REPORT OF THE INDEPENDENT REVIEW COMMITTEE TO THE GAVI ALLIANCE SECRETARIAT ON THE REVIEW OF APPLICATIONS

Geneva, November 2019

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List of Acronyms

2YL	Second year of life
AEFI	Adverse event(s) following immunization
CCE	Cold-chain equipment
CCEOP	Cold Chain Equipment Optimization Platform
CCL	Cold-chain logistics
CSO	Civil society organization
DHIS	District Health Information Software
DHS	Demographic and Health Survey
DSA	Daily Subsistence Allowance
EPI	Expanded Program on Immunization
EVM	Effective Vaccine Management
FIC	Fully Immunized Child
Gavi	Global Alliance for Vaccines and Immunizations
HIV	Human immunodeficiency virus
HPV	Human papillomavirus
HR	Human resources
HSS	Health System Strengthening
ICC	Inter-Agency Coordinating Committee
IEC	Information, Education and Communication
IgM	Immunoglobulin M
IP	Improvement plan
IRC	Independent Review Committee
JA	Joint Appraisal
LCA	Laboratory Capacity Assessment
M&E	Monitoring and Evaluation
MAC	Multi-age cohort
MCC	Multisector Coordinating Committee
MCV	Measles-containing vaccine
Men A	Meningococcal A vaccine
Mfu	Measles Follow-Up
MICS	Multi Indicator Cluster Survey
MSP	Measles Strategic Planning (tool)
NGO	Nongovernmental organization
NITAG	National Immunization Technical Advisory Group
NLWG	National Logistics Working Group
NVI	New Vaccine Introduction
NVS	New Vaccine Support
PCR	Polymerase chain reaction
PIE	Post-introduction evaluation
PNG	Papua New Guinea
RI	Routine immunization
Rota	Rotavirus vaccine
RRL	Regional reference laboratory
SC	Supply chain

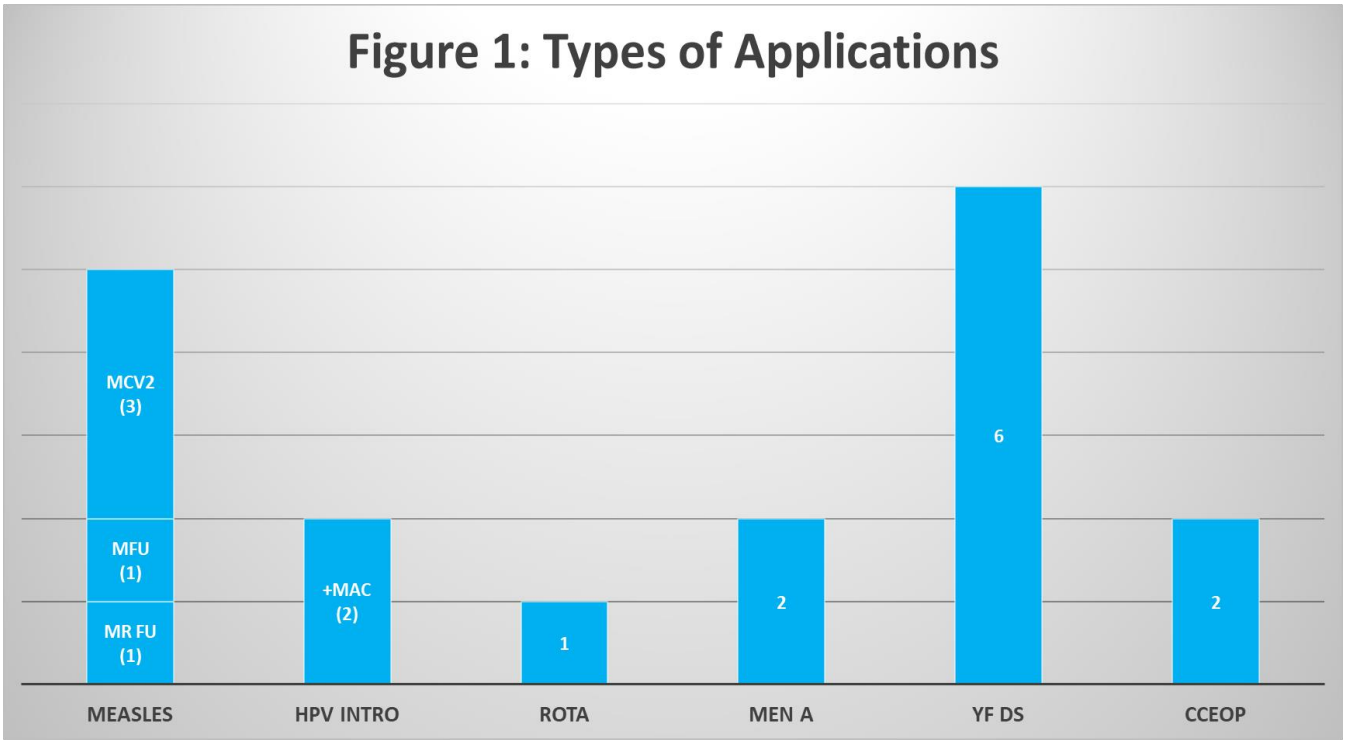
SCM	Supply-chain management
SIA	Supplementary immunization activity
SMS	Short-messaging system
TA	Technical assistance
TB	Tuberculosis
ToRs	Terms of reference
UNFPA	United Nations Fund for Population Activities
VIG	Vaccine introduction grant
WHO	World Health Organization
WUENIC	WHO/UNICEF Estimates of National Immunization Coverage
YF	Yellow fever
YF DS	Yellow fever diagnostics supplies
ZEIR	Zambia Electronic Immunization Registry

