled and embedded if effective in a specific local setting. Solutions can combine both 'quick wins' to deliver short-term benefits as well as sustainable longer-term interventions.

Progress in implementation of the National Emergency Routine Immunization Coordination Centre (NERICC) plan for routine immunization and primary health care strengthening in Nigeria

Bassey Okposen Bassey, MoH Nigeria

In 2017, Nigeria launched an emergency response to improve immunization coverage, coordinated by the National Emergency Routine Immunization Coordination Centre (NERICC). The impetus for NERICC came in 2016 with the recognition that overall coverage was low (DTP coverage of 33%), that administrative data were not providing a true picture of coverage, and that coverage varied widely subnationally. In addition, take up of services was influenced by a lack of trust in health services, a lack of awareness, and concerns about the quality of immunization services. The result was large numbers of under-immunized children.

In June 2017, the Ministry of Health declared a public health emergency and NERICC was launched the following month. Its key aim was to achieve coverage of at least 80% across all age groups by 2028. Five objectives were established, including increasing detection and responses, improving accountability, enhancing coordination, improving data use and enhancing outreach services.

NERICC's plans were developed and implemented in close collaboration with partners. A prioritization exercise identified 11 very high and seven high-priority states, which have been the focus of NERICC's activities. Strategic interventions have targeted key aspects of immunization function, including programme management and coordination, service delivery, performance management and data quality, advocacy and demand generation, and mobilization of resources. Frequent LQAS have been used to provide reliable data on coverage.

A key aim has been to instill accountability at all levels. States have been encouraged to assume greater responsibility for immunization services, and individual staff members are held accountable for their performance – underperforming individuals have lost their positions. Active community engagement has also been prioritized.

A differentiated approach has been established subnationally, with different states having different planned trajectories of improvement towards the 2028 target. LQAs are also being conducted quarterly to continue to identify underlying reasons and monitor progress. Although plans are at early stages of implementation, significant improvements in coverage have been achieved and smaller discrepancies are being seen between survey and administrative data.

Implementation of the Marshall Plan in DR Congo for routine immunization strengthening

Guillaume Ngoie Mwamba, MoH DR Congo

The DRC's Marshall Plan to enhance its national immunization programme was driven by the recognition that the country had large numbers of under-immunized children, was experiencing frequent stockouts, was affected by multiple epidemics, including cVDPV, yellow fever and measles, and that funds were not available at times of need.

Development of the plan drew on five key principles. These included complementarity with wider health development strategies, a results-based approach with appropriate quantitative indicators, a bottom-up approach, and a strong focus on integration, with a specific coordination team.

A prioritization exercise considering issues such as outbreaks, stockouts and numbers of under-immunized children identified nine priority provinces. A goal has been set of increasing coverage by 15% in 18 months. Priority activities across five themes were launched in 2018, spanning areas such as coordination of financing, service delivery, distribution, and monitoring and evaluation. The plan's overall budget is US\$28m.

Discussions emphasized the key need to **promote country ownership of immunization** and domestic investment, leveraging the commitments made in the Addis Declaration. A change in mindset was needed to ensure that national governments see protection of the health of their populations as a key aspect of their stewardship role. Given known returns on investment, supporting immunization activities should be seen as an investment in future national prosperity.

As well as mapping trends in financing over time, it was also argued that **greater transparency in national budgeting** was required. It was suggested that countries should develop **disaggregated budgets** that include specific budget lines for key activities such as surveillance, data management, vaccine logistics and NITAGs, and indicate whether resources are from domestic sources or partners.

RITAG members applauded the commitment and focus demonstrated by Nigeria and DRC, and the constructive engagement with partners to develop rigorous **country-led strategies and action plans**. The development activities were also seen to illustrate the **linkages between development of national immunization systems and health systems strengthening**, the two having a reciprocal and mutually reinforcing relationship.

It was also noted that the country examples illustrate the principle of a **differentiated approach to support at a subnational level**, with countries developing approaches to target priority areas to achieve greatest impact. With

devolvement of many health activities, it was also suggested that domestic financial commitments should be considered at a subnational as well as national level.

Questions were raised about the **sustainability of emergency responses**. Both countries emphasized the importance of integration with other health systems strengthening strategies. NERICC, for example, is intended to have a three-year lifespan, after which the emergency element will be dropped, although its structures and approaches will continue. Activities will also be integrated with the health systems strengthening initiative for Nigeria recently approved by Gavi.

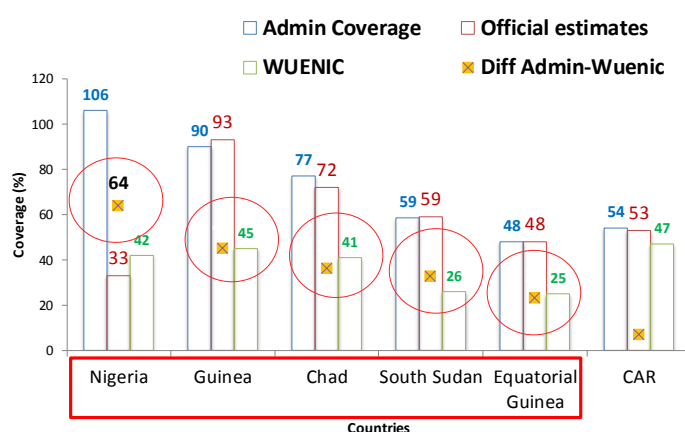
VACCINE DATA AND LOGISTICS

Progress in investments for improving data quality and use in the African Region

Alain Poy, WHO

Use of data is essential for planning and monitoring the performance of national immunization systems. Multiple types of data, particularly coverage and surveillance data, are of particular value. Data quality, management and use are therefore critical elements of national immunization programmes.

Notably, although administrative data are often used to plan and monitor immunization activities, there are frequently discrepancies between these figures and WUENIC data (WHO and UNICEF Estimates of National Immunization Coverage). In 2017, 18 countries had DTP3 coverage of greater than 80% according to both national and WUENIC data (up from 15 in 2016). Elsewhere, administrative data are generally higher than corresponding WUENIC figures, and discrepancies are typically greatest in low-coverage countries. Hence administrative data may often be overestimating coverage, and decision-making may be based on misleading data.



The difference ranges from 64 points in Nigeria to 7 points in CAR

Discrepancies between WUENIC and other estimates of vaccination coverage.

The WHO Regional Office has been working with countries to improve the quality of data collection, management, analysis and use. Data improvement plans have been developed for 20 countries, and support is being provided to strengthen information systems. New technologies are being introduced to provide additional data, adopting some of the technologies pioneered for polio surveillance. The capacity of EPI managers to make use of data is being developed, supported by new tools such as data dashboards. The Regional Office is also working with a wide range of external partners to develop new tools and improvements to IT systems.

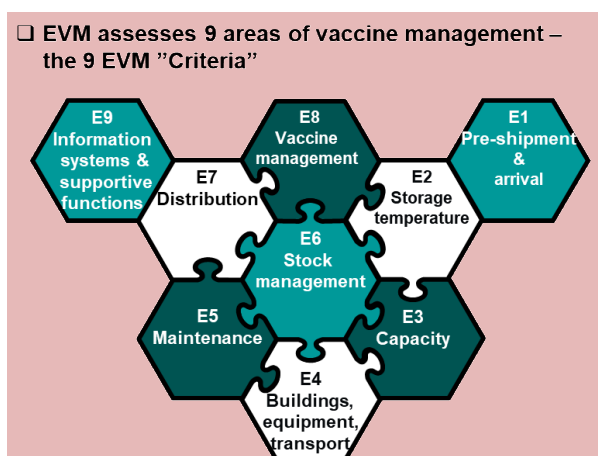
The impact of such work can be seen in countries such as Kenya, which has seen a decrease in the number of ‘data impossibilities’, such as coverage rates in excess of 100% and negative dropouts between immunization rounds. Administrative data are now also closer to WUENIC estimates.

