Report of the Regional Immunization Technical Advisory Group meeting

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Congo-Brazzaville
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Executive summary

The Regional Immunization Technical Advisory Group (RITAG), the principal advisory group to the WHO Regional Office for Africa, met at the WHO Regional Office in Brazzaville, Republic of the Congo, on 14–16 November 2019. A key aim of the meeting was to review progress towards the objectives set out in the Regional Strategic Plan for Immunization, with sessions dedicated to polio, measles and rubella, human papillomavirus (HPV) vaccination, malaria, yellow fever, Ebola, vaccination demand promotion, and pooled procurement in middle-income countries and small island developing states. A second key aim was to discuss the proposed approach for developing a successor regional immunization strategy, based on the global Immunization Agenda 2030 (IA2030).

The meeting also reviewed progress towards previous RITAG recommendations. It also provided an opportunity to discuss the recommendations recently made by the Strategic Advisory Group of Experts on Immunization (SAGE) and to identify issues of particular relevance to the African Region.

Progress in immunization

Immunization coverage rates in the region continue to plateau, leaving significant numbers of children unvaccinated or under-vaccinated. Gaps in coverage have led to major infectious disease outbreaks, particularly of measles and circulating vaccine-derived poliovirus (cVDPV).

More positive trends include the continuing absence of wild poliovirus, paving the way for certification of wild poliovirus eradication in the region in 2020. Also notable was the successful launch of the first malaria vaccine implementation projects in three countries in 2019, as well as the rapid introduction of the rVSV-ZEBOV-GP Ebola vaccine in the Democratic Republic of the Congo (DRC) under compassionate use provisions in highly challenging settings. The vaccine secured conditional marketing authorization from the European Medicines Agency in November 2019, opening up the prospect of wider use in 2020.

Key RITAG opinions

RITAG identified several areas of key strategic importance to the region:

- RITAG expressed concern at the potential limited availability of HPV vaccine in the region unless global agreement can be reached on equitable access during a period of limited supplies.
- RITAG applauded the dedication of frontline workers battling against Ebola in the DRC, under extremely difficult circumstances and often at great personal cost. The availability of a safe and effective vaccine could transform control of Ebola, the main obstacle to which is now gaining access to populations in conflict-affected areas.

- RITAG also saluted the efforts of all those who have contributed to regional efforts to secure polio eradication. Certification of eradication would be a tremendous achievement for the region. Even so, the widespread emergence of cVDPV is of grave concern and, along with measles outbreaks, reinforces the urgent need to strengthen immunization programmes in the region.
- RITAG welcomed the collaborative efforts of middle-income countries and small-island developing states to explore opportunities for pooled procurement. Such schemes have the potential to increase the efficiency of procurement, improve the security of supplies, and reduce the costs of vaccine procurement.
- RITAG welcomed the creation of a framework for developing a new regional immunization strategy for 2021–2030, within the context of IA2030.

Recommendations

RITAG also made a number of specific recommendations:

Regional strategy and Framework for Action

The Regional Office is developing a new regional strategic plan and Framework for Action, a successor to the Regional Strategic Plan for Immunization 2014–2020, to support implementation at the regional level of the global immunization strategy, the Immunization Agenda 2030 (IA2030).

- RITAG welcomed the planned approach for developing 'IA2030 for Africa' and the Framework for Action, which provides a solid foundation for further consultation with countries and regional stakeholders.
- RITAG recommended that the regional strategy and Framework for Action should stress the importance of engagement with 'non-traditional sectors' (e.g. private sector, financial community/potential investors, technology companies) and discussion of the role that other stakeholders could play in achieving regional immunization and disease control goals.
- RITAG supported suggestions that the regional strategy should focus on bottom-up target setting at the national level, aggregated to regional targets; countries should be encouraged to be ambitious but realistic in their target setting.
- RITAG suggested that the regional strategy should include a section on research strategy, including country-specific implementation research for addressing sub-optimal immunization coverage.
- In light of the stagnating coverage and anticipated increase in birth cohort sizes over the coming decade, RITAG recommended that the impact of projected population growth on future national resource requirements for immunization should be modelled, to guide resource mobilization efforts.

Data

Improving coverage and reducing inequalities will depend on effective use of accurate and relevant data. Countries are developing and implementing data improvement plans, supported by new health information system tools.

- RITAG emphasized the importance of making greater use of data to underpin decision-making and action across all levels, and to promote a culture of data use within immunization programmes, particularly at subnational levels.

- RITAG encouraged countries to include a strong focus on health care worker behaviour and the potential need for behaviour change interventions as well as technical training in data improvement plans.
- RITAG recommended that renewed efforts are made to incorporate up-to-date knowledge and practice related to vaccines and immunization, including significant components on data quality and the use of data for decision-making, into regional medical, public health and nursing curricula and in-service training.
- RITAG emphasized the need to develop and implement health information system tools that were resilient to the challenges common in the region, such as intermittent electricity supply, lack of internet connectivity and inadequate computing infrastructure.

Measles and rubella

Regional elimination targets for measles and rubella by 2020 will not be achieved. A new timeline may be needed to galvanize action, but should be sensitive to individual country circumstances.

- RITAG recommended that a consultative process be developed with global, regional and national stakeholders (including donors and community-based organizations) to establish an evidence-based timeline for regional measles and rubella elimination; intermediary elimination targets should be identified, and discussions held with partners to ensure that the necessary technical and financial assistance is available to achieve and validate measles and rubella elimination as rapidly as possible.
- As some countries come close to elimination, high-resolution surveillance (case-based fever-rash surveillance) is required, which has significant resource implications. RITAG suggested that a resource mobilization strategy based on the regional surveillance investment case should be developed and implemented to enable country adoption, when appropriate, of elimination-standard measles surveillance.
- Three countries in the region have yet to introduce the second dose of measles-containing vaccine (MCV2), and MCV2 coverage remains sub-optimal across the region. RITAG urged countries and NITAGs to provide a two-dose measles and rubella vaccine schedule as soon as possible if they have not already done so.
- RITAG suggested that inter-programmatic collaboration with broader health and maternal and child health programmes should be encouraged to enhance MCV1 and MCV2 uptake.
- Use of ten-dose measles vaccine vials may lead to vaccine wastage or discourage vaccine use for small groups. Five-dose vials have been developed as a more flexible alternative, but are not yet being widely used. RITAG recommended that advocacy strategies are developed and implemented to raise awareness of the benefits of five-dose vials and when their use should be considered, and countries encouraged to introduce when appropriate.
- The effectiveness of supplementary immunization activities (SIAs) is generally assessed in terms of the population coverage achieved, without consideration of whether unvaccinated or under-vaccinated children have been reached. RITAG urged those undertaking and supporting SIAs to recognize the critical importance of reaching 'zero dose' and under-vaccinated children when assessing the quality of SIAs;

countries should ensure that these children are re-engaged with routine immunization programmes to ensure full immunization with all vaccines.

- SIAs are often organized according to set schedules or when resources become available, rather than in an evidence-based manner. RITAG recommended that immunization strategies, including the appropriate timing and targeting of SIAs, should be based on population immunity profiles
- RITAG also suggested that the timeliness of outbreak responses should be monitored, to identify and overcome barriers to rapid immunization of at-risk populations.
- The measles outbreak in the DRC has claimed more lives than the Ebola outbreak but has not been addressed with the same degree of urgency or coordination between partners. RITAG recommended that a high-level advocacy visit to the DRC should be immediately undertaken to ensure greater coordination of stakeholders in the measles outbreak response, SIA planning and implementation, and strengthening of routine immunization and surveillance.

Polio

- RITAG expressed grave concern at the spread of cVDPV outbreaks to 13 countries in the region, particularly given their link to the introduction of monovalent oral poliovirus (mOPV) and its use in outbreak control. RITAG recommended that alternative options to mOPV2 use in cVDPV2 outbreak control should be urgently explored.
- RITAG recommended that use of inactivated poliovirus vaccine (IPV) for catch-up campaigns should be accelerated to boost immunity in cohorts that were missed due to recent global IPV shortages.
- RITAG recommended that countries are supported to implement the 2019–2023 cVDPV strategy.
- RITAG was concerned that slow progress is being made in the development and implementation of national polio transition plans, and that some plans may now need to be updated before implementation. RITAG emphasized the need to prioritize 2018 and 2019 recommendations on advocacy to promote stronger national ownership of the polio transition process.
- RITAG noted that fragile countries are unlikely to be able to commit significant domestic funding during and after the polio transition and will require ongoing support from partners. RITAG urged donors to coordinate their resourcing to ensure maintenance of essential polio functions in such countries.
- RITAG recommended that measles SIAs are used as an opportunity to provide populations with access to polio vaccine, and encouraged countries to include bivalent OPV in such SIAs.

Ebola

The rVSV-ZEBOV-GP Ebola vaccine has received conditional marketing authorization from the EMA and has been prequalified by WHO. However, it will continue to be deployed under compassionate use provisions in the DRC, as licensed vaccine will not be available until mid-2020. In addition, authorization currently applies only to use in adults. A registration roadmap has been developed to facilitate rapid licensing decision-making in affected countries.

- RITAG welcomed the authorization of rVSV-ZEBOV-GP and congratulated all those involved in its development and clinical evaluation in the field. Given likely short-term limitations on supply, and

potential off-label use in children and pregnant women, RITAG encouraged SAGE to develop guidance on preventive and off-label use of rVSV-ZEBOV-GP as rapidly as possible.

- To avoid the need for off-label use, RITAG called on the manufacturer of rVSV-ZEBOV-GP to update label indications to include use in children and pregnant women as rapidly as possible.
- Since rVSV-ZEBOV-GP will continue to be deployed under compassionate use provisions in the DRC, despite the EMA and WHO decisions, RITAG suggested that communication guidelines are developed to ensure countries and other stakeholders are clear on the status of rVSV-ZEBOV-GP and frameworks for its use in different settings.
- RITAG suggested that the possibility of extending the registration roadmap to countries at lower risk of outbreaks but with personnel contacts with at-risk countries should be considered.
- To illustrate best practice in new vaccine development and to guide future initiatives, RITAG recommended that a paper documents the successful public–private collaborations that led to the rapid development, evaluation, regulatory appraisal and use of rVSV-ZEBOV-GP.
- Measles and Ebola epidemics co-exist in the DRC, but little is known about interactions between the two, particularly the potential of measles infections to increase susceptibility to Ebola or affect vaccine responses. RITAG suggested that research should be undertaken to explore the potential impact of measles infections and vaccination on responses to Ebola vaccination.
- In light of the ongoing measles epidemic in the DRC, RITAG suggested that integration of measles vaccination into the Ebola ring vaccination strategy should be considered.
- As outbreaks typically deter health-seeking behaviour and disrupt health services, RITAG recommended that post-Ebola recovery plans should include activities to strengthen routine immunization as part of wider health system strengthening, mitigating the likely impact of an outbreak on coverage.

Human papillomavirus (HPV) vaccination

HPV vaccination will be pivotal to elimination of cervical cancer. Short-term shortages in vaccine supply have led to SAGE recommendations to delay vaccine use in multi-age cohorts, among boys and older women. However, despite having the greatest burden of disease, the region may not receive sufficient vaccine supplies because of use in groups other than young girls in the global North.

- RITAG suggested that the Regional Director should approach the WHO Director-General to raise the issue of HPV vaccine access and global equity at the next World Health Assembly; as the Africa Region is the most affected, RITAG argued that the Regional Office and RITAG representative should be included in any forum discussing global access to HPV vaccine.
- RITAG recommended that a rigorous investigation should be undertaken, involving all stakeholders, to identify the reasons behind the current shortage of HPV vaccine and how the risk of future vaccine shortages can be mitigated.
- SAGE has issued detailed guidelines on possible strategies for introduction of HPV in case of possible shortages. RITAG recommended that the Regional Office develop guidance for countries to facilitate their assessment of the complex range of social, logistical and economic factors influencing appropriate local schedules and delivery platforms for HPV vaccination.

- RITAG requested that the Regional Office be appropriately resourced to provide advice to countries on HPV vaccination.

Malaria vaccine implementation project (MVIP)

MVIP, taking place in three Africa countries, will provide key data to inform both WHO and funding decision-making for the malaria vaccine RTS,S/AS01. However, if vaccine is to be immediately available for use in countries, vaccines manufacturing would need to start before these decision points, presenting a significant risk to manufacturers.

- Given the importance of this vaccine to the region, RITAG called on stakeholders to urgently address the issues of de-risking and identify a mechanism to ensure continued manufacturing of RTS,S/AS01 and timely access in the event of positive WHO and funding decisions.
- MVIP reported that 400,000 doses of RTS,S/AS01 are currently unallocated but have an imminent expiry date. RITAG recommended that these doses should be used in the three pilot projects using appropriate community engagement to reach additional eligible non-immunized children.
- RITAG recommended that MVIP pilot sites develop a better definition of the eligible target population to calculate and report recruitment achievements.

Demand creation

The quality of services is an important factor affecting the take up of immunization services. A deeper understanding of the barriers to and facilitators of service use can inform the development of more people-centred services and encourage greater take up. The quality of services is very dependent on the behaviour and attitudes of health workers, which, along with service organization and delivery, are key factors affecting take up of services.

RITAG recognized the importance of effective community engagement and enhancing the quality of people-centred immunization services in order to increase take up. It noted that the Reaching Every District strategy, recently updated, and Immunization in Practice resource provide guidance on how this can be done effectively, although more complex contexts may require a deeper analysis of community attitudes and behaviour.