1. Executive Summary

The Independent Review Committee (IRC) met in Geneva from 28th October to 7th November 2019, and reviewed 14 applications from 9 Gavi-eligible countries that included 2 remote reviews. Proposals for Yellow Fever Diagnostics Support (YFDS) from 6 countries were also assessed, and recommendations provided. Two applications were for the introduction of Meningococcal A (Men A) vaccine into routine immunization including catch-up campaigns; three were for the introduction of measles second dose (MCV2), and one for a measles follow-up campaign; one was for the introduction of Rotavirus vaccine (Rota); one for a measles-rubella follow-up campaign; two for HPV routine with MAC in year of introduction; and two for CCEOP. Of these, three had been previously reviewed by the IRC and recommended for re-review (Guinea – MCV2 and measles follow-up campaign and Somalia – MCV2 introduction).

This review round was unique in that there were 3 review modalities:

1. Desk review of 12 applications according to the usual IRC practice of assigning 2 reviewers (3 in the case of Vietnam) to independently assess the proposals, and then present their findings in plenary for discussions, decision-making and recommendations.
2. Remote (exceptional) review of 2 post-transition countries; the first, PNG, had Board approved additional funding to be accessed using the usual IRC modalities, and the second, Timor-Leste, had a request for the introduction of Rota that had prior Board approval, so the outcome of the remote review was a “recommendation for funding”.
3. Six countries applied for yellow fever diagnostic support in a newly opened Gavi window of support. Three members of IRC were requested to assess these proposals based on the country applications and laboratory capacity assessments and make recommendations. The findings and recommendations were only shared with the IRC “for information”. There were minimal discussions, and not the entire IRC was involved in the decision-making process.



15 applications were recommended for approval, 1 for funding, and 4 for re-review.

Table 1: Review Outcomes

NVS and CCEOP Applications

Country	Support	Outcome
Benin	MenA (incl. catch-up)	Approval
Burkina Faso	HPV Routine with MAC in year of introduction	**Re-review**
Guinea	MCV2*	Approval
	Measles FU*	Approval
	MenA RI (incl catch-up)	Approval
Guinea Bissau	MCV2	**Re-review**
STP	HPV Routine with MAC in year of introduction	Approval
Somalia	MCV2	**Re-review**
Uganda	CCEOP	Approval
Vietnam	Rota	**Re-review**
	CCEOP	Approval
Zambia	Measles/ Rubella FU	Approval