Notably, increased data accuracy may be associated with an apparent decline in coverage. It was emphasized that accountability should be based on accuracy of data rather than coverage, to minimize the risk of inaccurate data recording or data falsification in order to deliver high coverage numbers

Progress in improving vaccine management and logistics in the African Region

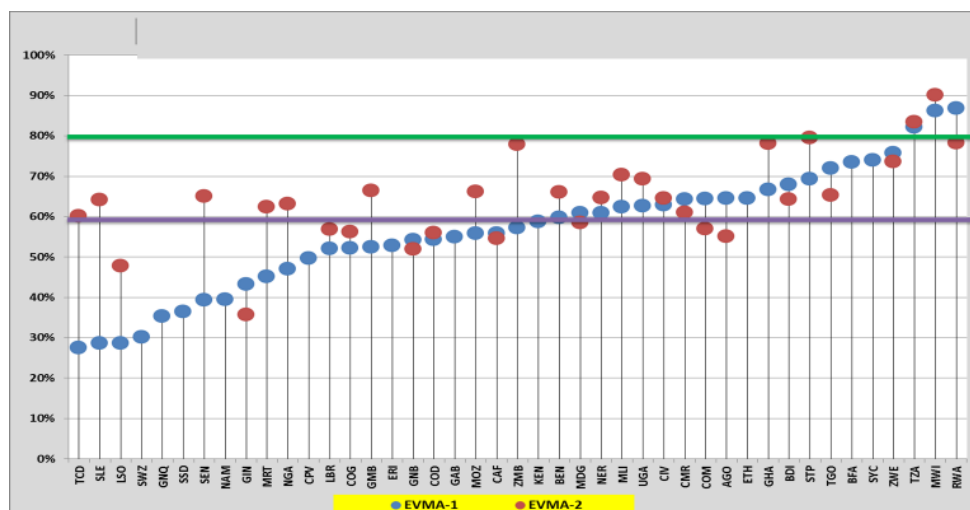
Claude Mangobo, WHO

Immunization programmes are dependent on both access to global vaccine supplies and the ability to deliver vaccines to populations. However, despite many changes in immunization programmes, the vaccine supply chain has changed little in decades. Benchmarking of national performance is based on Effective Vaccine Management criteria, which assess nine areas of vaccine management. Although some progress was achieved in the region between 2009 and 2018, there remains considerable room for improvement.



The nine criteria used in vaccine management evaluation.

Areas in particular need of improvement include analysis of temperature monitoring data, maintenance of cold chain equipment, stock management and distribution. Multiple actions could be taken to improve performance, including the development of cost-improvement plans, targeted staff training, and adherence to standard operating procedures. Improvement plans should be monitored, with a self-evaluation after two years.



Trends in vaccine management performance in countries in the Africa region.

WHO and partners are undertaking a range of initiatives to secure the global supply chain. A supply chain strategy has been developed for the period up to 2020.

National activities are beginning to bear fruit, with multiple examples of enhanced storage capacity and remodelling of supply chains to ensure quality vaccines reach delivery points. Attempts are also being made to increase efficiencies by integrating immunization and other medical supplies, although this is challenging in practice. Nevertheless, vaccine logistics remains a relatively neglected and under-resourced area.

Discussions emphasized the **critical importance of both data management and quality** and of **vaccine logistics** to immunization. The causes of inaccurate data are likely to be many and varied, and to differ between countries. As a general principle, it was argued that data accuracy should be seen as paramount, with mechanisms such as LQAS used to ensure accuracy whenever possible. Furthermore, the culture of data collection should prioritize accuracy and **avoid incentives based only on maximizing coverage** and punishments linked only to low coverage, which may encourage false reporting. Openness about coverage should be encouraged, as a basis for collaborative efforts to address the key issues affecting immunization coverage. Donors should also avoid simple performance measures that may incentivize falsification.

It was also noted that multiple **data quality initiatives** are underway, regionally and globally, emphasizing the importance of the issue. These include a data quality working group established by SAGE.

In terms of **procurement**, it was suggested that it would be helpful to revisit past recommendations on the potential for regional pooled procurement, particularly as more countries are due to graduate from Gavi support. It was also noted that lessons could be learned from countries such as Tanzania that had made progress in **integration of medical supply chains**.

MEASLES AND MATERNAL AND NEONATAL TETANUS

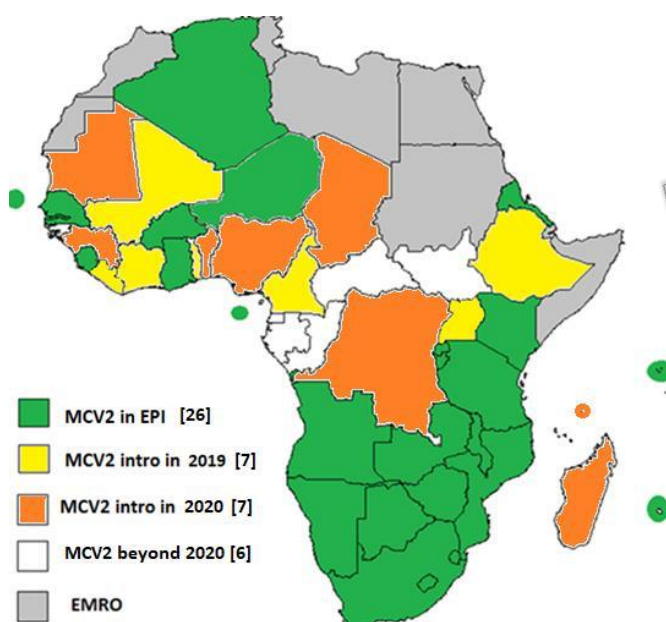
Status report on measles/rubella elimination in the African Region and plans to accelerate activities to reach 2020 measles elimination goal

Balcha Masresha, WHO

MCV1 coverage in Africa has plateaued at around 70% over the last five years, although MCV2 coverage has increased significantly since 2013. Eight countries achieved the target MCV1 coverage of 95% or higher in 2017, and a further eight achieved coverage of between 90 and 94%.

A total of 26 out of 47 countries have introduced MCV2, seven plan to do so in 2019 and seven more in 2020.

Nevertheless, dropout rates remain high, and coverage levels vary significantly subnationally. Reasons for low MCV2 coverage include insufficient political commitment and a lack of public awareness of its importance. Similarly, only eight countries have introduced DTP4 vaccination in the second year of life.



Status of MCV2 introductions.

Administrative data suggest that measles and measles/rubella campaigns routinely achieve 100% coverage. However, survey data suggest that, in reality, relatively few exceed 95% coverage (and not all countries carry out confirmatory surveys). Major campaigns have been carried out in Nigeria, achieving 88% coverage, compared with 56% in the national immunization programme. Some 40 million children were vaccinated through SIAs, 34% of whom received MCV for the first time.

Measles surveillance also remains suboptimal in the region. For the two surveillance indicators used for measles, both targets were met in 23 countries, but neither were met in nine.

Despite the plateauing of coverage, the incidence of measles and annual mortality have both continued to decline. This is particularly notable given that some large countries have yet to introduce MCV2 and known shortcomings in measles SIAs. Annual mortality has declined by 86% between 2000 and 2017, from 348,000 to 48,000 deaths. Nine countries are nearing elimination, and a further four are on track. This progress is encouraging discussions on suitable mechanisms for verification of eradication.

Nevertheless, on current trends, the 2020 measles elimination goal will not be achieved. Furthermore, the region has been affected by a number of large outbreaks, some affecting countries with relatively high coverage – evidence that measles will exploit even the smallest gaps in immunization coverage.

In November 2018, SAGE issued further guidance on measles control, defining three categories of countries and recommending control strategies for each category. However, to support operationalization of this guidance, clarification may be needed for the middle category, countries experiencing periodic outbreaks, with moderate coverage and inadequate population immunity.

Moving forward, further advocacy is required to accelerate progress towards the 2020 goals, with a particular emphasis on strengthening national immunization programmes and coverage in the second year of life. This agenda could be advanced by the setting of regional and national goals for MCV2 coverage and by developing a definition for the fully immunized child at age 2.