- RITAG recommended developing the capacity of immunization programmes and health facilities and health care workers to make full use of existing resources such as Reaching Every District and Immunization in Practice to understand and respond to local issues affecting take up of immunization services; for complex social contexts, additional proven tools for socio-behavioural analysis should be employed.

Yellow fever

Yellow fever control has been affected by vaccine shortages. These issues have now been significantly improved, although perceptions remain that vaccine supplies are limited.

- RITAG recommended that countries and other stakeholders are made aware of the current picture of vaccine availability to inform planning processes for preventive mass vaccination campaigns.
- RITAG noted that laboratory testing of potential yellow fever cases in Nigeria is generating high levels (>90%) of negative results. It is often unclear what infections (if any) such patients have. RITAG

recommended that a research project should be undertaken to identify causative agents when yellow fever is excluded, to inform future laboratory testing strategies for suspected yellow fever cases.

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. The RITAG meeting at the WHO Regional Office, the Congo, on 12–14 November 2019 provided an opportunity to review progress towards regional immunization goals and to discuss a range of key issues in the control of vaccine-preventable diseases.

In addition to RITAG members, participants included representatives from SAGE, regional and global partner organizations, Member States, and National Immunization Technical Advisory Groups (NITAGs). Illustrating the importance attached to RITAG by the Regional Office, in attendance at various points of the meeting were senior staff from other areas of the WHO Regional Office, including Dr Francis Kasolo, Director *a.i.* of the Office of the Regional Director.

Participants at the meeting were welcomed by **Dr Matshidoso Moeti**, WHO Regional Director, speaking via videolink from WHO headquarters. Dr Moeti expressed her gratitude for the work of RITAG and noted that its guidance and support was highly valued. She encouraged RITAG to be rigorous in its scrutiny of the Regional Office's activities and to offer constructive criticism when required.

Dr Moeti discussed some of the key challenges facing immunization in the region. Coverage rates remain too low, too many children are missing out on the benefits of immunization, and the region is experiencing multiple infectious disease outbreaks. Specific mechanisms are needed to address the challenges of fragile and conflict-affected countries, within the context of wider humanitarian efforts.

Even so, progress has been made. The region is on course to achieve certification of wild poliovirus in 2020, malaria vaccine implementation projects have begun in Kenya, Malawi and Ghana, and an effective Ebola vaccine has been used in the DRC in a highly challenging context and in neighbouring countries.

Looking forward, Dr Moeti suggested that there was a need to further enhance political commitments to immunization, leveraging the Addis Declaration on Immunization (ADI). The African Union summit early in 2020 will be an opportunity to remind heads of state of their ADI commitments and to present data on national progress to date. It will also be important to take advantage of the global momentum towards universal health coverage, to which immunization can make a significant contribution as part of integrated primary health care systems.

Professor Helen Rees, Chair of RITAG, noted RITAG's desire to be of service to the WHO Regional Office. Close engagement could enable it to offer advice and supportive constructive criticism. Professor Rees suggested that one key role of RITAG was to examine SAGE recommendations and to discuss their implementation in the region and adaptation when necessary in light of regional context and constraints.

Professor Rees also welcomed two new RITAG members. Dr Richard Adegbola, now an independent consultant, brings extensive experience of immunization across multiple sectors, having previously worked in academia, at the Bill and Melinda Gates Foundation, and in industry. Dr Ijeoma Edoka (Wits School of Public Health, South

Africa) is a health economist who will strengthen RITAG's capacity in this key area. Professor Rees also expressed her deep gratitude to the RITAG members completing their terms of office – Dr Mohamed-Mahmoud Hacen and Dr Clarisse Loe Loumou.

Welcoming participants, **Dr Richard Mihigo**, Immunization, Vaccines and Biologicals Programme Manager, also paid tribute to two recently deceased WHO staff members who had been key figures in immunization in the region. Dr Kwame Chiwaya joined WHO in 2007 and was the EPI focal point in Malawi, supporting routine immunization. Dr Evariste Mutabaruka joined WHO in 2001 and made major contributions to the development of mid-level management training materials for immunization staff.

RITAG and SAGE updates

Dr Andre Bita (WHO Regional Office) discussed progress in follow up of RITAG recommendations from 2018 and January 2019. Six recommendations have been completed, 18 are in progress and two have yet to start. Of particular note is a planned conference on African-led research in immunization, scheduled for the fourth quarter of 2020, as part of a wider meeting on health research in Africa. This is anticipated to be the first in a regular programme of such conferences, potentially to be held biennially.

Joachim Hombach (WHO headquarters) summarized key points from the SAGE meeting held in October 2019. The meeting endorsed the review of the Global Vaccine Action Plan (GVAP) and the new global immunization strategy, the Immunization Agenda 2020 (IA2030). SAGE also recommended that, although measles eradication is technically feasible, it should not be considered until more progress has been made in measles control globally. For rubella, SAGE recommended a change in policy removing the option of vaccination campaigns only among women of reproductive age, due to the risk of population immunity gaps and rubella outbreaks, recommending gender-neutral approaches instead.

SAGE also recommended a series of actions to enhance access to human papillomavirus (HPV) vaccine and to accelerate eradication of polio and improve control of cVDPV outbreaks (discussed below). Full details of SAGE decisions and supporting evidence can be found on the WHO website [1], and SAGE recommendations have also been published in the *Weekly Epidemiological Record* [2].

Regional updates

Regional Strategic Plan for Immunization

The Regional Strategic Plan for Immunization 2014–2020 (RSPI) is drawing to a close, and its successor will take its lead from the global IA2030, to be presented to the World Health Assembly for endorsement in May 2020. IA2030 sits within the wider global context of the Sustainable Development Goals, particularly SDG 3, to ensure healthy lives and promote well-being for all at all ages. Slow progress towards this goal has led to the development of a Global Action Plan for Healthy Lives and Well-being For All [3], launched at the UN General

[1] https://www.who.int/immunization/sage/meetings/2019/october/en/

[2] Meeting of the Strategic Advisory Group of Experts on Immunization, October 2019: conclusions and recommendations. Weekly Epidemiological Record. 2019. 94(47):541–560. Available at: https://www.who.int/wer/2019/wer9447/en/

[3] https://www.who.int/sdg/global-action-plan

Assembly in September 2019. The Global Action Plan noted that extra efforts would be required if health-related SDGs were to be met by 2030 and called for greater global collaboration and alignment.

Within the region, population growth has continued, in part due to high birth rates. Urbanization rates in sub-Saharan Africa are now the world's highest. Like other regions, sub-Saharan Africa has been affected by major measles outbreaks over the past two years, particularly in the DRC, Madagascar and Nigeria. The Ebola outbreak in the DRC has also been of great regional and global concern.

The RSPI's overall aim is to achieve universal immunization coverage in the region. Progress towards its first objective, increasing immunization coverage, has been limited, with coverage plateauing for traditional vaccines (Figure 1). Almost half of the world's unvaccinated and under-vaccinated children live in African region. Projected increases in the size of birth cohorts will present a further challenge to immunization coverage.

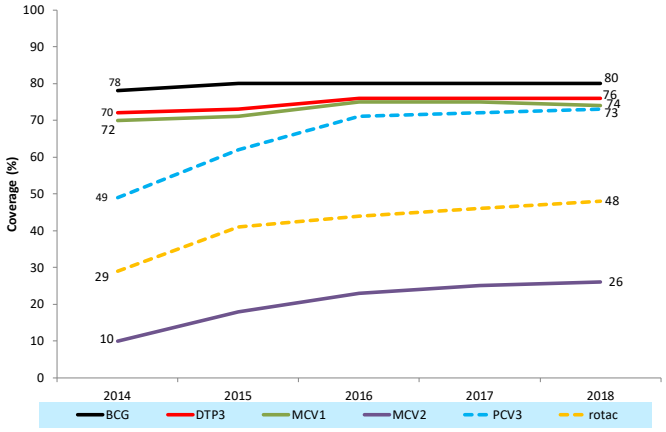

Figure 1: Trends in coverage for commonly used vaccines in the African Region.

Inequities within countries remain an outstanding issue, with many countries showing wide variation in coverage levels between districts. Dropout rates are particularly high for measles vaccination.

More positively, the first malaria vaccine implementation projects launched in Malawi, Kenya and Ghana (discussed further below). HPV vaccine has been introduced in more countries and coverage rates achieved compare well with those in other regions (see below).

For the second RSPI objective, polio eradication, three years have now elapsed since the last detection of wild poliovirus, and the region is on course for certification of polio eradication in 2020. However, cVDPV outbreaks have affected 13 countries.

Progress towards the third objective, measles and rubella elimination, has stalled. As well as major outbreaks, most countries are reporting measles cases above the level required for elimination status to be considered.

For the fourth objective, control of other vaccine-preventable diseases, two additional countries achieved maternal and neonatal tetanus elimination (MNTE) in 2019, DRC and Chad, and 41 out of 47 countries have now validated MNTE at a national level. Following the introduction of MenAfricaVac in 2010, MenA epidemics have been virtually eliminated although other meningococcal strains have emerged.

Key issues for the region therefore include the persistently large numbers of unvaccinated and under-vaccinated children, outbreaks, coverage inequities and inadequate demand. Political instability and conflict, population movements, urbanization, and population growth all present major challenges to service delivery. Responses include the implementation of the immunization business case for the region, the launch of the conceptual framework for integrated surveillance, leveraging of technological opportunities, and various country-specific approaches.

Health information systems

Health information systems in the region are often underdeveloped. Systems are often fragmented and labour-intensive – up to a third of health worker time can be spent on data recording and reporting, and lack of coordination between partners can lead to the need to report on numerous different indicators for the same disease. Some countries are using dozens of different data systems and reporting tools. More efficient and integrated approaches are essential, exploiting the explosive growth of mobile phone use.

Data should be used to inform immunization programme activities, but the reliability of data is often in doubt. A third of countries show differences between UNICEF/WHO and administrative coverage rates of >5%, and typically a quarter of districts are reporting coverage of >100%.

Efforts are being made to address data challenges at both the subnational/operational and national levels. An analysis of challenges has identified those that relate directly to health information systems, and can therefore be addressed by technological innovations, and those that relate to external issues which require alternative solutions.

These analyses have underpinned the development of app-based information packages based on shared access to data at different levels (local and national). These tools enable data to be visualized in ways that better enable health workers to monitor performance and identify appropriate corrective actions.

Most countries in the region have adopted (or are in the process of adopting) WHO's DHIS2 health information system. Efforts are underway to integrate immunization data tools into DHIS2, including surveillance data. Ultimately the vision is for an integrated regional and national information system, supporting users at all levels of the health system (Figure 2).

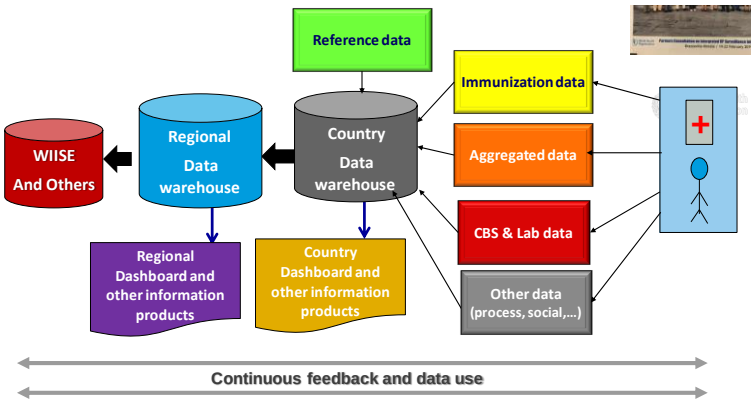

Figure 2: A model of an integrated regional health information system for immunization.

RITAG members welcomed the progress being made on health information systems, recognizing that data held the key to monitoring immunization programme performance and identifying how it can be improved. The crucial importance of focusing on data use and ensuring data are fit for purpose was noted. Ensuring data are used was seen to be the most effective way to improve the quality of data collection. It was noted that training would be essential, particularly of new cohorts of health workers, but also that behavioural interventions might be necessary among staff to promote greater commitment to the use of data and instill a culture of data use.

Post-2020 regional immunization strategy

With the RSPI coming to an end, work is beginning on a new regional immunization strategy, based on the global strategy, IA2030. A highly productive IA2030 regional consultation was held in July 2019, identifying a range of regional priority issues. To ensure continuity with RSPI, 'IA2030 for Africa' is on the agenda for the WHO Regional Committee meeting to be held in August 2020.

Development of the next strategy needs to consider five key questions: Who is the strategy for? How should objectives, outcomes and outputs be aligned? What are the principles that should guide its development? What strategic shifts are critical? And what are the critical enablers of success?

In terms of the first question, past strategies have been ambiguous on target audiences and accountability, but in practice have primarily addressed countries. Recent global strategies, such as the Global Action Plan[3], are placing a greater emphasis on transparent partner accountability. While RSPI was clearly defined as a framework for countries and described roles and responsibilities and accountabilities, there were few mechanisms to enforce accountability. The new strategy is therefore intended to act as a framework for countries, implementing partners and regional stakeholders in line with the Global Action Plan and including a clear accountability framework.

Looking forward, major new vaccines are likely to become available during the second half of the decade. The new strategy will therefore be flexible and based on two five-year frameworks, the first focusing on improving coverage and equity and the second potentially preparing for the introduction of major new vaccines.