Remote Reviews (Exceptional)

PNG	HSS Top-Up (Cold Chain)	Approval
Timor-Leste	Rota	Recommended for funding

Yellow Fever Diagnostics Support

Benin, Chad, Ethiopia, Ghana, Guinea, Sudan	Approval

15 IRC members participated in this review round, including 5 new members who underwent an intensive induction training. Areas of expertise included immunization services, measles control, health development, management and evaluation of health services, HSS, HPV, outbreak and emergency response, AEFI surveillance, health policy and planning, primary health care, cold-chain maintenance, epidemiology, and reproductive health. Two members focused on in-depth financial reviews, and three members focused on cold chain and logistics (see Annex for list of IRC members).

The IRC members focused on the following specific tasks during the review period:

- Review of country specific funding requests and supporting documentation for applications (including comprehensive multi-year plans (cMYPs), vaccine introduction plans, and plans of action) for vaccine introductions, campaigns and CCEOP in support of countries' efforts to improve the coverage and equity of immunization.
- Preparation of evaluation reports and recommendations for each country.
- Preparation of a consolidated report of the review, including recommendations for improving funding requests.
- Recommendations to the Board and the Alliance partners on improving processes relating to Gavi policies, governance, and structure.

In conclusion, the IRC noted that:

- Although data quality remains a concern, there is improvement in the availability of data in countries; however, these data are not being optimally used to support development of strategies and plans.
- Budgeting continues to be a challenge, especially proper use of the Gavi budgeting tool and identification and costing of all relevant expenses; focused TA support should contribute towards addressing this.
- There is need to re-emphasize the vital importance of routine immunization strengthening, including through opportunities such as MCV2 introduction.

2. Methods and Processes

Methods

The IRC met in Geneva from 28th October – 7th November, 2019. 15 IRC members participated in this review round, including 5 new members who underwent an intensive induction training on new GAVI strategies, policies and approaches as well as new technical guidance from Alliance partners. The areas of expertise included immunization services, measles control, health development, management and evaluation of health services, HSS, HPV, outbreak and emergency response, AEFI surveillance, health policy and planning, primary health care, cold-chain maintenance, epidemiology, and reproductive health.

The review started with briefings and updates from the Secretariat and Alliance Partners on key topics related to the applications submitted for review, namely, vaccines – HPV, MenA, Rota, measles; policy overview; M&E; and updates for cross-cutters on CCEOP and program financing. A summary of reasons for delayed grant signing and disbursements after IRC approval was also presented and discussed, with recommendations on how best to address the identified challenges.

Prior to arrival in Geneva, IRC members reviewed the applications and supporting documents, and prepared the analyses and draft reports of as many of their assigned countries as possible. This afforded

the opportunity to clarify any points and provide additional documents and/or country information prior to the review in Geneva. Each country proposal was reviewed by 2 members, a first and a second reviewer (3 for Vietnam's CCEOP application); each reviewed the applications and supporting documents independently and prepared individual reports. These reports were presented in daily plenaries, during which the initial findings were extensively discussed, with a final, consensual, outcome decision of approval or re-review. In some instances, the IRC deferred the final decision in order to obtain additional information and clarifications from the country, the SCM and other colleagues in the Secretariat, as well as from technical partners. All decisions were taken collectively with the participation and agreement of members. The first reviewers then consolidated the discussions, decisions and recommendations in draft country reports; these drafts were then finalized after a process of thorough fact and consistency checking, as well as quality review.

Two financial cross-cutters provided support on all matters related to finance, including budgets and financial management and sustainability. The CCEOP/CCL reviews were supported by three cross-cutters.

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2. Remote (exceptional) review of 2 post-transition countries; the first, PNG, had Board approved additional funding to be accessed using the usual IRC modalities, and the second, Timor-Leste, had a request for the introduction of Rota that had prior Board approval, so the outcome of the review was a "recommendation for funding", and reviewers added comments that should help during implementation.
3. Six countries applied for Yellow Fever Diagnostic Support (YFDS) in a newly opened Gavi window of support, and a sub-set of the IRC (three members) were requested to assess these proposals and make recommendations. The findings and recommendations were only shared with the whole IRC "for information". There were minimal discussions and not the entire IRC was involved in the decision-making process.