Measles elimination: lessons learnt and experience from SEARO

Sunil Bahl, WHO (via webex)

The South-East Asia Region encompasses a population of nearly 2 billion people in 11 countries, and an annual birth cohort of 38 million. Its regional goal is to achieve measles elimination by 2020. To date, elimination has been verified in four countries and six countries have verified rubella control.

All 11 countries have introduced MCV2 and all 11 will have introduced rubella vaccination by the end of 2019. A total of 345 million people were reached through measles SIAs in 2016–18 and more campaigns are planned for 2019. In terms of surveillance, every country has a WHO-proficient laboratory. A regional verification committee, national verification committees and framework for measles elimination have also been established.

Regional MCV1 coverage is close to 90% and MCV2 coverage has risen to nearly 80%, following a strong push since 2010 and its adoption by several large countries. The numbers of measles cases in the region have fallen significantly, from around 100,000 cases a year in the early 2000s to less than 30,000 cases in 2016 and 2017. Each country has adopted specific measures to improve national immunization programmes and optimize immunization schedules, including a strong focus on year 2.

Regional challenges include suboptimal coverage in six countries, subnational variation in coverage, and a backlog of under-immunized children and young adults. Various policy and programme barriers have been identified, and dropout is not yet monitored adequately.

A range of targeted and tailored measures are being promoted to address these challenges. SIAs are being used to enhance national immunization programmes and the regional technical advisory group and NITAGs are being mobilized to tackle the policy and programme barriers.

Much has been learnt from regional SIA, including the importance of pre-campaign readiness assessments, which inform corrective actions before campaigns are launched. Social media have been extensively mobilized to engage communities, and innovative work carried out with schools. Local immunity data have been used to establish the appropriate age

ranges for immunization, which often extend into adulthood. Staff have been recruited to manage independent monitoring. Importantly, activities have been driven by high levels of political commitment and strong engagement with partners.

First Assessment			Final Assessment		
District	Operations	Communications	District	Operations	Communications
ADILABAD	Moderate	Moderate	ADILABAD	On track	On track
HYDERABAD	Critical	Critical	HYDERABAD	Moderate	Moderate
KARIMNAGAR	Moderate	Moderate	KARIMNAGAR	Moderate	Moderate
KHAMMAM	Moderate	Critical	KHAMMAM	On track	On Track
MAHABUBABAD	Moderate	Moderate	MAHABUBABAD	On track	On Track
MAHBUBNAGAR	Critical	Moderate	MAHBUBNAGAR	Moderate	On Track
MANCHERIAL	Moderate	Critical	MANCHERIAL	On track	Moderate
MEDCHAL MALKAJGIRI	Moderate	Critical	MEDCHAL MALKAJGIRI	Moderate	On Track
NALGONDA	Critical	Critical	NALGONDA	On track	On Track
RANGAREDDY	Moderate	Moderate	RANGAREDDY	On track	Moderate
SANGAREDDY	Critical	Moderate	SANGAREDDY	On Track	Moderate
WARANGAL URBAN	Moderate	On track	WARANGAL URBAN	On track	On track
STATE	Moderate	Critical	STATE	On track	On track

Preparedness assessments before measles SIAs in the South-East Asia Region.

Attention has also been given to strengthening surveillance systems and laboratory networks, and to ensuring effective emergency responses. A regional verification committee was created in 2016 and has established processes and structures defining the steps towards verification of elimination.

Measles elimination: country perspectives

Yousseuf Ahmat Annadif, MoH Chad

Chad is a country of 16.3 million people in 23 provinces. Vaccine coverage has slipped in recent years, from 84% for MCV1 in 2016 to under 70% in 2017, although WUENIC estimates suggest lower coverage (below 40%). Discrepancies are likely to reflect inaccurate data recording but also denominator uncertainty given large numbers of displaced people. Insecurity in the Lake Chad Basin area presents a particular challenge to immunization. Coverage also shows significant subnational variation.

Below-target performance reflects a number of issues. These include problems with stockouts, ineffective field visits, lack of transport, poor cold chain capabilities, insecurity and inaccessibility of some populations.

Immunization has been identified as a national priority, illustrated by a National Vaccination Forum held in March 2018 and strong support from the First Lady of Chad. Immunization budgets are being increased, with support from a range of partners. A variety of approaches have been adopted in 2017 and 2018 to increase coverage, including use of the missed opportunities approach, targeting of special groups and population sites such as nomadic and urban populations, and introduction of new packages of vaccines.

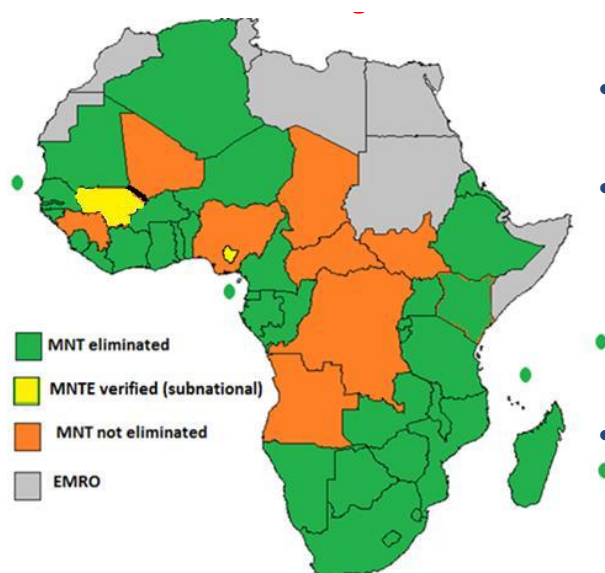
Governance and leadership have been central to this renewed vigour, particularly the commitment of the head of state. Technical and financial partners also provide key regular input. Efforts are being made to improve data quality and accuracy as well as surveillance coverage.

The country was affected by a large measles outbreak in 2018, illustrating the importance of continuing these improvement efforts. Further campaigns are planned for 2019 alongside strengthening of the national immunization programme, and the country is due to introduce MCV2 in 2020.

Status report on maternal and neonatal tetanus elimination in the African Region

Richard Luce, WHO

Elimination of maternal and neonatal tetanus by 2020 is one of the objectives of the Regional Strategic Plan for Immunization. As at March 2018, 45 out of 59 at-risk countries globally had achieved elimination. Eight out of the 14 remaining countries were in the African Region.



Status of maternal and neonatal tetanus elimination (MNTE) in the Africa Region.

In 2017, 43% of reported cases of maternal and neonatal tetanus were in the African Region (reported cases probably greatly underestimate the total disease burden). Protection at birth, an indicator that includes vaccination as well as other interventions that prevent infection, has risen from 60% to 80% since 2000, although coverage varies widely across the region.

Between 2014 and 2017, 13.3 million women of reproductive age were reached by tetanus toxoid (TT) SIAs in high-risk districts in nine countries. SIAs were not completed in several countries owing to security challenges and funding shortfalls.

In 2017, new recommendations for a six-dose schedule starting at six weeks of age were issued. A long-standing recommendation is for countries to switch from TT to tetanus–diphtheria (Td) vaccination, although fewer than half the countries have done so to date. The slow transition may reflect the lack of an active push to discourage TT use, insufficient awareness of the benefits of a diphtheria booster, and the need for evidence of cost-effectiveness (although the price differential is small). Additional guidance on transition was issued in June 2018, and withdrawal of UNICEF funding for TT should accelerate this transition.

Key global activities include a meeting in November 2018 to discuss the of maternal and neonatal tetanus elimination business case. This identified US\$200m as the sum required to achieve elimination, although commitments to date have totalled just US\$21.6m, so a sizeable funding gap remains. The figure includes US\$55m for use of compact pre-filled auto-disable (Uniject) devices, which was not approved by the Gavi Policy and Programme Committee.