In terms of aligning objectives, outcomes and outputs, a high-level IA2030 for Africa strategic document will be developed for the Regional Committee. A more implementation-oriented Framework for Action will be jointly developed by countries, partners and other stakeholders and presented to RITAG in December 2020.

A set of principles have been identified to guide development of the strategy (Figure 3). Strategic shifts include a core focus on coverage and equity, integration of immunization into primary health care along the life course, using measles as a tracer of coverage and equity, comprehensive surveillance, and integrated data systems. Operationally, the Framework for Action will emphasize differentiated support according to country needs, innovative approaches for fragile states, a focus on the specific issues facing middle-income countries, enhanced partner and stakeholder coordination, and ensuring a smooth polio transition.

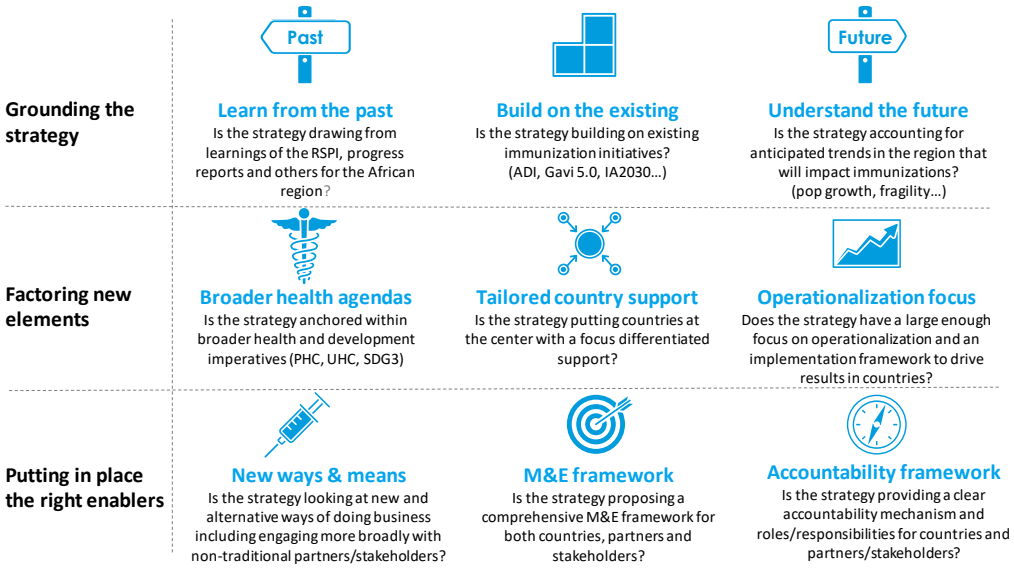

Figure 3: Guiding principles for IA2030 for Africa.

Critical enablers include high-level political will, leveraging the ADI, policy and strategic guidance (in particular through RITAG and NITAGs), enhanced partner coordination and accountability, and expanded monitoring and evaluation.

A possible approach for taking this strategic agenda forward would be a matrix based on three key constituencies – countries, regional implementing partners, and regional stakeholders (Figure 4). For each constituency, the matrix would identify specific ambitions, mission, strategic framework, operational accelerators, monitoring and evaluation framework, governance mechanism, and accountability mechanism.

African IA2030 Framework for Action

Possible construct – 2021-2025

				Levers for Action	Operational Accelerators	Results tracker	Ownership	Enablers of change
	Vision 2030	Ambition	Mission	Strategic Framework	Operational Framework	M&E Framework	Governance	Accountability Framework
Countries		***By 2025** – a 1/3 reduction in the number of unvaccinated (pop. growth adjusted)*	*To achieve and sustain national and regional immunization goals & targets*	Coverage & equity Mainstreaming immunization within PHC along the lifecourse Enhanced outbreak preparedness & response	- National planning based on Maturity Vision (nextgen cMYP) - Country support framework (nextgen JA/TCA) - Fit-for-purpose ICC (nextgen country op. model) - Functional NITAG	Country M&E + JRF	NITAGs	Regional Committee Enhanced
Regional Implementing Partners		***By 2025** – 2/3 of countries in the region have reached level3 or 4 maturity of their immunization programme*	*To optimize technical assistance to drive results and ensure country programmes reach the highest levels of maturity*	Comprehensive VPD Surveillance Digitized immunization information systems	- Differentiated support based on maturity grid - Re-designed EPI managers meetings and other regional forums - Enhancing partner collaboration via country processes (ex: Joint missions…) - Improved coordination with UHC and PHC support to countries	Maturity Tracking + Partner Score Cards	RITAG	RITAG Enhanced + Stakeholders Meeting New
Regional Stakeholders		***By 2025** – 5/10 ADI goals achieved*	*To sustain the highest level of political commitment to immunization in the region*	Polio transition Fragile states MICs	- ADI Implementation Roadmap	ADI Dashboard / Score cards	African Union	AU Summit Enhanced

Figure 4: A matrix for taking forward the IA2030 Framework for Action in the region.

RITAG warmly welcomed the suggested approach for developing the IA2030 for Africa and the Framework for Action. RITAG noted that it provided an excellent starting point and a solid basis for further consultation with countries, partners and other stakeholders.

RITAG also emphasized the importance of ensuring that country ownership is central to the new strategy, building on the ADI and emphasizing that ownership implies commitment of additional domestic resources and a long-term vision to ensure national self-sustainability. RITAG suggested that the strategy should have a strong focus on country-defined agendas for the development of national immunization programmes, developed in conjunction with partners and with clarity on roles and responsibilities and accountability for results, with support tailored according to the maturity of countries' immunization programmes.

Consistent with the country-based approach, RITAG noted the potential for bottom-up target setting at the country level, aggregated to regional targets. It encouraged countries to be ambitious but realistic in their target setting.

RITAG noted that immunization should be seen an as important component of primary health care contributing to universal health coverage, and supported use of measles as a tracer of coverage and equity. The group stressed the importance of engagement with 'non-traditional sectors' (e.g. private sector, financial community/potential investors, tech companies) and discussion of the role that other stakeholders could play in achieving regional goals.

RITAG also suggested that the strategy should include a research component, including country-specific implementation research to enhance immunization coverage. This could be included as an operational accelerator.

Discussions noted the potential to focus on regulatory processes in the strategy, particularly harmonization of processes between countries to expedite the introduction and improve the availability of new vaccines.

It was noted that there was a high degree of strategic alignment among global partners, even if they have their own strategic plans. A major challenge would be to ensure good coordination and integration of activities at a national level, based on very clear shared understanding of ownership, governance and accountability.

One specific challenge will be the projected growth in the size of the population in the region, increasing demands on immunization services. It was suggested that modelling could be carried out to quantify the potential impact of demographic changes on immunization resource needs, to inform future planning.

Measles and rubella

Regional overview

Dr Balcha Masresha (WHO) reported that MCV1 coverage has increased slightly since 2013, from 70% to 74% in 2018. MCV2 coverage has increased from 7% to 26%; 30 out of 47 countries have introduced MCV2 and introductions are planned in a further 10 countries in 2019 and 2020.

Two MCV2 indicators have been proposed: coverage ≥80% of MCV1 coverage within 3 years of introduction and an MCV1–2 dropout rate of <10%. Although 15 countries have achieved the former, dropout rates are <10% in just six countries.

One possible way to increase coverage would be to make more use of recently developed five-dose vials. Currently used 10-dose vials lead to significant wastage, and health care workers may be reluctant to open vials for a small number of attendees at vaccination sessions. A controlled pilot study in Zambia, led by JSI, found that five-dose vials led to bigger increases in MCV2 coverage and lower dropout rates, and almost halved wastage.

Although per-dose costs are higher for five-dose vials, after adjusting for reduced wastage, costs for 10-dose vial use are comparable. They would require a 5% increase in cold chain space but no additional transport costs or vaccination sessions.

Surveys continue to point to deficiencies in measles SIAs, revealing coverage lower than that implied by administrative data and generally well below the 95% target. The quality of SIAs is being improved through monitoring of zero-dose children and introduction of comprehensive readiness assessments before campaigns are launched.

The potential is also being explored in a small number of countries for targeted SIAs focused on specific areas of low coverage as an alternative to nationwide campaigns, as recommended by SAGE. This is dependent on the quality of subnational data in countries.

The incidence of measles declined significantly between 2013 and 2017, but increased sharply in 2018 and is likely to rise again in 2019 (Figure 5). DRC and Madagascar have both been badly affected by measles outbreaks in 2018 and 2019, with more than 220,000 cases reported in each country.

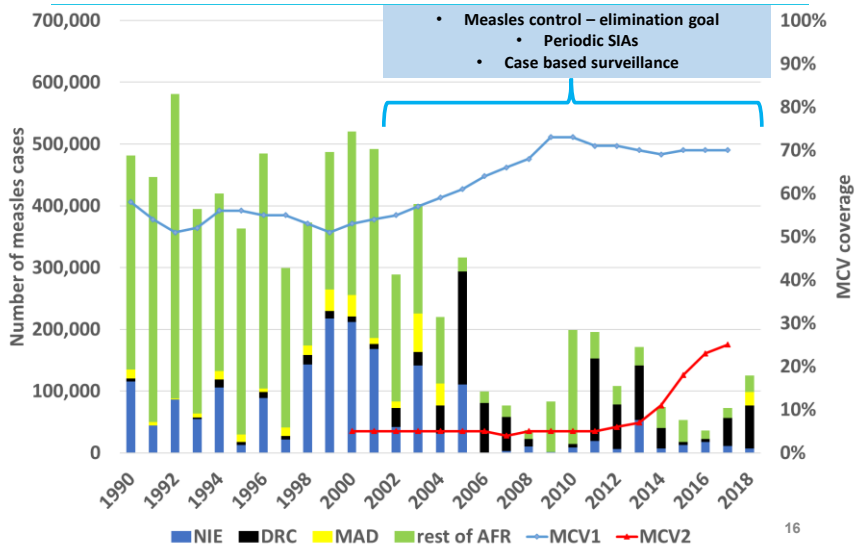

Figure 5: Distribution of measles cases since 1990 and MCV coverage.

As for rubella, 27 countries have introduced rubella-containing vaccine (RCV). SIAs are planned for an additional four countries in 2019 and all remaining countries are due to have introduced RCV by 2024. Rubella SIAs have proven highly effective in reducing the incidence of rubella.

A measles Regional Verification Commission has been established and 11 countries have set up National Verification Committees. Measles elimination has not yet been verified in any country in the region.

Tailored strategies sensitive to country context are needed to boost MCV1 coverage and reduce MCV1 –2 dropout rates. Strengthening of outbreak preparedness and responses is also required. As countries come closer to elimination, enhanced 'elimination standard' surveillance will be required to ensure sufficient sensitivity in case detection.

A revised regional elimination target date will need to take account of the fact that the timelines of regional elimination will depend on progress in countries with highly immature immunization programmes. Stepwise elimination could be envisaged, as increasing numbers of countries achieve elimination, a nd the more tractable challenge of rubella elimination could also be achieved sooner than measles elimination.

Measles in the DRC

Dr Guillaume Ngoie Mwamba (Ministry of Health, DRC) described the ongoing outbreak in the DRC and efforts to control it. Despite establishing a strategic plan for elimination of measles by 2020, the DRC has experienced multiple cases of measles over the past decade, culminating in a large-scale epidemic in 2019 affecting more than 230,000 people. Case fatality rates have been extremely high due to a combination of factors, including widespread malnutrition, late seeking of care, and insufficient case management.

In response to the 2019 epidemic, the DRC has launched a three-stage vaccination campaign (Figure 6). In phase 1, nearly 4 million children under the age of 5 years were vaccinated in seven provinces. The second and third waves of vaccination were due to take place in November and December 2019, in nine and ten provinces, respectively. Campaigns have included microplanning, readiness assessments and independent monitoring with feedback to inform corrective actions.

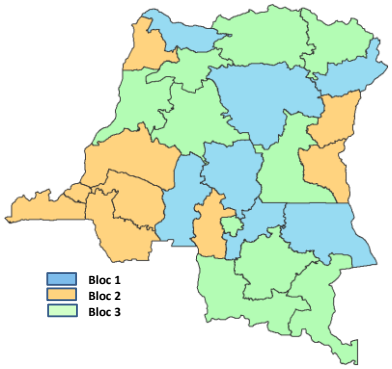

Figure 6: Three phases of planned measles SIAs in the DRC.

As well as SIAs in areas affected by the epidemic, the DRC has also been strengthening other aspects of measles control, including surveillance, outbreak response, pharmacovigilance, community engagement, measles case management and routine immunization.

Strengthening of routine immunization has focused on identifying under-vaccinated children and implementation of the national 'Mashako plan'. This has been increasing the number of health centres providing vaccination services, enhancing supervision and monitoring, and introducing other innovations to improve coverage. Cold chain capacity is being enhanced and plans are being made to introduce MCV2 in 2021 and to provide catch-up vaccination during the second year of life.

Measles in Madagascar

Dr Yolande Masembe Vuo (WHO/Madagascar on behalf of Ministry of Health, Madagascar) provided an update on measles outbreak control activities in Madagascar. Communicable diseases remain the leading cause of morbidity and mortality in Madagascar, which in recent years has experienced epidemics of cVDPV, plague and measles. Control of infectious diseases is hampered by lack of resources, insecurity, lack of access to health facilities in rural areas, and limited use of modern medicine for cultural and economic reasons.