Table 2: Applications by review modality

Countries	**Application/ Support requested**	**Modality**	**No. of applications**
Guinea	Measles follow-up	Desk review	1
Zambia	Measles-Rubella follow-up SIA	Desk review	1
Somalia; Guinea-Bissau; Guinea	MCV2 introduction	Desk review	3
Burkina Faso; Sao Tome et Principe	HPV vaccine introduction	Desk review	2
Vietnam	Rota vaccine introduction	Desk review	1
Vietnam; Uganda	CCEOP	Desk review	2
Benin; Guinea	MenA vaccine introduction incl. MenA catch up campaign	Desk review	2
Benin; Chad; Ethiopia; Ghana; Guinea; Sudan	YF diagnostics support	Supplementary review	6
Timor-Leste	Rota (exceptional case)	Remote review	1
PNG	HSS Top Up (Cold Chain)	Remote review	1

During this round, three IRC members had to be recused during the review of three countries (Guinea, Guinea Bissau, and Zambia).

Criteria for review

The review of the applications was guided by key considerations which are in line with Gavi mission. These include the justification for the proposed activities; soundness of approach; country readiness; feasibility of plans; system strengthening and sustainability, programmatic and financial sustainability; and public health benefit of the investment. The IRC adhered strictly to these guidelines in a bid to ensure that the integrity and consistency of the transparent funding process is guaranteed.

Decisions

The IRC recommendations were in two decision categories: approval with issues to be addressed in consultation with the Gavi Secretariat and partners; and re-review with resubmission of the revised application to the IRC. However, in the exceptional case of the request from Timor-Leste, this post-transition country had received prior Board approval for the introduction of Rota, so the review outcome was "recommended for funding".

Good Practices

Country-specific good practices noted are listed below:

- Zambia and Vietnam: Use of new technologies such as the Zambia Electronic Immunization Registry (ZEIR) and SMS reminders.
- Sao Tome and Principe: Integration of the ICC and the CCM: oversight of the funding linked to 5 programs: HIV, Malaria, TB, Reproductive Health and EPI.
- Benin: Country prepared "national refusal mapping document" that assisted in the identification of areas for focused IEC, advocacy and social mobilization activities.
- Vietnam: The country adjusted the denominators for coverage to reflect actual population. An electronic data system has also been established.
- Guinea: The country identified areas of joint activities for 3 proposals (MenA introduction including catch-up; MCV2 introduction and measles follow-up SIA) to ensure more effective and efficient implementation through integration.

3. Key Findings and Recommendations

NVS and campaigns

The IRC reviewed applications from 8 countries for NVS support: one for rotavirus vaccine (RV) introduction (Vietnam); three for measles second dose (MCV2) introduction (Guinea, Guinea-Bissau, Somalia); two for MCV follow-up SIAs (Guinea, Zambia); two for HPV introduction, including a multi-age cohort (Burkina Faso, and Sao Tome et Principe); and two for Meningitis A (MenA) introduction with subsequent catch-up campaigns (Benin, Guinea). One RV (Vietnam), two MCV2 (Guinea-Bissau, and Somalia), and one HPV (Burkina-Faso) introduction applications were not recommended for approval. Guinea and Somalia MCV2 introduction applications first reviewed in March 2019 were re-reviewed and while Guinea had improved its proposal based on the IRC feedback, Somalia had not done so sufficiently.

Issue 01: Plan – budget disconnects and challenges of NVS multi-window application.

There is an apparent disconnect between plans and respective budgets, with budgets being dictated more by the Gavi ceiling than by program needs. Of concern, as previously noted by the IRC, is the domination of meeting and training costs, and funding of operational costs that are unlikely to strengthen the system.

The limited impact of classroom-based training was noted in the March 2019 IRC report, yet this item continues to dominate budgets. Another common issue is the inadequate availability of human resources for health, with an unequal geographical distribution a major constraint. In addition, it was noted that some proposals for SIAs planned on using a large number of health workers while providing no evidence that these health workers are actually available in the country, or that they could feasibly be mobilised.