With many countries having achieved elimination, sustaining these gains is also a high priority. Maternal and neonatal tetanus elimination sustainability guidelines have been developed and a planning workshop was held with 19 countries in August 2018.

Mali and Nigeria have adopted a state-by-state approach to elimination, and individual states and regions have achieved elimination in each country. Other countries that have yet to achieve elimination have activities planned, and it is anticipated that four further countries and additional states and regions in Mali and Nigeria will secure elimination status by 2020. However, progress in South Sudan and the Central African Republic is significantly slower.

Key challenges include insecurity and the fragility of some countries' health systems, as well as the relatively small pool of donors engaged in maternal and neonatal tetanus elimination. Countries also have multiple competing health priorities, while limited human resources are available to drive forward elimination. Future actions include finalization of remaining countries' elimination plans, integration of maternal and neonatal tetanus elimination activities into wider reproductive, maternal and child health service delivery, and encouraging more countries to adopt the six-dose policy.

In discussions, the **key role played by partners** in regional efforts to control measles was acknowledged, particularly the US CDC. With the regional 2020 target looking likely to be missed, there was much debate on whether a new **elimination target date** should be set. While this might aid planning, it could also discourage countries from energetically pursuing elimination by 2020.

It was suggested that **advocacy linked to the Addis Declaration** should stress the importance of controlling measles. Specific **regional and national targets for MCV2 coverage** could also help to galvanize action, as could a new definition for a **'fully immunized child at age 2'** including MCV2.

It was noted that much could be learned from SEARO's significant progress, particularly in its effective use of SIAs, for example through extensive **pre-campaign planning and preparedness assessment**. The need to ensure that SIAs also **enhance national immunization programmes** was reiterated. It was also argued that countries should decide on the **age range and geographic coverage of SIAs** based on local epidemiological data, rather than being driven by donor policies.

For maternal and neonatal tetanus elimination, it was noted that progress needed to be monitored carefully, particularly given maternal and neonatal tetanus's status as an infection predominantly affecting the poor and women. The narrowness of funding sources was acknowledged to be a significant issue, and it was also acknowledged that global support for auto-disable technology would not be forthcoming.

The importance of integrating maternal and neonatal tetanus control with reproductive, maternal and child health services was stressed. It was also suggested that opportunities might exist to link HPV vaccination to the last Td booster,

potentially extending vaccination to boys as well as girls (which, as well as delivering health benefits to boys, might help to address falsehoods linked to vaccination just of girls).

DEMAND

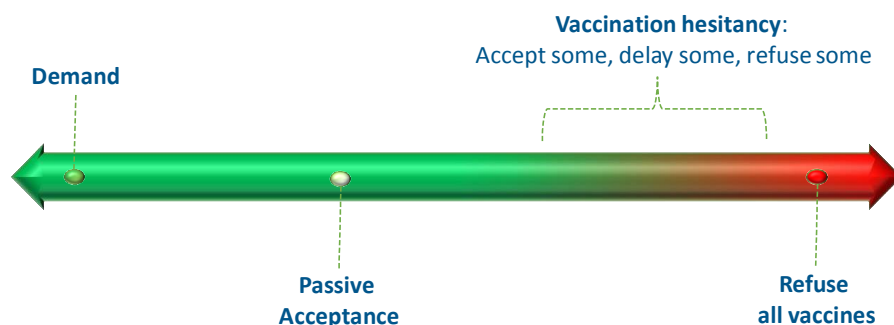
Community demand for immunization: proven and promising approaches

Robb Butler, UNICEF

Vaccination acceptance and demand are increasingly seen as central to the success of national immunization programmes, even if the full extent of hesitancy, and whether it is on the rise, is not yet clear. A move towards demand-driven immunization is a central tenet of the Regional Strategic Plan for Immunization.

A caregivers' journey to immunization is complex, subject to multiple influences, and affected by many different enablers and barriers. It is essential to understand key 'demand determinants' that have influence on this journey, so barriers can be lowered and enablers promoted. It is also important to note the distinction between an intention to act and the action itself, as there are often disconnects between knowledge and action. This has important implications for the nature and targeting of messages, both of which need to be based on an understanding and segmentation of audiences.

Vaccination behaviour can be seen as falling on a continuum from active demand, through passive acceptance, hesitancy and outright refusal (generally still rare). Consultations suggest that the reasons for not choosing vaccination vary widely, and are often not simply due to lack of knowledge. People's experience of vaccine services, for example, has a major impact on the likelihood of return visits to health facilities. Such studies emphasize the need to build trust, reduce practical and psychological barriers, tailor services to user needs, and to use interventions that help to turn intentions into actions.



The spectrum of vaccination demand.

Hesitancy can be considered within the context of the '3Cs' – complacency (of caregivers, healthcare workers and politicians), convenience (for caregivers) and confidence (trust in healthcare workers and immunization systems more generally). Passive acceptance is commonplace, but may often reflect copying behaviours linked to social norms. Although this may generate good coverage, passive acceptance is vulnerable to external shocks that rapidly shift social norms – as illustrated by national outbreaks of hesitancy in which coverage has plummeted and taken years to recover.

Greater resilience to external shocks can be achieved by shifting passive acceptance towards active demand – broadly defined as seeking of services, advocating for immunization services and actively promoting immunization. Although

there have been many attempts at demand creation, few have been well documented and there is limited evidence on which to base recommendations. Importantly, however, it is essential to consider local context to tailor activities, considering reasons for lack of vaccination (barriers) as well as for being vaccinated (enablers).

Panel Discussion and RITAG Q&A

Moderator: Niklas Danielsson, UNICEF

Launching the discussion, panel member **Joseph Okeibunor** (WHO) noted that multiple factors affect people's vaccination behaviour. These are highly contextual and subject to change over time. Research and listening to people is needed to generate a clearer picture of these factors. He argued that social scientists have a key role to play in ensuring that the right questions are asked in the right ways in such studies, so that reliable evidence on attitudes and behaviour is generated.

Sue Goldstein (Priceless) noted that community engagement has tended to be framed in a western context, with a strong emphasis on the individual and less on more collective cultural norms typical of Asia and Africa. Storytelling and participation are deeply rooted aspects of African culture. She also suggested that it was important to learn from the engagement approaches adopted by the polio programme in Afghanistan and Pakistan, and to prioritize listening to communities. Involving frontline workers was crucial, providing an opportunity to change not only how they are perceived by others but also how they perceive themselves.

Charles Shey Wiysonge (South African Cochrane Centre) noted that service delivery issues represented a major cause of vaccine hesitancy in many settings. He argued that it was important to tackle the quality of services to reduce barriers to vaccination, and that local data were important to shape interventions. Most research in this area to date has been carried out in high-income countries and may be of limited relevance in the African Region.

Whether vaccine hesitancy is on the increase was much debated. SAGE's vaccine hesitancy working group recently concluded that it was hard to judge with any certainty. Reasons for hesitancy can be highly localized and can now generate a lot of attention. While active resistance to vaccination may always have existed, and may still be rare, new tools such as social media provide a route through which negative views can gain much greater exposure very rapidly. In addition, several vaccine-preventable diseases are now rare, so the 'fear factor' may have declined and concerns about the possible harms of vaccination become more significant.

It was also noted that CSOs had a potentially critical role to play in demand activities, and that some have the expertise to undertake systematic community consultation (CSOs include academic institutions). It was suggested that other fields of medicine, such as maternal health, might hold lessons for the design of respectful high-quality services – and that quality needs to be understood from a caregivers' point of view. An additional suggestion was that lessons could be learned from the corporate sector, which places great emphasis on customer engagement and incentivization of staff.

It was felt to be important to have a good understanding of the demand creation activities being undertaken in the region, and evidence of their impact, to inform future activities. However, it was questioned whether national immunization programmes had the expertise or capacity to integrate this aspect into their work.

It was argued that it was important to have high-quality data on hesitancy, and to track attitudes and behaviour over time. Investing in demand generation was seen as critical to hesitancy prevention, to create resilient populations that are not swung by misinformation or unnecessary alarms. Nevertheless, it was argued that the capacity to develop and implement demand generation strategies was currently limited in the region. Although more needs to be done, it is important that activities are based on best practices and supported by strong evidence.