Madagascar last experienced measles outbreaks in 2003 and 2004. A much larger outbreak began in September 2018, which had affected more than 240,000 people by November 2019. More than 30,000 people have been hospitalized with measles and over 1000 people have died; nearly four in ten cases are children under the age of 5 years.

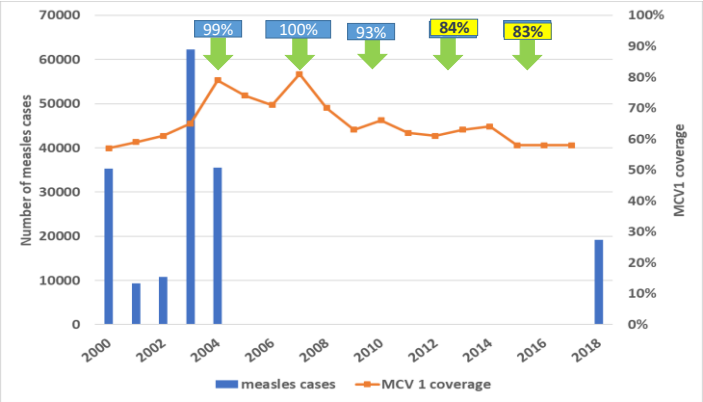

Figure 7: Measles cases and MCV coverage in Madagascar.

The epidemic response encompassed six elements – strengthening coordination, improving case management, improving surveillance, vaccination campaigns, communication and social mobilization, and revitalization of routine immunization. Activities have been backed by political commitments at the highest level, including the active involvement of Madagascar's President.

The measles epidemic reflected major gaps in coverage, and has provided an opportunity for the country to reassess its routine immunization system in preparation for the introduction of MCV2 in 2020. A roadmap has been developed for revitalization of routine immunization, prioritizing expanding equitable coverage and improving data quality – administrative coverage figures have been consistently much higher than WHO–UNICEF estimates.

The roadmap has included implementation of a 'reaching every target' approach, launch of a data improvement plan, and creation of a NITAG. A platform for vaccination in the second year of life is being developed and the national immunization programme is being reorganized.

Madagascar's response to the measles epidemic was recognized in a commendation from the Measles and Rubella Initiative in September 2019. The response has proven the trigger for multiple further actions, including revitalization of routine immunization, with a focus on effective micro-planning, improving equity, improving services in urban areas, and developing approaches for insecure areas of the country. Action is still needed to strengthen cold chain capacity, improve data management and monitoring, and enhance community engagement.

In discussions, RITAG considered the development of five-dose vials as a positive step, but careful advice needed to be given to countries on when their use was justified (in many situations, such as SIAs, ten-dose vials remain the most cost-effective option).

It was suggested that focusing on zero-dose children in SIAs was extremely important, and the numbers identified should be seen as a key success criterion in campaigns. The importance of linking such children to routine immunization was emphasized, as was the potential to add additional vaccination and other services into SIAs (e.g. polio, tetanus toxoid vaccination, vitamin A supplementation, de-worming). Recording of campaign doses was seen as a key challenge, while closer links to primary health care could strengthen the case for the introduction of birth registration systems that would benefit multiple health services.

A continued push to increase MCV2 coverage was seen as vital, including the need for a better understanding of the factors affecting dropout rates. Understanding the perspectives of caregivers, particularly women, could help to identify barriers to service use.

Risk assessments were seen as an important way to identify priority populations for SIAs in countries, although they are dependent on the availability of reliable subnational data. At a national level, MCV coverage levels can be used to identify countries at risk of outbreaks due to the build up in the number of under-vaccinated and susceptible individuals over multiple years. Madagascar is using risk assessments to plan its campaigns, and is also modelling the economic impact of outbreaks to bolster the case for investment in routine immunization and health systems strengthening to prevent outbreaks.

RITAG members were concerned about the measles response in the DRC, including the effectiveness of phase 1 campaigns and readiness for further phases. Lack of coordination across in-country partners was seen as a particular issue, as was the prioritization and resourcing of the measles response compared to Ebola, even though measles has claimed more lives.

Polio eradication and endgame strategy

Progress towards certification

Dr Ticha Johnson Muluh (WHO) noted that a revised Polio Endgame Strategy 2019–2023 has been developed[4], focusing on eradication of wild poliovirus and control of cVDPV outbreaks, integration of polio functions into routine immunization, and certification and containment. Wild poliovirus type 3 was declared eradicated globally in October 2019, and the region has reported no new case of wild poliovirus since August 2016 (Figure 7). The countdown has therefore begun towards regional certification of eradication. The African Regional Certification Commission (ARCC) has accepted submissions from 43 countries, and submissions from the four remaining countries – Nigeria, Cameroon, Central African Republic and South Sudan – are pending.

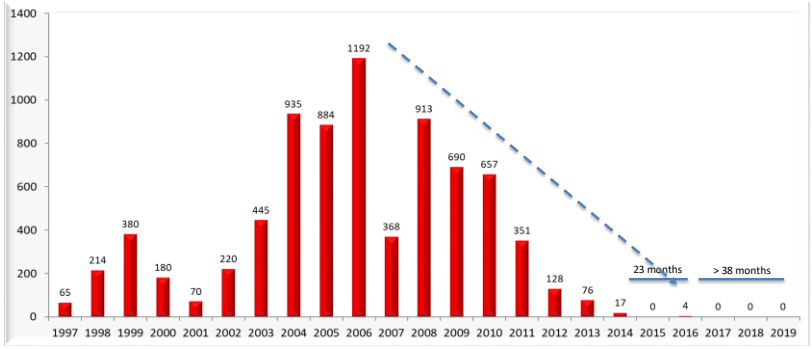

Figure 7: Cases of wild poliovirus in the region since 1997.

Nevertheless, many challenges remain. Chief among them is the emergence of cVDPV outbreaks, now documented in 13 countries. The quality of surveillance is a concern in some areas, as are low levels of population immunity. Polio control activities are affected by high staff turnover and a lack of government commitment in some countries, while insecure and inaccessible areas continue to pose major challenges to vaccination teams and surveillance.

cVDPV outbreaks reflect low levels of herd immunity, due to poor routine immunization and suboptimal SIAs. Type 3 oral poliovirus vaccine (OPV3) coverage has scarcely changed over the past three years, although some improvement in inactivated poliovirus vaccine (IPV) coverage has been seen.

Analysis of cVDPV outbreaks has provided important information to guide future control efforts. One of the most serious outbreaks was of NIE-JIS-1 in Nigeria, which spread to 13 states in Nigeria and seven additional countries between 2018 and 2019. Dissemination was associated with population movements, including nomadic populations, displacement due to insecurity, seasonal migration and movements lined to trade. Notably, effective control in Niger may have been promoted by wide-scale use of mOPV2 and preventive campaigns targeting a range of mobile populations and routes of movement to halt dissemination.

The DRC has seen multiple cVDPV outbreaks. Notably, there is some evidence that populations surrounding areas where mOPV2 responses take place may be vulnerable to the spread of cVDPV.

In summary, the experience of the past two years suggests that mOPV2 responses have successfully halted cVDPV2 outbreaks that pre-dated the switch from trivalent OPV and most post-switch outbreaks. New outbreaks

[4] http://polioeradication.org/wp-content/uploads/2019/06/english-polio-endgame-strategy.pdf

may be occurring in areas next to districts in which mOPV2 responses have been undertaken. Long-range transmission of mOPV2 has been seen, as well as rapid mutation of cVDPV2 after mOPV2 use. In addition, IPV use after mOPV2 use in areas of Nigeria seems to have been effective in controlling outbreaks.

These findings suggest that control should focus on targeting wider geographic areas, and in particular routes of population movements. The population immunity of surrounding areas s hould also be considered when responses are being planned. There is also a need for catch-up campaigns to reach those affected by IPV shortages in 2015–2018. There is also potential to use IPV after rounds of mOPV2 if transmission persists. Control would also greatly benefit from use of novel OPV2, currently being tested, which is much less likely to revert to virulence[5].

Assistance is also being provided to countries to improve surveillance and outbreak responses. New GIS-based and mobile technologies are being more widely introduced for community-based surveillance, and environmental surveillance is being expanded. Rapid response teams are being set up to undertake risk assessments and to coordinate preparedness and response activities.

Polio in Nigeria

Dr Joseph Oteri (Ministry of Health, Nigeria) noted that wild poliovirus in Africa was last detected in conflict-affected Borno state in August 2016. Since then, major efforts have been made to vaccinate populations in remote and insecure areas and to improve surveillance (Figure 8). With the support of the military, vaccination teams have been able to reach more children, with the numbers of unreached children under 5 years falling from 162,000 in September 2017 to 44,000 in June 2019.

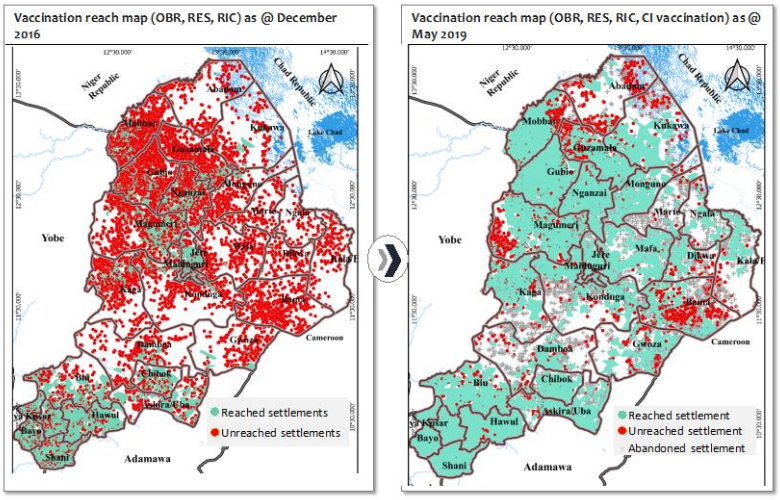

Figure 8: Increasing access in Borno.

[5] Van Damme P, De Coster I, Bandyopadhyay AS, Revets H, Withanage K, De Smedt P, Suykens L, Oberste MS, Weldon WC, Costa-Clemens SA, Clemens R, Modlin J, Weiner AJ, Macadam AJ, Andino R, Kew OM, Konopka-Anstadt JL, Burns CC, Konz J, Wahid R, Gast C. The safety and immunogenicity of two novel live attenuated monovalent (serotype 2) oral poliovirus vaccines in healthy adults: a double-blind, single-centre phase 1 study. Lancet. 2019;394(10193):148–158.

Reporting of acute flaccid paralysis cases has increased significantly in insecure areas, and environmental surveillance has expanded from three to 113 sites across 29 states.

The country switched from trivalent to bivalent OPV in 2016. Throughout 2018 and 2019, it has been affected by multiple cVDPV cases, including NEI-JIS-1, which has spread both internally and internationally. However, there are signs of progress, as the number of affected states has fallen to six in the last 6 months. Five states have been affected by the 2018 outbreaks and two states have seen new emergences (Sokoto state has been affected by both) and the number of cases has been falling.

At the time of the switch from trivalent to bivalent OPV, coverage in Nigeria was just 33%; in ten states, it was 20% or lower. cVDPV outbreaks have been concentrated in states with low routine immunization coverage (Figure 9). Three large-scale mOPV2 campaigns have been organized in 2018 and 2019, with gradually improving coverage (89% of districts achieving 90% coverage in September 2019). High-risk areas have also been targeted in IPV routine immunization intensification.

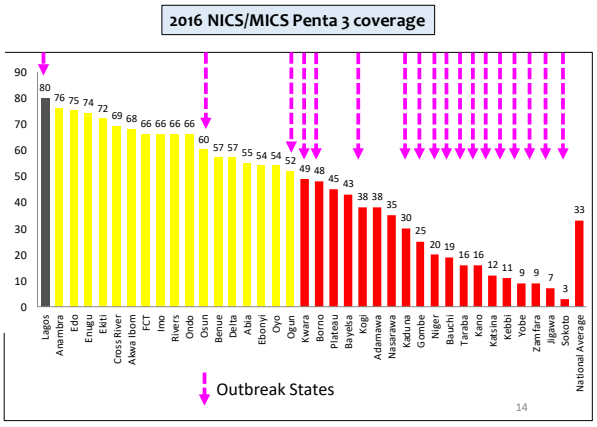

Figure 9: Correlation between coverage and cVDPV outbreaks.

Wider efforts to improve population immunity have been based on the National Emergency Routine Immunization Coordination Centre (NERICC), launched in 2017. NERICC has driven integrated approaches to enhance routine immunization in target states, mobilizing the support of state governors. These efforts are beginning to have an impact, with some gradual improvements in coverage in focus states over the past two years.

Risk assessments have identified an emerging challenge of declining type 2 immunity, particularly in the south of the country. Routine immunization intensification with IPV is being planned for high-risk districts in this area. Bivalent OPV campaigns are also planned for underperforming districts nationwide.

Polio transition planning

Mr Brian Tisdall (WHO headquarters) explained that the Strategic Action Plan on Polio Transition[6] was endorsed at the World Health Assembly in 2018 and is due to be implemented in 2019–2023 in 20 priority countries. It aims to sustain a polio-free world after eradication, strengthen immunization systems, and enhance emergency

[6] https://www.who.int/polio-transition/strategic-action-plan-on-polio-transition-may-2018.pdf?ua=1

preparedness and response capabilities. The Strategic Action Plan is being taken forward by the WHO Deputy Director General, illustrating the importance attached to it. A key task is to support the development and implementation of national plans for polio transition.