The IRC welcomed the multi-window application from Guinea that plans to conduct a number of joint activities across NVS applications. However, it noted possible challenges and risks that would need to be mitigated by careful planning. This includes avoiding duplication in budgeting of individual NVS applications, ensuring appropriate cold chain preparedness and contingency planning, and managing programmatic risks of multiple vaccines administration (see AEFI section).

Recommendations:

- Alliance partners to support countries developing joint NVS application to develop an integrated budget that optimises joint activities. Gavi to consider policy on how resulting savings can be used to strengthen the routine system.
- Countries and partners to make cold chain assessment mandatory in the case of multi-NVS applications, including the elaboration of a cold chain contingency plan in the cases of multiple SIAs.
- Gavi and partners to request clear justification on number of staff deployed in SIAs, based on national HR evidence, and specific assumptions of duration and staffing level of campaign.

Issue 02: Linking of MenA routine introduction with MenA catch-up campaign with regard to age for routine dose, and calculation of target population for MenA catch-up campaign.

Countries that introduce MenA into the routine immunization schedule, need to provide a catch-up for children aged <1 year at the time of the initial preventive SIA and for those born since. As the time of implementation remains uncertain until vaccine and resources are in country, it is not helpful to define the target population by years of age, as both Benin (9 years) and Guinea (5 years) did. Determining target population by date of birth, i.e., all children born after one year before the initial campaign, would prevent potentially missing up to a cohort or more in one country. The IRC understands that the arithmetic is normally done before decisions on doses and dollars are finalized, but this remains an issue that pre-screening could have resolved. In addition, the timing of the catch-up campaign in relation to the age at routine introduction did not appear to be clear to countries (i.e. if MenA routine dose is introduced at 9 months, the catch-up campaign should be timed 3 months after RI introduction). The priority objective should remain not to miss any child.

There was also debate about the wisdom of the country (Guinea) choice to introduce MenA at 9 months with MCV1 and YF as opposed to pairing it with MCV2. Given the limited progress of MCV2 coverage that most Gavi countries are showing, co-administration of Men A and MCV2 might help enhance MCV2 coverage and facilitate the development of the second year of life platform (2YLP). Such scheduling would also create greater screening and catch-up opportunities for vaccines missed in the first year, including MCV1. Another potential benefit is that the multivalent meningitis vaccine that will likely replace MenA may need to be scheduled in the second year of life. This was not made a consideration for approval as the IRC could not come to a consensus, and the countries had already made their scheduling decisions.

Recommendations:

- Gavi and partners to consider recommendations on scheduling of MenA routine dose to strengthen 2YL platform.
- Countries to ensure that MenA catch-up campaign is adequately timed and that the target population includes all those born after 1 year before the initial preventive wide-age range campaign.

Issue 03: Programmatic challenges and optimizing sustainability of HPV programmes.

In reviewing the two applications as well as reflecting on past applications, the IRC noted that countries are faced with challenges in developing strategies that foster programmatic and financial sustainability of their HPV programmes. In their applications, countries did not always demonstrate a rationale for specific strategies and how they understand and operationalize trade-offs between costs and coverage. This involves choosing between 6 or 12 months' interval between two doses; selection of grade versus age eligibility criteria in school vaccination; choice of delivery through school or health care facilities, or a combination of both; and the degree to which outreach will be used to vaccinate girls and the marginal cost associated with this strategy.

Perhaps the costliest delivery for programmes is 'campaign-mode' rather than routine outreach to every school in their district over the course of the year. Another cost is the search for out-of-school girls, in contrast to encouraging them to come to health facilities. While the former is likely to increase coverage and equity, it is not clear that this is cost-beneficial for the wider programme.

The Secretariat advised the IRC that grade-based vaccination was being challenged in some countries because of the wide age range in some classes. However, that is not an issue if all girls passed through that grade, and the appropriate grade was selected to ensure vaccination before the age of 14 years. The reason for the move from grade-based targeting appears to be driven by the use of age-based coverage indicators.