Consolidating guidance, aligning and harmonizing efforts to generate acceptance and demand

Robb Butler, UNICEF

UNICEF and multiple partners² have formed a collaboration to develop a global vaccine acceptance and demand hub. The impetus for the initiative was the fragmented nature of the technical assistance being offered by the various partners. The vision was therefore to create a single knowledge repository for high-quality demand-related materials, to help align and harmonize the technical support provided. It will include practical tools and policy guidance, and provide a platform for a demand-related community of practice.



Overview of the global vaccine acceptance and demand hub.

Consultation exercises with multiple stakeholders are being used to shape the vision, scope and functionality of the resource. This includes engagement with additional providers of technical assistance as well as CSOs and communities themselves. Terms of reference have now been endorsed across all partners.

Alongside this work, a white paper is being developed spelling out challenges and a vision for demand generation over the next decade. This will be published in time to feed into discussions on the global post-2020 immunization strategy.

Long-term goals for the field include the need to adopt a more strategic approach to demand generation, to demonstrate its value, to integrate demand activities into routine practice, to raise the visibility of demand as a key aspect of immunization systems, and to ensure integrated support is available through the demand hub.

² WHO, CDC, Bill and Melinda Gates Foundation, Gavi, Gavi CSO Constituency, International Federation of Red Cross and Red Crescent Societies, and JSI.

Use of IHR monitoring and evaluation framework and IDSR strategy for strategic planning to secure health security in Africa

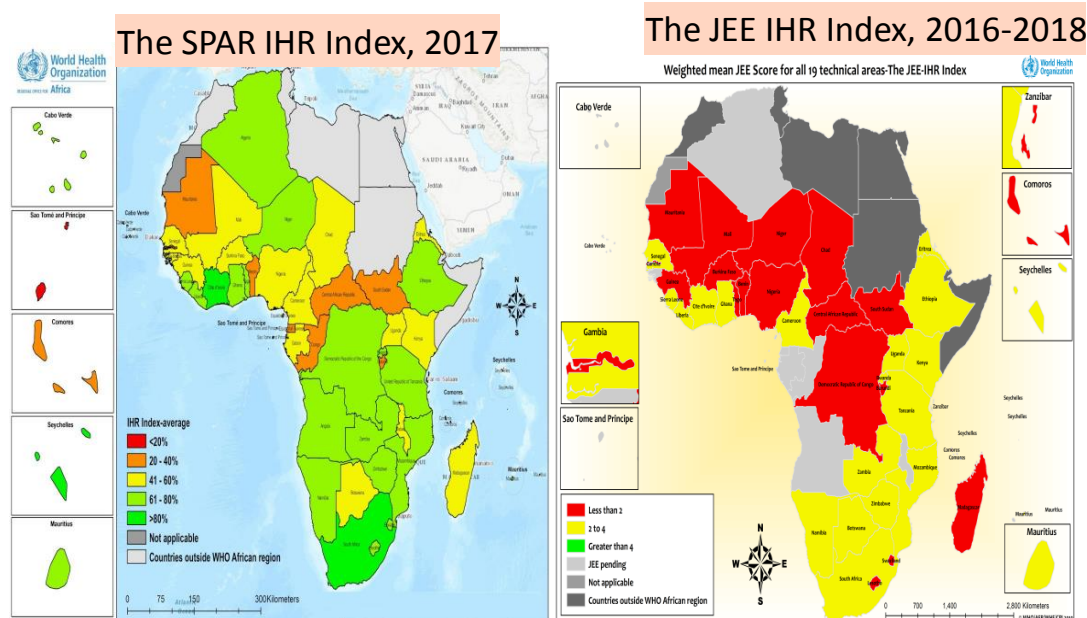
Ambrose Talisuna, WHO

The 2014–16 Ebola outbreak catalysed renewed interest in global health security, and use of mechanisms such as IHR and Integrated Disease Surveillance and Response (IDSR) to protect it. The Building Health Security beyond Ebola meeting held in Cape Town in 2015 stressed the importance of preparedness and the roles of national, regional and global stakeholders. Africa is central to such discussions – it experiences an average of three acute public health events a week, dominated by infectious diseases such as cholera, viral haemorrhagic fevers and measles. Since the drivers of health emergencies span multiple sectors, an interdisciplinary approach is essential.

The Cape Town meeting identified global leadership priorities for WHO, actions for partners and commitments required of countries. IHR provide a global framework for preventing and responding to all public health threats, legally binding on countries. There are strong synergies between health system strengthening and development of IHR core competencies.

Monitoring IHR capabilities has four components: self-assessments, after-action reviews, simulation exercises and voluntary joint external evaluations (JEEs). In the African region, all 47 countries have undertaken self-assessments and 39 have undergone JEEs. Covering the general areas of ‘prevent’, ‘detect’ and ‘respond’, both self-assessments and JEEs generate scores (from 1–5) for key aspects of IHR capability. Notably, comparisons of self-assessment and JEE scores generally identify significant over-scoring in the former.

For most criteria, IHR scores as judged by JEEs are suboptimal. Notably, across 19 technical areas, immunization is the area that scores highest across the region as a whole. Nevertheless, the evaluations suggest countries in the region have a long way to go to develop their IHR competencies. In 2018, according to JEE criteria, no country in the region has the full set of required IHR capacities.

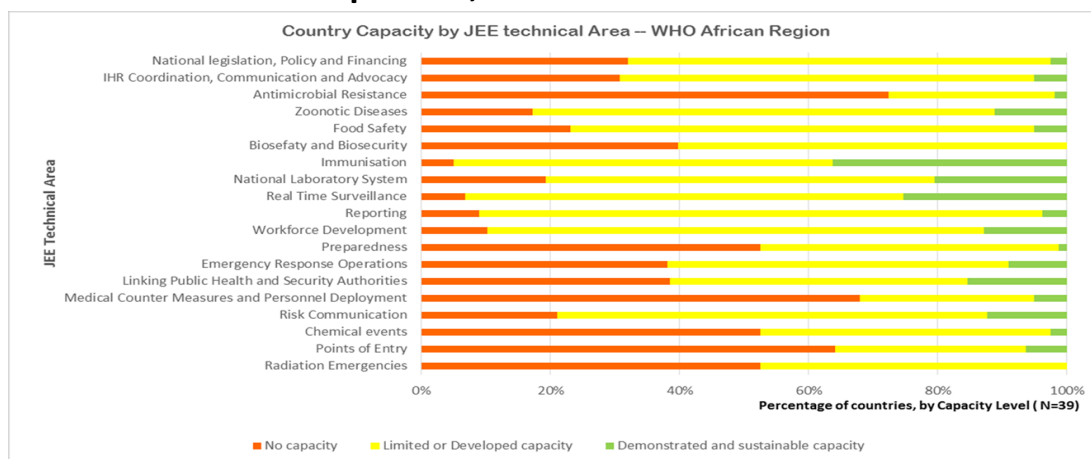


2018:Based on JEE data, no African country has the required IHR capacities

A comparison of self-assessments and JEE assessments.

JEEs are used as the basis of national actions plans for health security, which have been developed by 21 countries in the region; 11 are being developed and two more are planned. A new costing tool has been developed to identify the resource requirements associated with national actions plans.