Responsibility is gradually being transferred from WHO headquarters to regions and countries. To ensure post-eradication sustainability, US$667m for polio transition has been transferred into the WHO base budget for 2020–2023.

Seven priority countries are in the African Region, and six have approved transition plans. However, only Angola has so far taken steps towards implementation, having secured initial funding from Gavi and the World Bank for health systems strengthening activities linked to immunization. In Cameroon, Chad and Ethiopia, cVDPV outbreaks have stalled progress in implementation. In the DRC, polio transition planning is at an early stage and is not a high priority given ongoing outbreaks. Due to cVDPV outbreaks, there is little appetite to move forward with transition in Nigeria and no progress has been made in South Sudan.

In Angola, the polio transition plan has been costed at US$22.9m, mainly for polio surveillance activities, for 2019–2024. Staff costs account for almost two-thirds of this sum. Gavi has committed US$1.7m and the World Bank US$2.5m and other donors are being sought.

Further joint planning visits to priority countries are planned, and a global communication and advocacy strategy is being developed to promote greater country commitment to transition planning. A dashboard is being developed to map progress in implementation of polio transition plans. A high-level mission to the region, led by the Deputy Director General, is due to take place in January 2020.

RITAG members congratulated countries, the Regional Office and the many partners who had worked together to achieve wild poliovirus eradication in the region. **Professor Rose Leke**, Chair of the ARCC, briefly discussed the certification process, given the persistence of cVDPV outbreaks. A sequential certification process is being adopted, whereby wild poliovirus would be declared eradicated in 2020 (assuming all eradication criteria are met). Nevertheless, it was felt that communication around certification would need to be carefully managed given the very strong likelihood that cVDPV outbreaks would still be occurring and that cases of acute flaccid paralysis from other causes would still occur.

Continuing use of mOPV2 to extinguish cVDPV outbreaks was queried, given the potential for it to seed new outbreaks. The key challenge is that the main alternative, IPV, does not stimulate mucosal immunity, so is unlikely to be effective against cVDPV outbreaks. However, now that IPV supplies have improved, greater use of IPV could be envisaged, to boost population immunity and to protect areas surrounding those where mOPV2 campaigns are organized. As mucosal immunity continues to wane in populations, there is a significant risk that additional cVDPV outbreaks will occur – emphasizing the importance of accelerating development of novel OPV2 to provide a more effective tool to combat outbreaks.

It was also noted that polio vaccination could be included in other campaigns, such as those in response to measles. The reverse, adding measles vaccination to polio campaigns, would be more challenging, given the door-to-door nature of such campaigns.

Delays in the implementation of polio transition plans, previously highlighted by RITAG, remain a major concern. Further advocacy, potentially coordinated with global efforts, was felt to be essential. It was queried whether transition plans were truly influencing actions of countries and partners on the ground as anticipated. It was also acknowledged that some might now need to be updated, for example through implementation annexes to avoid re-opening formally approved documents. RITAG suggested that future meetings could include first-hand reports from countries on progress in transition planning.

The issue of domestic resourcing was also raised, and the extent to which countries would be contributing to the identified costs. The long-term goal is for countries to be self-sustainable, but it was noted that the assimilation of large numbers of staff was a major challenge. It was also acknowledged that fragile and conflict-affected states were unlikely to be able to commit significant domestic resources for the foreseeable future and would require special attention.

Ebola virus disease

Ebola vaccines

Dr Ana-Maria Henao Restrepo (WHO headquarters) noted that eight Ebola vaccines are undergoing clinical trials or have been licensed in their country of origin. rVSV-ZEBOV-GP (Merck) has undergone the most extensive clinical testing and has been used in the DRC under compassionate use provisions (expanded access protocols). rVSV-ZEBOV-GP is a one-dose schedule, while the next most extensively tested vaccine, Ad26-ZEBOV (Johnson & Johnson), requires a two-dose schedule given 56 days apart.

While neither vaccine is in short supply, a Global Ebola Vaccines Security Plan is being developed to ensure coordinated access to vaccine according to need. The aim is to ensure access to vaccines for outbreak responses, for preventive vaccination when warranted by evidence, and to facilitate research on additional candidate vaccines.

This process is designed to ensure a fair distribution supported by transparent and evidence-based decision-making. It will also address the key issues of affordable pricing and sustainability of supplies. A mechanism will be developed to oversee allocation of licensed vaccines, similar to the International Coordinating Group (ICG) moderating global access to other vaccine stockpiles (Figure 10).

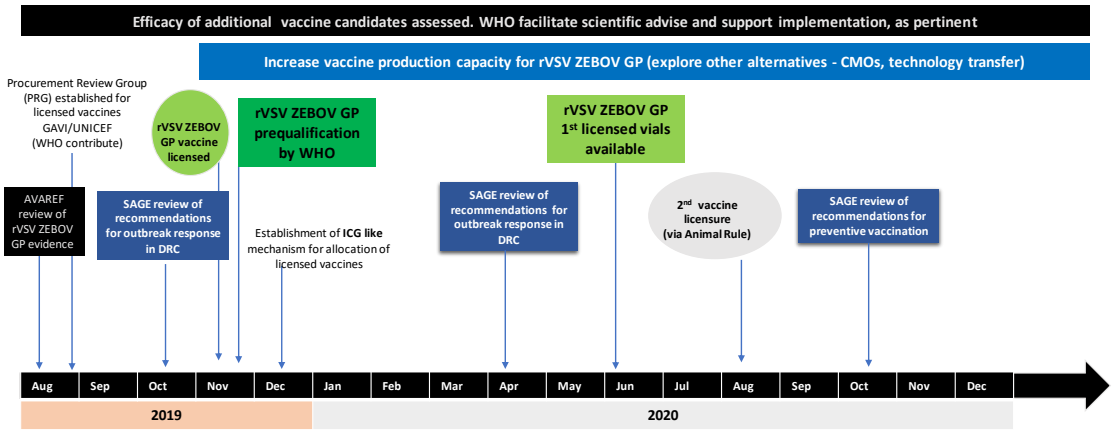

Figure 10: A roadmap for development of rVSV-ZEBOV-GP in 2020.

The EMA agreed provisional marketing authorization for rVSV-ZEBOV-GP in November 2019 and it was pre-qualified by WHO a day later. However, the first supplies of licensed vaccine will not be distributed until the middle of 2020. rVSV-ZEBOV-GP will continue to be used in the DRC under compassionate use provisions and the existing protocol. A roadmap has been developed by the WHO regulatory affairs team with the manufacturers and partners, including the African Vaccine Regulatory Forum (AVAREF), to promote a coordinated assessment by national regulatory authorities and thereby to accelerate national registration.

WHO has also worked with neighbouring and at-risk countries to promote preparedness for use of Ebola vaccine and therapeutics. Healthcare workers and other frontline workers have been vaccinated with rVSV-ZEBOV-GP in areas bordering affected areas in the DRC as well as in South Sudan, Uganda, Rwanda and Burundi.

The Ad26.ZEBOV+MVA-BN-FILO vaccine combination is being tested among lower-risk individuals and those ineligible for rVSV-ZEBOV-GP in the DRC. A phase II study, ZEBOVAC, has been launched in Uganda among healthcare workers and other frontline workers to assess safety and efficacy and perceptions of recipients. A similar trial targeting an at-risk population (traders) has begun in Rwanda.

Ebola in the DRC

Dr Guillaume Ngoie Mwamba (Ministry of Health, DRC) provided an update on the response to Ebola and Ebola vaccine use in the DRC. The first case of Ebola was detected on 27 July 2018 and confirmed on 31 July 2018. An epidemic was declared on 1 August 2018 and the first response team deployed on 2 August 2018. The first vaccination occurred on 8 August 2018.

The epidemic has affected two provinces, North Kivu and Ituri, characterized by high population density, high population mobility and persistent insecurity. The area borders several other countries, with frequent cross-border travel.

A ring vaccination strategy has been employed, with vaccination of contacts, contacts of contacts, healthcare workers and frontline workers in affected areas, and potential contacts. Infants and pregnant women began to be offered vaccination in June 2019. After initial observation, only the two latter groups are now being actively followed up (at 21 days and at delivery).

Vaccination activities are being carried out in highly challenging security-compromised circumstances, with high levels of community mistrust in the health system and Ebola vaccine. Community engagement has been crucial to gain support and assure security for vaccination activities. Strategies used include 'pop up' vaccination sites, often at a distance from contacts to avoid stigmatization, and targeted geographic vaccination, with teams present at multiple secured locations. Strategies are flexible to deal with the circumstances of individual cases. Activities are led by 36 teams, including more than 400 locally trained responders, with support from partners including researchers from Guinea, one of the countries affected by the 2014–2016 Ebola outbreak.

Even with the security challenges, ring vaccination has been achieved around >90% of cases, and >95% of cases in October–November 2019. By November 2019, more than 250,000 people have been vaccinated and consent rates among contacts and contacts of contacts have been >98%. Only around 0.2% of vaccinated individuals have developed Ebola virus disease, mainly healthcare workers; most Ebola cases are among people who have not been vaccinated (Figure 11). By November 2019, there were encouraging signs that the epidemic was being brought under control and confined to the region in which it first emerged. Access to affected areas remains the main factor preventing eradication of the outbreak.

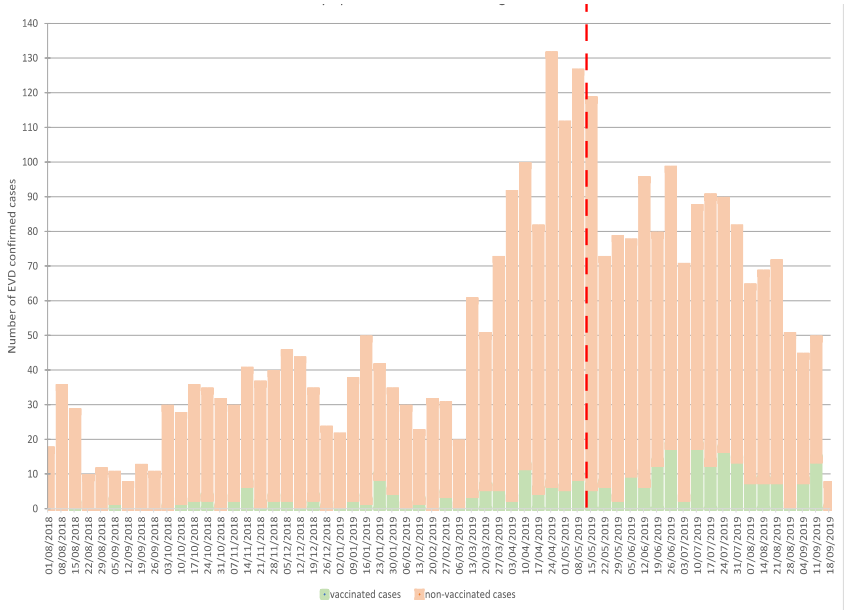

Figure 11: Cases of Ebola among vaccinated and unvaccinated individuals.

The DRC is developing a post-Ebola resilience plan, which will include strengthening of routine immunization. It is also establishing a centre of excellence for continuing education in Ebola virus disease in North Kivu to promote training in Good Clinical Practice and to support preparedness for future responses.

RITAG strongly commended the dedication, bravery and self-sacrifice of all those involved in the battle against Ebola in the DRC, particularly those at the frontline exposed to life-threatening risks on a daily basis. Many have died helping to ensure the safety of others and the world more generally.

The importance of community engagement under highly challenging circumstances and learning lessons for the future was discussed. Resources such as the global Ebola Vaccine Implementation Tool and Good Participatory

Practice guidelines for research in epidemics are being updated to take account of the DRC experience. With speed of the essence, rapid response teams have prioritized contact with community leaders (and rebel leaders when necessary) to secure vaccination team access. The campaign has been able to update messaging about vaccination, to communicate that a safe and effective vaccine is now available to protect individuals.

The importance of SAGE recommendations, often developed at great speed, was also seen as critical. Further key questions for SAGE now include the preventive use of rVSV-ZEBOV-GP and its potential use off-label – initial indications will be for use only in adults (not children or pregnant women). Off-label use is generally a risk–benefit assessment, and in outbreak situations the benefits clearly outweigh the risks. However, preventive off-label use would require careful consideration. Off-label use should always be treated with caution given uncertainties about accountability.

RITAG also warmly welcomed the efforts that have made to coordinate regulatory assessments and develop a licensing roadmap, including coordination across national regulatory authorities. Licensing in countries will be important to ensure timely use in countries if required. It was suggested that the roadmap might be extended to countries not directly at risk but with citizens who might travel to affected areas as part of humanitarian or peacekeeping efforts. RITAG was also strongly supportive of the continued development and evaluation of alternative Ebola vaccines in the pipeline.

Since rVSV-ZEBOV-GP will continue to be deployed under compassionate use provisions in the DRC, and would be if outbreaks were to occur before licensed vaccine becomes available in mid-2020, RITAG suggested that clear communication was needed to ensure countries and other stakeholders were aware of the status of rVSV-ZEBOV-GP and frameworks for its use.

In parallel with regulatory approvals, Gavi has a meeting scheduled to discuss funding for development of a global repository of Ebola vaccine to ensure ready availability for preventive and emergency use [7]. In the longer term, as additional vaccines become available, it will be important to conduct cost-effectiveness studies and to analyse programmatic issues to enable countries to make informed decisions on choice of vaccine and when they should be used.

Given the existence of a measles as well as an Ebola epidemic in the DRC, it was suggested that Ebola responses and resources could also be used to deliver measles vaccination. Important questions exist about interactions between the two infections, including the potential impact of prior measles infections and measles vaccinations on susceptibility to Ebola and responses to Ebola vaccination.

Finally, the importance of pharmacovigilance systems to detect and investigate potential adverse events following Ebola vaccination was noted. With other vaccines for emerging and re-emerging infections undergoing clinical evaluation (e.g. Lassa fever), a more general need for pharmacovigilance infrastructure was noted.

[7] Gavi subsequently announced plans to support development of a global ERbola vaccine stockpile; https://www.gavi.org/news/media-room/gavi-board-approves-new-ebola-vaccine-programme

Human papillomavirus (HPV) vaccination

HPV introductions in the African Region

Dr Phionah Atuhebwe (WHO Afro) reported that HPV vaccination has been introduced in 100 countries, including 15 in the African Region. A further seven countries have received approval from Gavi for HPV introduction. Compared with other regions, countries in the African Region have achieved excellent coverage and low dropout rates (Figure 12). HPV vaccine is central to elimination of cervical cancer, which claims the lives of 50,000 women in the region every year. All the top 15 countries in the world with the highest incidence of cervical cancer are in Africa[8].

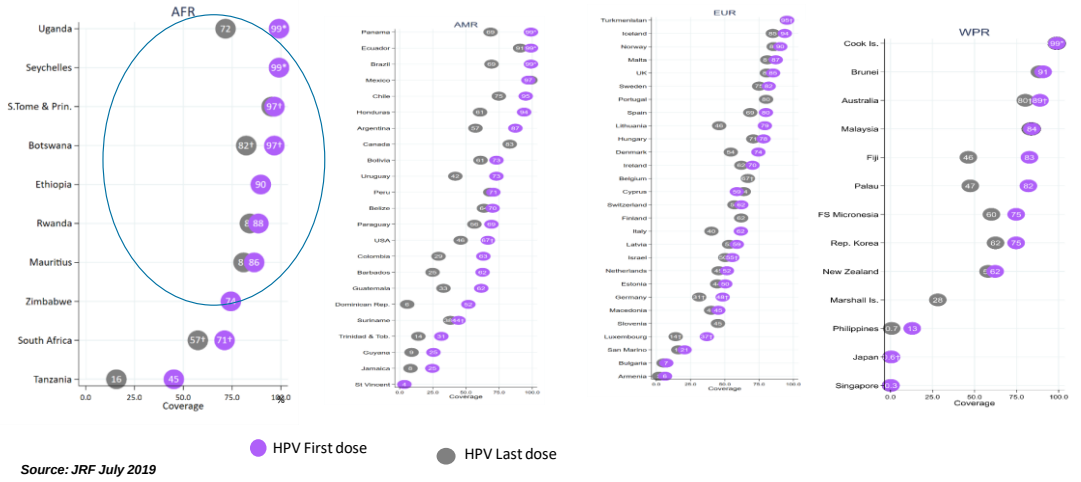

Figure 12: HPV vaccine coverage in the African and other regions.

Introductions to date have revealed several issues with planning and preparation. Countries have not always been as prepared as assumed, identification of target populations has not always been accurate, and some countries have experienced anti-HPV vaccine campaigns. Challenges to implementation have included confusion following a switch from school- to health facility-based vaccination, lack of coordination across different departments and civil society organizations (CSOs), and use of vaccine outside target age groups.

Notable success stories include Zimbabwe, which took advantage of an existing highly functioning school health programme to achieve coverage of >93%, and Rwanda, which achieved good and rising coverage despite not having initially run a demonstration programme as in most other countries.

Among the lessons learned are the need for systematic preparation, including prior communication with schools and communities, and use of multiple sources of data to determine denominators. Comprehensive school engagement strategies are critical. Delivery strategies strongly depend on local circumstances with both school-based and health facility-based strategies (and mixed models) being used successfully. Notably, lengthy consent procedures used by some countries generally increase refusal rates.

[8] https://www.wcrf.org/dietandcancer/cancer-trends/cervical-cancer-statistics

The global shortage of HPV vaccine was also noted. This has affected the implementation of planned introductions to multi-age cohorts of girls aged between 9 and 14 years. Most countries have had to introduce the vaccine to single-age cohorts. This will disrupt plans for cervical cancer elimination.

SAGE recommendations on HPV

Dr Paul Bloem (WHO headquarters) reviewed discussions held in October 2019, when SAGE considered several issues related to HPV vaccine introductions and use. One concern has been limitations in global supply of HPV vaccine. In 2019, most countries have been able to secure sufficient vaccine for single-age cohorts, although local stockouts have occurred in some countries. Gavi-funded countries have been able to introduce HPV vaccine for routine cohorts, including eight in the African Region, although several were not able to vaccinate multi-age cohorts as originally planned. One middle-income country has had to postpone HPV introduction.

Currently, two manufacturers make HPV vaccine, although other producers are poised to introduce new products within the next few years. Likely demand for HPV vaccine has been estimated through to 2030 and compared with the projected availability of supplies. With baseline supply, short-term (1–3 year) shortages are predicted for all usage scenarios except two-dose schedules with a three-year interval (Figure 13). Even in this scenario, supply and demand are finely balanced and factors such as greater use among alternative groups (such as boys or older women) or country preferences for particular suppliers could have a major impact on availability.

	Base Supply			Low Supply		
Demand Scenarios	**Short-Term (1-3)**	**Mid-Term (4-6)**	**Long-Term (6-9)**	**Short-Term (1-3)**	**Mid-Term (4-6)**	**Long-Term (6-9)**
#1 2-dose + MACs						
#2 2-dose No MACs						
#3 1-dose + MACs						
#4 1-dose No MACs						
#5 3y Extended Interval						
#6 5y Ext. Int. + 14yo						
#7 14yo, Later 9yo						

Figure 13: Supply–demand analyses for HPV vaccine.

An analysis has also been carried out of the effectiveness of one-dose HPV vaccine schedules. Data are mostly from observational studies rather than trials, and suggest that a single dose elicits more antibodies than no dose of vaccine but less than two or three doses. It is not clear that these differences have any clinical impact, but data are limited. However, a range of trials of one-dose HPV schedules are being carried out and will begin to deliver high-quality evidence in 2021.

In light of these analyses, SAGE made no change to its recommendations, suggesting that there was currently insufficient evidence to warrant use of one-dose schedules. It noted that all current HPV vaccines have equivalent clinical impact in terms of preventing cervical cancer.

However, SAGE was concerned about the potential for near-term shortages in HPV vaccine supply. It recommended that all countries should postpone multi-age cohort vaccination, gender-neutral vaccination (i.e. vaccination also of boys) and vaccination in older age groups (≥15 years) until all countries have secure access to vaccine.

It noted that this would avoid disadvantaging countries with the highest burden of cervical cancer – the number needed to vaccinate to avoid any HPV-related cancer is 78 Ugandan girls, 560 Canadian girls, 5480 Canadian boys, and 8500 middle-aged US women.

To ensure access to two doses of HPV vaccine, SAGE recommended that countries weigh up the advantages and disadvantages of two alternative strategies. The first would be to target older girls (14-year-olds), so the benefits of vaccination are achieved sooner. One disadvantage of this strategy is that the numbers of girls in schools decline with increasing age, so school-based delivery would miss more girls. When supplies improve, countries could maintain this approach or shift vaccination to earlier ages.

The second model is to adopt a '1+1' schedule, with an extended interval of 3 –5 years between doses. This would capture more girls initially but would represent off-label use of vaccine and it could be challenging to track girls over this extended time period (although evidence may soon be available to show that a single dose affords effective protection and a second dose would therefore not be necessary).

SAGE also called upon WHO and global partners, including manufacturers, to begin urgent dialogue to discuss global access.

RITAG concurred with SAGE's recommendations, and acknowledged that choice of delivery strategy and platform could only be made at a national level based on local programmatic contexts. It suggested that the Regional Office develop guidance to help countries and NITAGs investigate the complex range of factors that needed to be considered before such decisions were made.

RITAG was also greatly concerned about the potential for disruption in the availability of HPV vaccine in the region, particularly given its high burden of disease. It urged the Regional Office to take up the issue at the highest possible level within WHO, and requested that it be involved in any discussions on global access.

Given that several other vaccine shortages have been experienced in recent years, RITAG also argued that a thorough investigation should be undertaken to determine why vaccine supply has not been sufficient to meet global demand. It noted that postponement of multi-age cohort HPV vaccination would inevitably lead to additional avoidable deaths of women in the region. Key lessons learned from such an investigation could reduce the risk that similar situations arise in the future.

Malaria Vaccine Implementation Project (MVIP)

Update on the MVIP Framework for Policy Decision Planning

Dr Phionah Atuhebwe (WHO Afro) provided an update on implementation of the malaria vaccine RTS,S/AS01. Given the high burden of disease in malaria-endemic countries – malaria still claims the lives of more than 400,000 people a year, most of them children in Africa – the level of protection provided by RTS,S/AS01 could deliver major public health benefits (Figure 14).

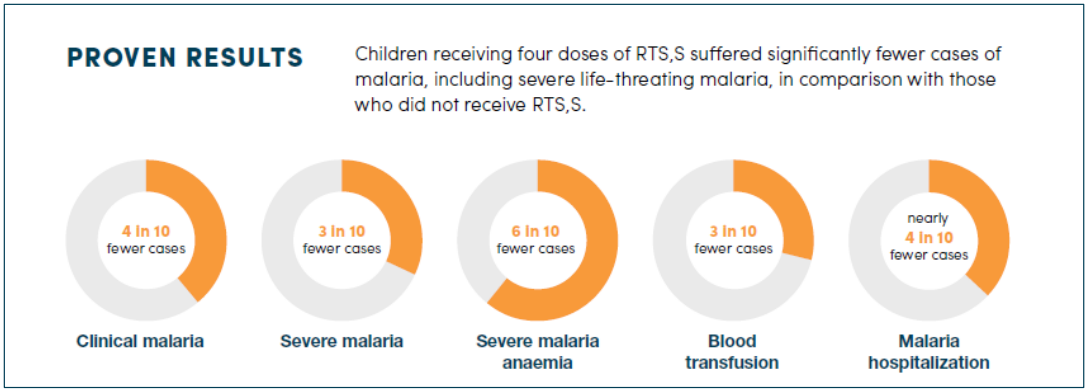

Figure 14: Benefits of RTS,S/AS01 use.

In 2015, RTS,S/AS01 received a positive scientific opinion from the EMA. Following this, SAGE and the Malaria Policy Advisory Committee (MPAC) recommended undertaking pilot studies to explore the feasibility of reaching children with four doses, to follow up on phase III safety signals, and to explore issues relating to routine use. The implementation pilots would introduce RTS,S/AS01 through national immunization programmes and include three evaluations: a WHO-led pilot evaluation focusing on sentinel hospital and community-based mortality surveillance; a qualitative and cost-effectiveness analysis led by PATH; and an independent phase IV pharmacovigilance study led by the manufacturers.

A Framework for Policy Decision has been developed, designed to provide a rationale for decision-making once data from the project become available. This Framework was endorsed by SAGE and MPAC in 2019. Long-term follow up from the pivotal phase III trial[9] found that efficacy remained positive during 7 years of follow up; hence, efficacy demonstrated in the first 4 years after vaccination – when children are at highest risk of clinical malaria or severe malaria – was maintained. In addition, children receiving only three doses were not at increased risk of severe malaria. Efficacy was good even for three doses, and mathematical modelling suggested that the fourth dose may provide only a small incremental benefit.

Based on these findings, the Framework for Policy Decision considers safety data to be the primary factor affecting a policy decision, followed by efficacy, and then feasibility. The feasibility of delivering the fourth dose should not be a major factor influencing decision-making.

However, the timeline for decision-making has created a potential supply challenge. A WHO policy decision could be made as early as late 2021, the soonest that safety data might be available, and a funding decision could be made soon after, perhaps early in 2022. Timings depend on the acquisition of safety data, which could extend into 2023. However, assurance of supply after the pilots are completed would require manufacturing to continue after the 10 million donation doses have been manufactured but before a policy decision has been made. This presents a financial risk that the manufacturer may not be willing to take. Because of manufacturing lead times,

[9] Tinto H, Otieno W, Gesase S, Sorgho H, Otieno L, Liheluka E, Valéa I, Sing'oei V, Malabeja A, Valia D, Wangwe A, Gvozdenovic E, Guerra Mendoza Y, Jongert E, Lievens M, Roman F, Schuerman L, Lusingu J. Long-term incidence of severe malaria following RTS,S/AS01 vaccination in children and infants in Africa: an open-label 3-year extension study of a phase 3 randomised controlled trial. Lancet Infect Dis. 2019;19(8):821-832.

initiating production after WHO and funders' decision-making would lead to gap in vaccine supply of at least a year and potentially longer in the pilot countries and a delay before vaccine could be made available for wider use within the pilot countries or in new countries (Figure 15).