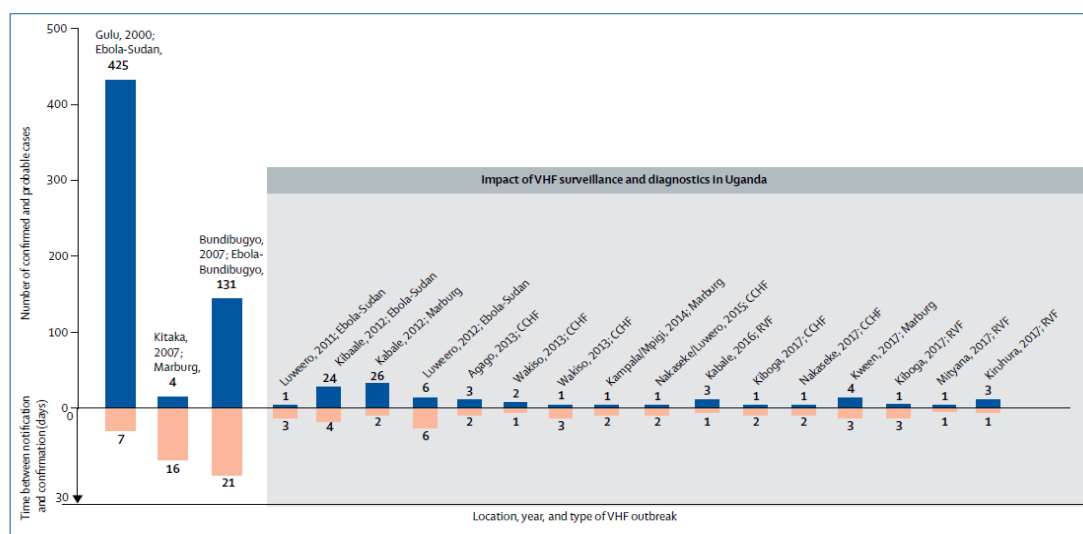
IHR Capacities, 19 JEE technical areas



IHR capacities across 19 technical areas.

The IDSR concept was developed in the 1990s. Technical guidelines and performance indicators have been developed to support event-based and indicator-based surveillance. They have been adopted in 44 countries, but only 40% have activities at peripheral health facilities.

The experience of Uganda illustrates the major impact such activities can have. The country is affected by regular haemorrhagic fever outbreaks, but since the introduction of event-based surveillance, the impact of such outbreaks has been dramatically reduced. Although zoonotic transmission cannot yet be prevented, prompt detection and containment can limit its impact³.



Reduction in haemorrhagic fever outbreak size following introduction of surveillance.

VPD surveillance and laboratory networks in the African region - current status

Balcha Masresha, WHO

Surveillance is critical to the success of national immunization programmes. Although vaccination coverage is used as the key indicator of immunization system performance, what truly matter are impacts on disease burden. Accurate understanding of infections can verify the attainment of targets but also guide the timing and nature of SIAs and shape outbreak responses.

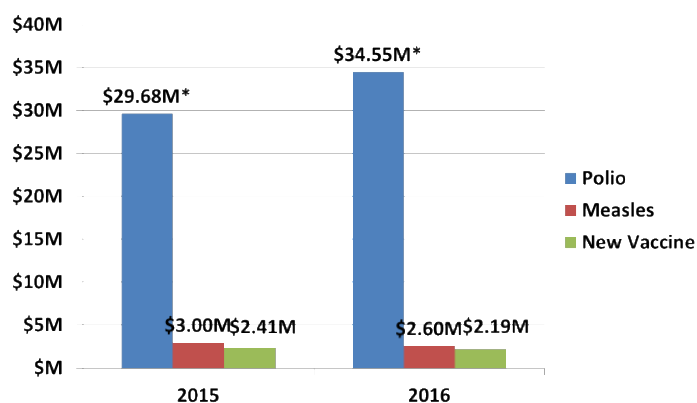
In the midterm review of the Global Vaccine Action Plan, most indicators were off-track. Notably, four key indicators require surveillance data. Furthermore, surveillance is explicitly referenced as a core commitment in the Addis Declaration.

Disease surveillance is either case-based (active seeking of infections), based on weekly or monthly reporting, or sentinel site surveillance. Case-based surveillance, exemplified by polio and infections targeted for elimination, is an intensive exercise in which every case matters. Sustainability is likely to be challenging, although digital technologies are opening up new opportunities to detect and investigate suspected cases. Sentinel surveillance, applied to infections such as rubella, rotavirus and meningitis, generally requires specialist centres and use of sophisticated diagnostic techniques. Africa currently has 32 such sentinel sites as well as three Regional Reference Laboratories for paediatric bacterial meningitis and two Regional Reference Laboratories for rotavirus.

³ Shoemaker TR *et al.* Impact of enhanced viral haemorrhagic fever surveillance on outbreak detection and response in Uganda. *Lancet Infect Dis.* 2018;18(4):373–375.

An infrastructure of laboratory networks provides critical information on disease trends, vaccine impact and detection of outbreaks. They can undertake tasks such as strain characterization to distinguish local and imported cases and shed light on routes of transmission. The regional polio laboratory network covers 16 virology laboratories in 15 countries, and often also undertakes work on other viral infections. The measles, rubella and yellow fever serological laboratory network encompasses 49 laboratories in 44 countries and three Regional Reference Laboratories.

Although figures are hard to come by, an analysis of funding suggests that the vast majority of financial support for surveillance is for polio surveillance, and nearly half is directed to just one country, Nigeria. An analysis of immunization programme data suggests that 60% of funding comes from WHO and just 11% from government sources – implying that countries are spending just US\$1 per citizen on surveillance every year.



Contribution of polio funding to surveillance expenditure.

Shifting ownership of surveillance from WHO to countries is therefore a key challenge. Other major issues include the need to ensure sustained and reliable funding to avoid stockouts of consumables, the need to track additional infections as new vaccines become available, integration of systems that have typically been developed independently, and absorption of new technologies, such as mhealth and rapid point-of-care diagnostics.

Conceptual framework for vaccine-preventable disease surveillance in Africa 2019-2030

Benoit Derudder, Deloitte

Given that surveillance in the region is so dependent on polio funding, RITAG has been concerned that the withdrawal of polio funding could compromise vital surveillance activities. It requested that the Regional Office develop an investment case for surveillance that could mobilize resources to cover any funding gaps. Subsequent consultations identified a more general need for a document that provided a foundation for longer-term investments in surveillance.

The ultimate goal is for countries to become autonomous in the financing and management of surveillance systems. While surveillance is critical to immunization, it is also an integral aspect of global health security and IHR, requiring a coordinated and cross-sectoral approach to its strategic development.

Guided by the Regional Office, Deloitte undertook an extensive consultation exercise with stakeholders including member states, agencies, WHO and external experts. It went on to develop a surveillance value report covering five areas – a situational analysis, a categorization of countries according to the maturity of their surveillance systems, value-

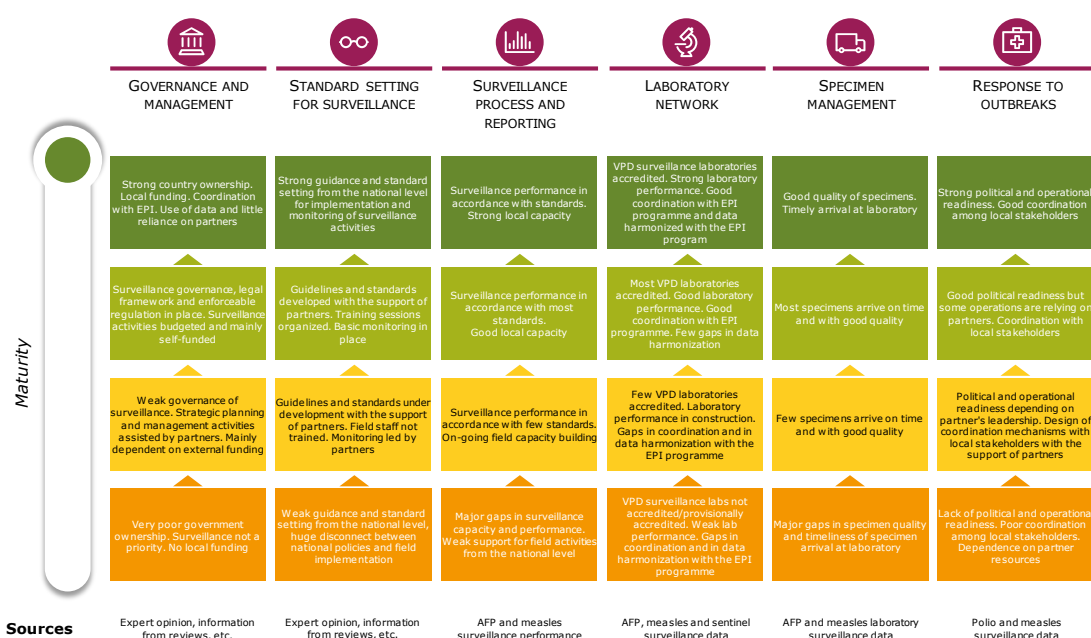
added activities that could be built on surveillance platforms to maximize their impact, and new technologies and innovations.