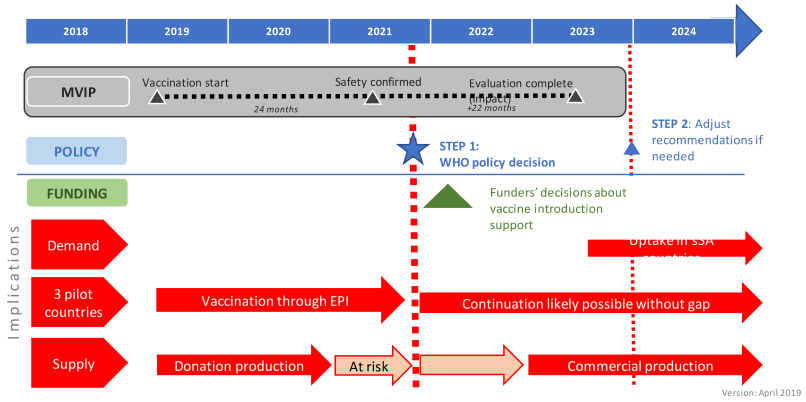

Figure 15: Timelines for RTS,S/AS01 policy and funding decision making.

A further issue is that 400,000 doses of RTS,S/AS01 will reach their expiry date in August 2020. No decision has yet been taken on how these doses should be used, if at all.

MVIP in Malawi

Temwa Mzengeza (Ministry of Health, Malawi) provided a brief update on Malawi's pilot implementation project, which began in April 2019. By September 2019, it had delivered 34,804 doses, around half its target. Dropout rates between the first and second and the first and third doses have been significant (27% and 35%, respectively). Uptake has been lower than for DTP3 and MCV1, but has been improving since June 2019.

Challenges have included healthcare worker confusion about age eligibility, lack of community sensitization, some problems with data collection and management and with adverse event (AESI/AEFI) reporting, and the high rate of dropout. Mitigation measures include intensified supportive supervision and training as well as enhanced social mobilization.

To date, the project has shown that countries like Malawi can introduce several vaccines at the same time. The decision to go for a low-key launch may have led to low initial uptake, and more active demand generation is now being pursued. Support and training for staff has been essential. Key challenges have included movement of people between implementation clusters.

Steps are being taken to address these issues and to improve data management by incorporating malaria vaccine reporting into DHIS2. A post-introduction evaluation is due to take place early in 2020. No AESIs associated with RTS,S/AS01 have been reported and none of six RTS,S/AS01-associated AEFIs required investigation.

MVIP in Ghana

Dr George Bonsu (Ministry of Health, Ghana) described progress in the Ghana pilot, also launched in April 2019. By September 2019, it had delivered 101,000 doses to 46,000 children, around 66% of the age-eligible target

population. Dropout rates have varied from 1 to 13% across regions. Coverage initially matched comparator vaccines, but dipped markedly a month after launch, after which it stabilized. No AESIs associated with RTS,S/AS01 have been reported and no RTS,S/AS01-associated AEFIs required investigation.

The dip in June 2019 may have reflected anti-vaccine messages on social media from outside the country, which were promptly addressed by the Ministry of Health. Other challenges have included data consistency, caregiver knowledge on vaccination schedules, and low reporting of potential adverse events.

Responses include additional supervision, coaching and training, adaptation of DHIS2, and a greater emphasis on community mobilization. Ghana will also be organizing a post-introduction evaluation early in 2020.

RITAG members welcomed the programme, recognizing the importance of tackling a disease responsible for such a high burden of disease. While supplies for the pilot sites are secure for the duration of the pilots, RITAG was concerned at the possible halt in production and the potential for delayed introductions in other countries. Gavi is due to consider providing funding to establish an inventory, and other possible mechanisms of risk-sharing are being explored by WHO, Gavi, the manufacturer and other stakeholders.

RITAG members were keen to ensure that the 400,000 doses due to expire shortly did not go to waste. It was felt that pilot sites in the three MVIP countries were the only sites set up to make use of these doses, which could be used to expand coverage.

Demand promotion

Increasing health and immunization services take up

Helena Ballester Bon (UNICEF) described some of UNICEF's work on 'human-centred design' and the use of behavioural science to improve take up of health services. Even when vaccines are available to communities, individuals may not take up immunization services. The reasons for sub-optimal vaccine uptake are varied, but focusing on the quality of services and interactions between health workers and caregivers may be a productive route to increase service use.

Surveys are often used to explore why caregivers have not taken advantage of immunization services. These generally reveal a wide range of barriers, but responses are not always helpful in identifying underlying root causes or factors that are amenable to change. More human-centred approaches, to understand the perspectives and needs of both service users and health workers, may be a way to identify specific issues that can be addressed through the design of services.

To create an organizing structure for the barriers and drivers that affect service uptake, UNICEF has developed a framework known as the 'journey to health and immunization'[10]. It has been designed as a perpetual cycle with six key stages (Figure 16). The model focuses on the journey of a caregiver, from the development of knowledge

[10] www.hcd4health.org

and beliefs about immunization, through an intention to act, preparation for a clinic visit, the visit itself and the vaccination experience, and follow up.

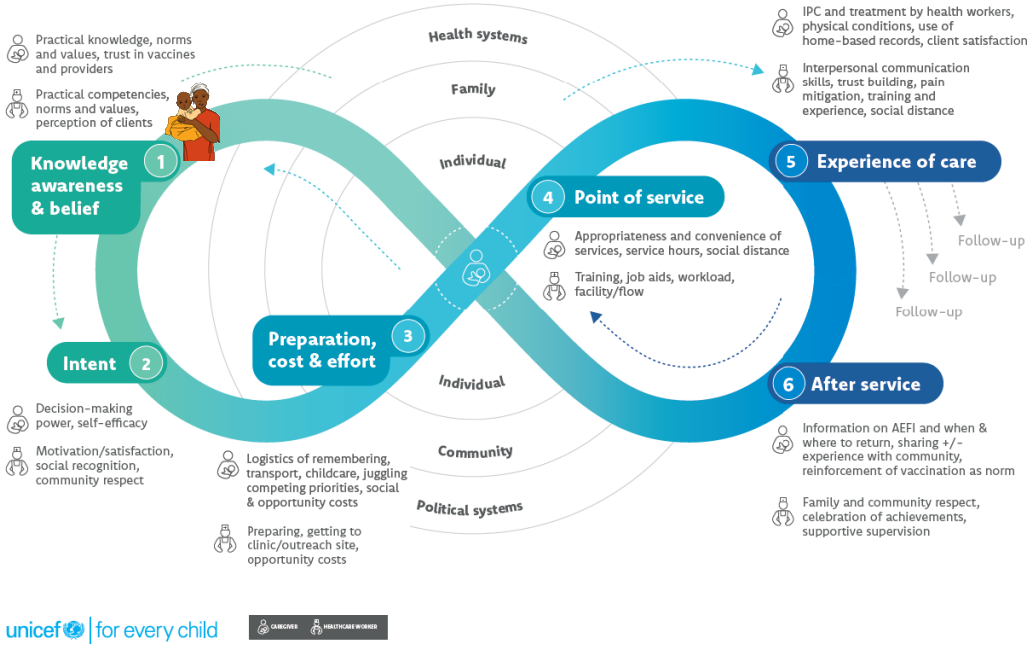

Figure 16: The journey to health and immunization.

This model can be used by local service providers to explore and categorize barriers and drivers, focusing on underlying causes. In turn, these can form the basis of targeted actions to lower barriers and promote drivers of service use. It can be particularly helpful to identify 'influencers' at each point in the cycle, who have most influence on caregiver behaviour and where behaviour change interventions could have most indirect impact on caregivers' actions.

A growing evidence base exists on the most effective approaches for influencing caregiver behaviour[11]. There is limited evidence that influencing thoughts and feelings, for example through education and promotional campaigns, affects behaviour. Exploiting social processes, for example through social media, is showing promise. However, the most effective approach is not to attempt to shift thoughts and feelings but to make it as easy as possible for people to turn intentions into action.

This can again be achieved by focusing on the key points in the journey to health. The foundation of success therefore lies in building trust between health workers and individuals and communities, engaging with communities to ensure that services meet local needs, reducing barriers to take up of services, and using methods (such as calendars or text messaging) to turn intentions into actions.

JSI pilots

[11] Brewer NT, Chapman GB, Rothman AJ, Leask J, Kempe A. Increasing Vaccination: Putting Psychological Science Into Action. Psychol Sci Public Interest. 2017 Dec;18(3):149-207.

Adelaide Shearley (John Snow, Inc., JSI) described how JSI has been exploring human-centred approaches to increase take up immunization services in pilot projects in Africa. These pilots are based on the principle of deep community engagement, including collaborative planning, implementation and monitoring, to create a shared sense of purpose and joint accountability (Figure 17).

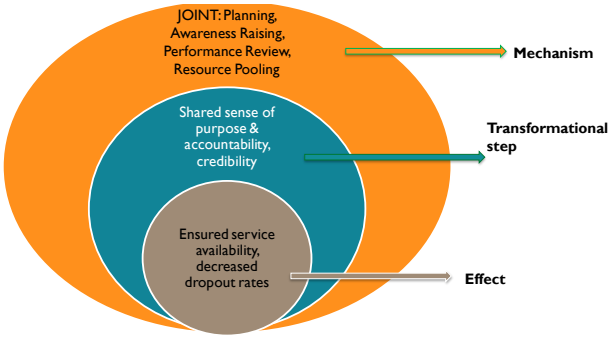

Figure 17: Promoting co-ownership of immunization activities.

One example is the 'My Village My Home' (MVMH) initiative and use of vaccination cards in Zimbabwe. Home-based records are a valuable way to track vaccination status, but the extent of their use varies widely. The MVMH initiative aims to make home-based records a more useful tool, containing additional information and advice about immunization[12]. A poster-sized record shaped like a house has a row for every child in the community, and a 'brick' is added every time an infant is immunized – symbolizing that a strong community, like a strong house, is built on a strong foundation.

JSI has piloted MVMH in ten health facilities in two districts, using the new cards. Volunteer health workers track participation and defaulters at a community level. The cards play a critical role, linking caregivers, health workers, community health workers and volunteer health workers. Initial results from the two districts suggested that the MVMH has increased vaccine coverage, and the Government of Zimbabwe has supported a scale up to include 16 priority districts with low coverage.

In Ethiopia, JSI has been exploring the use of Quality Improvement Teams (QITs), in which service providers and communities come together to discuss challenges, identify responses, and test solutions collaboratively[13]. The teams meet regularly to ensure joint ownership. The approach has been focused on increasing coverage among hard-to-reach nomadic communities.

QITs therefore act as a critical link between the health system and the community, helping to build knowledge and trust, shape appropriately designed services, and mobilize communities to trace defaulters. These activities have led to a significant increase in coverage among target populations.

As discussed by **Ms Lisa Menning** (WHO headquarters), demand promotion places great emphasis on the quality of immunization services. The quality of health services is a complex concept, encompassing multiple elements

[12] https://www.jsi.com/JSIInternet/IntlHealth/project/display.cfm?ctid=na&cid=na&tid=40&id=22541

[13] http://uifhs.jsi.com/wp-content/uploads/2018/08/UI-FHS-Mid-Program-Review-report.pdf

(Figure 18)[14]. The behaviour of health workers is crucial to the quality of immunization services, as they are the point of contact with services users and often the most trusted advisor on vaccination decision-making. However, health workers typically find it difficult to manage non-vaccination, may have limited knowledge, and may have their own concerns about vaccines.

Figure 18: Different aspects of health service quality.

Evidence suggests that improving health care provider practices depends on the use of a combination of approaches, the most effective being a combination of community support, strengthened infrastructure, supervision, other management techniques and training[15]. All strategies should be backed up by monitoring and evaluation.

A range of practical tool kits have been developed to support the development of people-centred immunization services. These include UNICEF's Interpersonal Communication for Immunization[16] and the Sharing Knowledge about Immunization (SKAI) resource[17].

To address high dropout rates, Ms Menning suggested that immunization programmes need first to ensure they have an enabling policy environment, then to engage with communities to understand needs and perspectives, and to jointly develop services underpinned by health workers with a strong commitment to people-centred approaches. A variety of data sources, including coverage and surveillance data as well as behavioural and social data as discussed above, can support evaluation of these efforts and guide course corrections.

Take up of services is influenced by the behaviour and actions of both caregivers and service providers – and, crucially, interactions between the two. A deeper understanding of the drivers of behaviour among communities and individuals can help identify where to focus efforts. Engaging communities in the design of services that overcome barriers to service use will be the most productive way to improve take up of services.

[14] WHO. *Quality in primary health care*. 2018. WHO WB OECD. *Delivering quality health services.* 2018.

[15] Rowe AK, Rowe SY, Peters DH, Holloway KA, Chalker J, Ross-Degnan D. Effectiveness of strategies to improve health-care provider practices in low-income and middle-income countries: a systematic review. Lancet Glob Health. 2018 Nov;6(11):e1163-e1175.

[16] https://ipc.unicef.org/

[17] http://www.ncirs.org.au/our-work/sharing-knowledge-about-immunisation

In discussions, RITAG noted the importance of adopting a people-centred approach to the design of immunization services, and of engaging with communities to ensure services meet people's needs. A key challenge is how this is done in practice. Existing tools such as Reaching Every District [18] and Immunization in Practice [19] include guidance on community engagement. In some settings, more in-depth social and behavioural research might need to be conducted to examine how behavioural factors among health workers and service users affect service uptake. It was also stressed that interventions targeting these factors should be based on a sound evidence base, including their impacts on coverage, and with due regard for programmatic implementability and financial sustainability.