The report identifies a range of key challenges facing surveillance in the region. These include fragmented systems and silo-ed funding, insufficient public financing, minimal community-based surveillance, high staff turnover, and practical issues such as transportation of samples. These challenges will grow as the number of infections requiring surveillance grows – from six in 2000, to 18 now and 22 or more by 2030.

Surveillance data also provide a foundation on which other important activities could be built, to enhance monitoring, planning and budgeting, and improve the efficiency of immunization programmes. Although technological advances are hard to predict, tools such as rapid diagnostics, low-cost genome sequencing and geotagged data could have a significant future impact on surveillance.

To categorize countries' surveillance capabilities, the project defined six core components of surveillance systems, and four levels of capability within each of these components. Each country in the region was then graded for each component, and an overall maturity score calculated. Eight category 1 countries require the most intensive support to develop their surveillance capabilities, while nine category 4 countries require targeted support. The ultimate aim is to ensure 80% of countries are at category 4 by 2030.

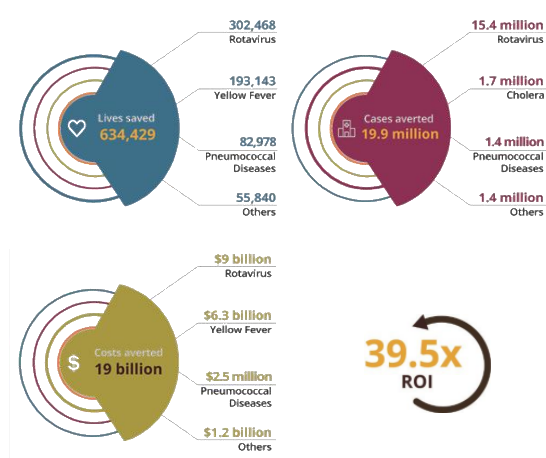
A "Surveillance Maturity Grid" was developed for each component. Level 1 refers to low maturity. Level 4 refers to the highest level of maturity



A maturity grid developed to grade national surveillance capacities.

Resourcing of surveillance can be seen as a long-term investment with the potential to deliver significant returns. By preventing and controlling outbreaks, surveillance could save an estimated 600,000 lives and avert US\$19bn in costs, delivering a 39.5-fold return on investment. Furthermore, surveillance is a critical aspect of national health security.

Outbreaks can have huge economic impact and disrupt public health systems – leading to additional mortality on the same scale as deaths directly linked to an outbreak. Nevertheless, the economic analyses are based on limited data and a range of assumptions. Further work is required to translate regional figures to the national level and to develop a true investment case for surveillance.



Projected return on investment for surveillance.

Discussions emphasized the **critical importance of surveillance**. It was felt that a change in mindset was needed, to ensure that surveillance was not seen as a WHO responsibility but was **owned by countries**. Leveraging the commitment made in the Addis Declaration, this view needed to be stressed in the July 2019 progress report to heads of state.

Furthermore, high-level advocacy needed to present an **integrated case for surveillance**, reflecting its criticality to national and global health security as well as immunization.

It was also recognised that there was an urgent need to **build surveillance capacities** in the region, to meet IHR obligations and to support immunization programmes. It was acknowledged that this presented a range of challenges, including the need to move away from vertical disease-oriented systems to more integrated and flexible models able to respond to new vaccine introductions and emerging infections. **Capacity building and skills development** would be a further major challenge, extending beyond laboratory functions and training programmes. Integrated models should also embrace **community-based surveillance**, a further challenge to capacity building, and how best to leverage CSOs. **Data management** was also suggested to be a key area for future investment and for inclusion in capacity development strategies. Overall, therefore, the design and implementation of integrated national and international surveillance presented a major challenge.

It was also suggested that the surveillance value report should include reference to other key **regional and global initiatives relevant to surveillance**. These include national public health institutes, which the African Union and Africa CDC envisage as having a key interest in surveillance. An opportunity may also exist to link surveillance for vaccine-preventable diseases to other strategically important surveillance activities, for example of disease vectors and antimicrobial resistance.

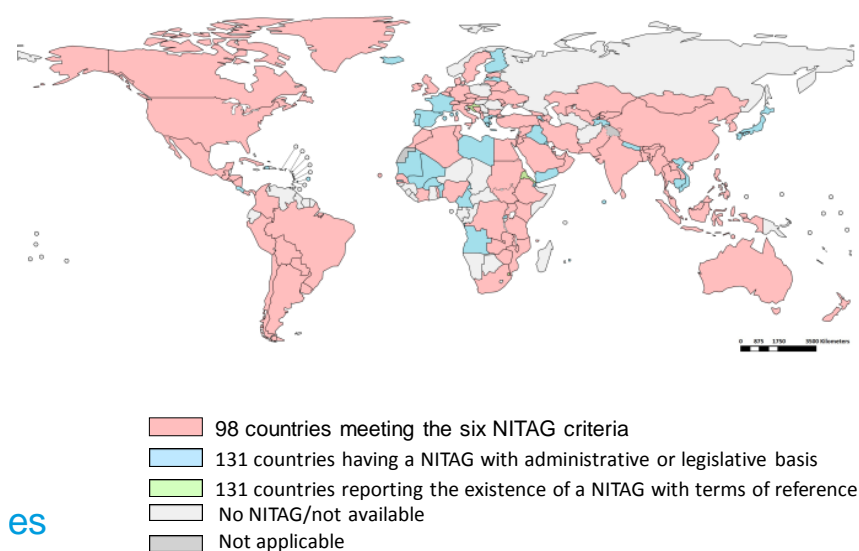
Globally, through the work of WHO and partners, updated surveillance standards were published in 2018, and a comprehensive vaccine-preventable disease surveillance strategy is being developed. In addition, a Gates Foundation-funded project is addressing fragmentation, developing an integrated information platform for managing both immunization and surveillance data.

Global strategy for NITAG support

Joachim Hombach, WHO

The Global Vaccine Action Plan identified two indicators of country ownership – domestic investment in immunization and establishment of a NITAG. The key function of NITAGs is to provide independent evidence-based advice to ministries of health and national immunization systems, acting as a conduit for global and regional technical recommendations from SAGE, technical advisory groups and RITAGs, and providing an upward channel of communication to national and global levels.

The target set in the Global Vaccine Action Plan was for all countries to have a NITAG by 2020. Good progress has been made, with 131 countries having NITAGs by the end of 2017, 98 of which fulfill six process indicators. The April 2017 SAGE meeting made a number of recommendations related to NITAGs to expand their role to include optimal use of vaccines as well as new vaccines, actions to build their capacity, and to set up of a Global NITAG Network and NITAG Reference Centre.



Global NITAG distribution.

The South East Asia Region has played an active role in the development of NITAGs, while the Region of the Americas has addressed the issue of small Caribbean Island states by creating subregional NITAGs. A similar model may be introduced for small Pacific Island states.

Recently WHO has taken on responsibility for the Global NITAG Network, which provides a forum through which NITAG representatives from LMICs and high-income countries can meet and exchange information and experience, share best practices and interact with donors. WHO has also assumed responsibility for the NITAG Resource Centre, a web-based 'one-stop' shop of NITAG resources, although further investment is required for it to achieve its full potential.

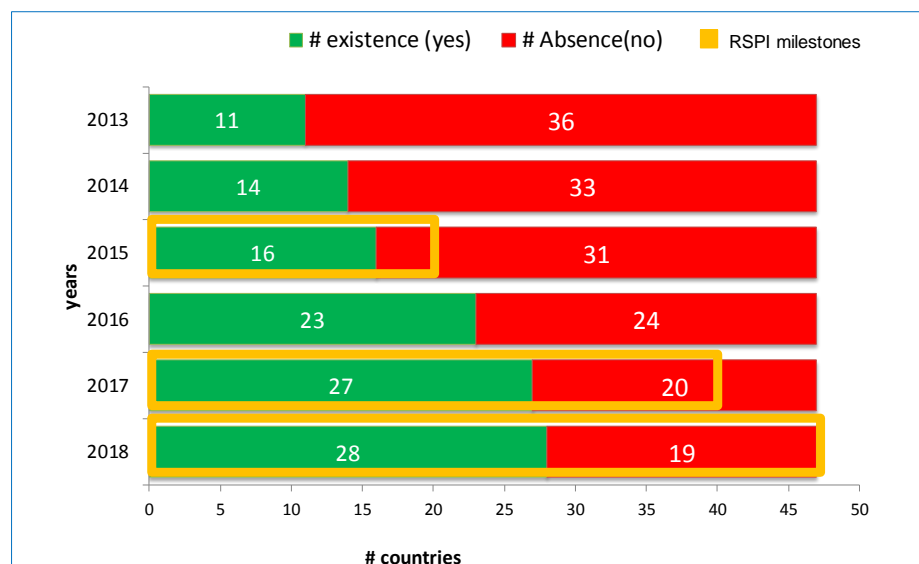
Other recent initiatives include a twinning model, encouraging North–South and South–South collaborations to support newly formed NITAGs, while discussions have been held on possible regional hubs that could provide tailored regional support. Possible additional evaluation criteria are also being considered, based on the quality of recommendations and integration of NITAG recommendations into national decision-making processes.

NITAGs can be seen as an innovative mechanism for integrating evidence-based approaches into national health policymaking. They are therefore a key national asset, the importance of which will grow as new and more costly vaccines become available. Relatively small investments at national, regional and global levels could help to further embed them in national decision making and ensure they achieve their full potential.

Progress and challenges in establishing NITAGs in the African Region

Julien Kabore, WHO

Establishing and strengthening NITAGs are specific priorities within the Regional Strategic Plan for Immunization as well as the Global Vaccine Action Plan. Although significant progress has been made, the region is currently off-track to meet its 2020 targets. By 2018, 28 countries had established NITAGs, against a target of 47, and the pace of introduction has markedly slowed in recent years. In 2017, 15 NITAGs complied with the six process criteria.



Status of NITAGs in the African Region.

Several NITAGs have undertaken self-assessment (using the SIVAC tool) or external evaluations. These evaluations examine functionality, including structural viability and functional capacity, quality, including technical expertise, access to training opportunities and access to external expertise, and integration, including relationships with local health authorities. Nine countries have undertaken self-assessments and five have undergone external evaluation.

To support regional activities, the Regional Office organized an orientation workshop in 2015, which stimulated several countries to set up a NITAG immediately. In 2018, training of consultants was organized to provide a resource to help countries establish a NITAG. Various other support activities have been organized with partners to build NITAG capacities, and staff are being recruited to extend these activities in 2019.

Challenges include the sharing and implementation of recommendations, lack of funding, a lack of visibility and clarity of roles (for example, some confusion with the role of Interagency Coordinating Committees). There are also issues with the inadequate use of information resources, lack of collaboration, a lack of competency to make recommendations in certain areas. Possible ways forward include greater advocacy to raise awareness of NITAGs and their roles, more emphasis on the use of resources and collaboration, potentially through a regional hub for capacity building or twinning/mentoring between well-established and immature NITAGs, a greater emphasis on raising resourcing for NITAGs, and development of decision-making capabilities.

Role of NITAGs in support of decision-making process

Ouattara Siguifota Coulibaly Germaine, Vice-President, Cote d'Ivoire NITAG, Belete Tafesse, MoH Ethiopia (representing the NITAG Chair), Jahit Sacarlal, Chair, Mozambique NITAG

The **Cote D'Ivoire** NITAG (CNEIV-CI) was established in 2009. It has 17 members, plus nine *ex officio* members and three liaison members. It meets at least four times a year. Its key roles are to provide advice and information to the ministry of health on optimal vaccination strategies and scientific developments in vaccination.

The NITAG responds to requests from the ministry of health. Having analysed the request, it establishes a working group of committee members and other experts which develops a draft opinion or recommendation. This is reviewed by the NITAG before being presented to the ministry of health. It aims to provide short and digestible reports to the ministry. Recommendations have covered areas such as introduction of HPV, hepB birth dose, pneumococcal, meningococcal and influenza vaccination and age of rotavirus vaccination.

Challenges include the availability of some members for meetings and a shortage of resources. Going forward, it aims to recruit new member, review its governing documents, and secure additional resources. Activities in 2019 include a survey on participation of the private sector in immunization, training for NITAG members in anthropological evaluation of immunization, and working with additional technical and financial partners.

The NITAG in **Ethiopia** (E-NITAG) was established in 2016 to provide advice to the national immunization programme. It responds to requests from the ministry of health, reviewing globally relevant documentation and SAGE and RITAG recommendations as well as any relevant local information. It then adapts recommendations to fit the local context.

It has provided advice on national multiyear plans, the national Gavi investment strategy, and on the introduction of multiple vaccines, including HPV, hepB birth dose and yellow fever, as well as measles control plans and age of MCV2 vaccination.

Challenges include ensuring the committee's breadth of expertise, limited contact with the national immunization programme, and a shortage of resources for activities such as systematic reviews. Plans for 2019 include at least two meetings on measles SIAs, and MR, yellow fever, HepB and meningococcal A vaccine introductions.

The NITAG in **Mozambique** (CoPI) was set up in 2011. Its chair and a member of the secretariat undertook a three-month evaluation exercise in 2018 using the standard NITAG evaluation tool. As a result, it updates some of its terms of reference, working procedures and workplans, in preparation for an external evaluation.

Up to the end of 2018, the NITAG had made 29 recommendations, 17 of which were implemented fully or in part, seven of which are in progress and five have yet to be implemented. Recommendations have covered introduction of vaccine introductions including rotavirus, IPV, MCV2, MR and HPV, as well as areas such as pharmacovigilance, logistics and cold chain capabilities, measles vaccination and use of cholera vaccination.

Challenges include limited funding for some NITAG activities, limited secretariat support, keeping members engaged, developing clear and concrete recommendations, and training.

Discussions noted the considerable progress that had been in the establishment of NITAGs in the region, but concern was also expressed that the rate of new introductions had slowed markedly and needed close monitoring. NITAGs were felt to be crucial aspects of national immunization ecosystems, with a vital role to play as a source of independent expert advice to support evidence-based immunization policy-making. While the six process indicators have performed a useful function in the set up phase, additional function-focused indicators were also thought to be required. These could be based on areas such as having a clear recommendation-development and evidence-assessment process and use of recommendations by national immunization programmes.

NITAGs should therefore be seen as national assets, with ring-fenced funding included in comprehensive multiyear plans. Countries should also ensure that NITAGs receive sufficient secretariat support to function effectively. A glossary describing committees relevant to immunization, such as ICCs, as well as relationships between them, could help to clarify roles and responsibilities.

Ensuring that NITAGs had sufficient breadth of expertise, ideally including areas such as the social sciences and health economics, was seen as an important issue. Local academic institutions were seen as key resources that NITAGs could draw upon. Potentially, the WHO Regional Office could offer advice on sources of expertise if they were not available locally. For countries that currently lack NITAGs and may not have the expertise in-country to cover all their functions, there was little appetite for subregional NITAGs, as too many issues were felt to be country-specific. Collaboration between NITAGs in nearby countries was felt to be a more promising alternative.