It was also noted that the models discussed emphasized the artificiality of distinctions between supply and demand. In reality the two are strongly interlinked, with demand (service seeking) highly sensitive to the nature as well as availability of services. Demand promotion therefore needs to be seen as going far beyond communication, embracing the building of relationships and trust with communities through active engagement and involvement in all stages of service planning and delivery. At a local level, immunization should be seen as a joint enterprise between communities and health service providers.

Yellow fever control

Progress in yellow fever control in the African Region

Dr Blaise Bathonoli (WHO Afro) described regional progress in implementation of the Eliminating Yellow Fever Epidemics (EYE) strategy. Yellow fever is endemic in 27 countries in Africa. An effective vaccine has been available for many years, and preventive mass vaccine campaigns had a significant impact on disease burden in the mid-20th century. Since then, however, the disease has rebounded, including a large outbreak in Angola and the DRC in 2016–2017.

Three endemic countries have yet to introduce yellow fever vaccine into routine immunization – Ethiopia, South Sudan and Uganda (Figure 19). Ethiopia is planning to submit an application to Gavi in 2020, South Sudan has planned future vaccine use but is not in a position to introduce it yet, and Uganda has prioritized yellow fever vaccination behind MCV2 and MenA. In countries that have introduced the vaccine, coverage remains low – 64% in 2018. Coverage has typically been lower than MCV1 coverage, although this gap has been closing in recent years.

[18] https://www.who.int/immunization/programmes_systems/service_delivery/red/en/

[19] https://apps.who.int/iris/handle/10665/193412

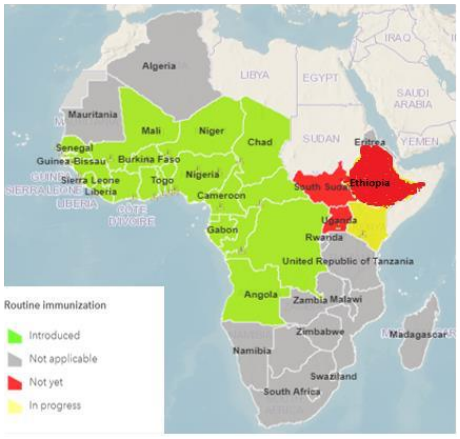

Figure 19: Introduction of yellow fever vaccine in the region.

The EYE strategy encompasses a global coalition of countries and partners committed to tackling the disease. It has three key objectives – to protect at-risk populations, to prevent international spread, and to contain outbreaks rapidly.

It aims to improve population coverage through catch-up campaigns and strengthening routine immunization systems. It also aims to work with the measles and rubella initiative and others to improve coverage in the first year of life and to establish platforms for catch up in the second year of life.

A total of 15 out of 27 at-risk countries in the region have completed preventive mass vaccination campaigns and two others are in progress. Between three and five campaigns are likely to take place in 2020. Ten countries have yet to complete national campaigns.

Between January and August, 7280 suspected cases of yellow fever were reported in the region, but 95% tested negative in national reference laboratories. Just 1% of samples tested positive in regional reference laboratory analysis. These findings point to shortcomings in case definitions used in the field.

Nearly 20 million doses of yellow fever vaccine have been made available by the ICG from the global stockpile for outbreak responses. Campaigns have been carried out in Nigeria, the DRC, Ethiopia and Sudan between 2017 and 2019. Earlier vaccine shortages led to use of fractional dosing, but vaccine is now available again globally.

Challenges include limited political commitment to yellow fever control in several countries, suboptimal implementation of control strategies, and low routine immunization coverage. IHR processes are also not being fully implemented, increasing risks to global health security. Better methods of case definition may also be needed.

Yellow fever in Nigeria

Dr Joseph A. Oteri (Ministry of Health, Nigeria) described Nigeria's attempts to control yellow fever. Nigeria introduced yellow fever vaccination into routine immunization in 2004. In 2008, following a risk assessment exercise, all states were prioritized for PMVCs. However, for various reasons, including global vaccine shortages and competing priorities, campaigns only began to take place in 2018 and 2019, when Nigeria adopted the EYE

strategy. More than 40 million people have been reached in preventive and reactive campaigns in these two years.

Through the EYE strategy, Nigeria aims to control yellow fever by 2026. Key objectives include regular risk analyses and outbreak response planning, high-quality PMVCs, enhancing routine immunization coverage, improving surveillance and strengthening IHR capacities.

A risk analysis in October 2019 identified six high-risk and 27 medium-risk states; insecurity in Borno state may also increase the risk of outbreaks. Nationally, routine coverage of yellow fever vaccine remains suboptimal, at under 70%.

Up to October 2019, more than 200 cases have been confirmed by WHO's Regional Reference Laboratory in Dakar, Senegal (Figure 20). A much larger number of suspected cases are being reported, with positive test results obtained in less than 5% of cases. All age groups are affected, with a peak in childhood and early adulthood. Reactive campaigns have been launched in the most affected areas, with more than 11.4 million people aged 9 months to 45 years vaccinated in 2017–2019.

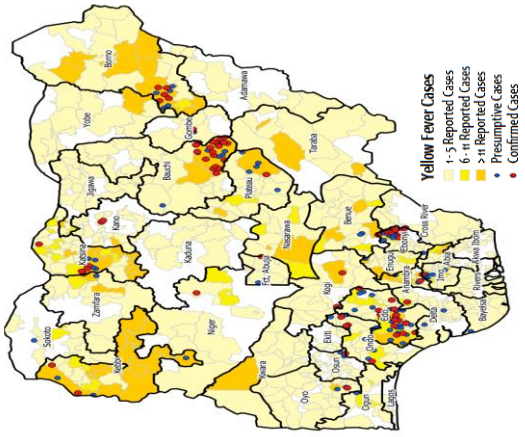

Figure 20: Yellow fever cases in Nigeria.

Nigeria's yellow fever laboratory network has expanded to six laboratories, reducing the time taken for sample testing. The Nigerian CDC National Reference Laboratory is now operational and two others are being developed.

Remaining challenges include the unavailability of vaccine, insecurity and delays in confirmation of cases. Low coverage in routine immunization remains a concern, while a lack of resourcing, high staff turnover and reagent supplies present multiple practical challenges.

The country has PMVCs planned for 2020, 2021 and 2022, to be complemented by other public health interventions. The NERICC routine immunization strengthening initiative will be used to improve routine coverage. Nigeria will also be seeking accreditation of its national yellow fever serological laboratories and for molecular testing in its National Reference Laboratory.

RITAG again urged Ethiopia, South Sudan and Uganda to introduce yellow fever vaccination into their routine immunization programmes as rapidly as possible, and for all at-risk countries to prioritize yellow fever control. A highly effective vaccine has long been available and global supply is no longer a significant constraint.

Strengthening routine immunization and yellow fever vaccine coverage was seen as a critical activity. Years of low coverage is creating a large pool of susceptible individuals, while high population mobility in many countries is exposing people to risk of infection and promoting wider dissemination. It was also suggested that EYE should not attempt to act independently but seek to strengthen routine immunization through its activities.

Supply of yellow fever vaccine appeared to be a point of confusion. Not all countries may be aware that yellow fever vaccine supply shortages have been overcome. Although unexpected outbreaks could lead to vaccine shortages, there may be potential for countries such as Nigeria to bring forward their mass campaign schedules. Good communication and planning at global and national levels are needed to ensure that yellow fever vaccine stocks are used optimally.

Development of laboratory capacity was also seen as critical, to improve the speed of case confirmation. Gavi's willingness to support capacity building and the supply of materials was warmly welcomed.

Non-human primates are a potential reservoir of yellow fever virus and, unlike in South America, primate infection is not associated with die-offs that act as warning signs of yellow fever risk. Vector monitoring could provide additional information on risk, and a Framework on the Implementation of the Global Vector Control Response in the region, which includes surveillance, was approved at the WHO Regional Committee meeting in August 2019.

A final point made was that surveillance was generating a wealth of data that could be analysed to provide new insights into disease epidemiology. There was also a need to understand what infections (if any) the 95% of cases testing negative for yellow fever might have.

Middle-income countries and vaccine procurement

Middle-income countries

Dr Amos Petu (WHO Afro) described progress being made to establish pooled procurement mechanisms across the region's middle-income countries (MICs). In the absence of Gavi support and access to preferential pricing, MICs in the region have struggled to introduce and sustain new vaccines. These challenges have been exacerbated by the declining economic fortunes of many MICs in the region. MICs are also often associated with high levels of inequality, with a high proportion of their populations living in poverty.

MICs report feeling isolated, typically procure independently, and pay very different prices for vaccines. In April 2018, representatives from 17 countries met in Brazzaville to discuss possible ways to improve access of MICs to affordable vaccines. As well as enhanced political commitment and greater national investment, the workshop concluded that there was scope to improve procurement and regulatory processes to enhance availability and affordability.

A consultation identified a range of issues, including weak in-country decision-making systems, burdensome regulatory environments, complex contracting procedures and a lack of skills in procurement and contracting, and limited use of market information. Addressing procurement issues can deliver significant benefits – Eswatini achieved savings of more than 10% in vaccine costs by procuring through UNICEF.

At a further workshop held in Eswatini in October–November 2019, representatives from MICs, WHO, partner organizations and vaccine manufacturers met again to discuss collaborative approaches to enhance vaccine availability and affordability. The workshop considered four models of pooled procurement, ranging from sharing of information to support more informed procurement through to fully integrated models with a central agency procuring on behalf of multiple countries (Figure 21).

Country Processes Retain Individuality		**Country Processes Merge into Group platform**	
Informed buying	Coordinated informed procurement	Group Contracting	Central Contracting and Purchasing
Countries share price and supplier information	Countries do joint market research, share supplier information and monitor prices	Countries Jointly negotiate prices, select suppliers, agree to purchase from same suppliers	Countries jointly conduct tenders, and award contract through an organization that acts for and on their behalf
Procurement done individually			Procurement done and managed by central buying unit/structure

Figure 21: Different models of pooled procurement.

A pre-workshop questionnaire had revealed that several countries had non-functional NITAGs. Key potential benefits were seen to be lower vaccine pricing, a reduction in the costs of procurement, and more reliable supplies of vaccine.

As a result of the meeting, countries resolved to coordinate market research and share information on suppliers and prices, to create a web-based community platform to connect MICs, and to strengthen NITAGs and their input into decision-making. The potential to include vaccines in fast-tracking product registration mechanisms will be explored. Advocacy would be undertaken to mobilize funding from domestic and other sources, and capacity building would be undertaken to promote greater use of the Market Information for Access (MI4A) tool and to enhance the forecasting and planning capabilities of national immunization programmes.

Small-island developing states

Dr A. Loua (WHO/AFRO) described how the potential for pooled procurement of vaccines is also being explored by small-island developing states (SIDS), as part of wider initiatives to collaborate on sourcing of medical products. The SIDS scheme is one of several such regional initiatives, with others being managed by the African Association of Central Medical Stores and by the Southern Africa Development Community (SADC).

The SIDS initiative encompasses six countries and focuses on particularly expensive products and those where availability can be a challenge (vaccines and medicines for non-communicable diseases). It includes technical

cooperation and capacity building, shared procurement to achieve economies of scale, and collaboration on quality assurance procedures. By harmonizing processes and collaborating, the countries aim to secure lower prices, ensure continuous supplies, and improve efficiency.

The first technical meeting on pooled procurement was held in July 2018 and an operational plan has been developed. This is due to be endorsed by ministers of health in December 2019, leading to the formal launch of the SIDS pooled procurement mechanism. The WHO Regional Office is supporting the initiative by acting as secretariat and providing technical assistance.

The initiative has had a number of challenges to overcome. These have included language differences, variation in processes between countries, and a weak regulatory and policy environment in several countries. As well as the pooled procurement scheme, countries are exploring other ways to enhance the regulatory and policy environment for medicines and vaccines.

RITAG welcomed the progress that is being made towards pooled procurement in the region. It recognized that such initiatives were ambitious and complex, but had the potential to achieve significant impact.

It was also noted that the drive towards more affordable pricing had to be balanced with the need for sustainable markets to ensure the continuing development and availability of vaccine products. The ideal scenario is one in which pricing is not a barrier to the introduction of vaccines to address unmet needs and also ensures the long-term financial sustainability of vaccine developers and manufacturers. It was noted that the vaccine marketplace is unusual, being characterized by a relatively small number of manufacturers and a lack of generic products. While greater transparency and pooled procurement may be able to exert downward pressure on pricing, manufacturers also stand to benefit from increased volumes and longer-term certainty in orders.

Future years will see more countries in the region graduating out of Gavi support. Gavi has recognized the risks posed by transitions, and now has a strong focus on development of programmatic capacities, including procurement capabilities, to ensure long-term sustainability of programmes.

It was suggested that lessons could be learned from other regions, particularly the Region of the Americas, which have successfully introduced pooled procurement mechanisms. The involvement of a single large country, Brazil, may have been a key factor in ensuring the success of this approach in the Americas.

The importance of regulatory simplification and harmonization was also recognized, to reduce barriers to the introduction of new vaccines and accelerate access. It was also stressed that the role of the WHO Regional Office was to facilitate efforts at regulatory harmonization, policy development and collaboration between countries on pooled procurement, but not to negotiate with manufacturers directly.