The PIE for HPV introduction is best done when not part of the multi-age-cohort (MAC), as the latter may cloud findings for the continuing routine service. For financial sustainability, the PIE is best done in the year after the VIG has been spent (year two of the routine programme) for a more pertinent review, even if there is no MAC. This will help assess programmatic and financial sustainability of the HPV vaccination programme.

Recommendations:

- Alliance partners to evaluate different programme aspects in relation to trade-offs between cost, coverage and equity, from existing and planned national evaluations, in order to develop guidance for Gavi policy on HPV introductions.
- Alliance partners to develop simple costing models for countries to evaluate these trade-offs and help countries choose appropriate delivery models.
- Countries should undertake a PIE after the second routine cohort (i.e. the cohort that does not receive Gavi VIG support).

Issue 04: SIA applications did not take advantage of the new Gavi SIA flexibility policy.

The IRC was pleased to be briefed on the Board's decision to provide flexibility for the funding of MCV supplementary immunization activities (SIAs). Unfortunately, neither of the two applicants used this

opportunity to innovate. Interestingly, the two countries are at the opposite ends of measles control, with Zambia having practically eliminated measles though with surveillance and coverage data too poor to be able to demonstrate this. Guinea continues to be at risk of large epidemics because of its persistently low routine coverage. The case for an SIA here is stronger, but remains of questionable value if routine coverage cannot be increased. Each follow-up SIA has less impact unless new communities are reached, and yet, the focus of technical partners appears to remain on conducting non-selective SIAs.

To be effective the SIA must include dynamic realities and not just map the entire population. Translating this approach to the routine immunization system is another requirement for the SIA's legacy. In the case of Zambia, as the country already has begun the development of an electronic immunization registry in some Southern Provinces, this could include noting which children do not have two documented doses of measles vaccine by entering the mobile phone number or other contact details for every child to assure follow-up after the campaign.

The IRC had also discussed the limitations of the WHO tools that countries were using to make decisions on SIAs. The IRC compared the WHO Measles Strategic Planning (MSP) tool results with results obtained using an Excel Model with WUENIC coverage inputs, and standard vaccine effectiveness of 85% at 9 months and 95% from the second year. The comparison found two differences that are key to strategic thinking about measles control.

Figure 2a: Zambia 2020 immunity profile from WHO MSP tool

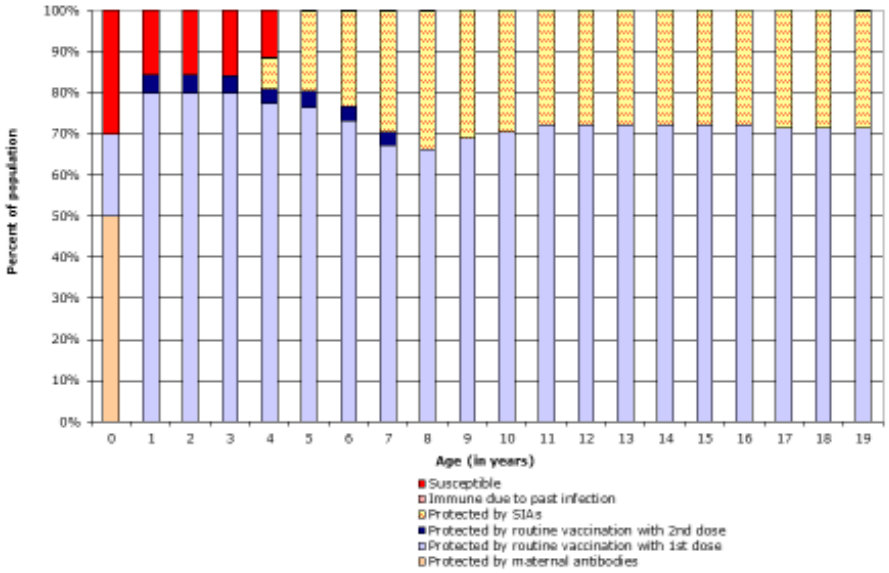
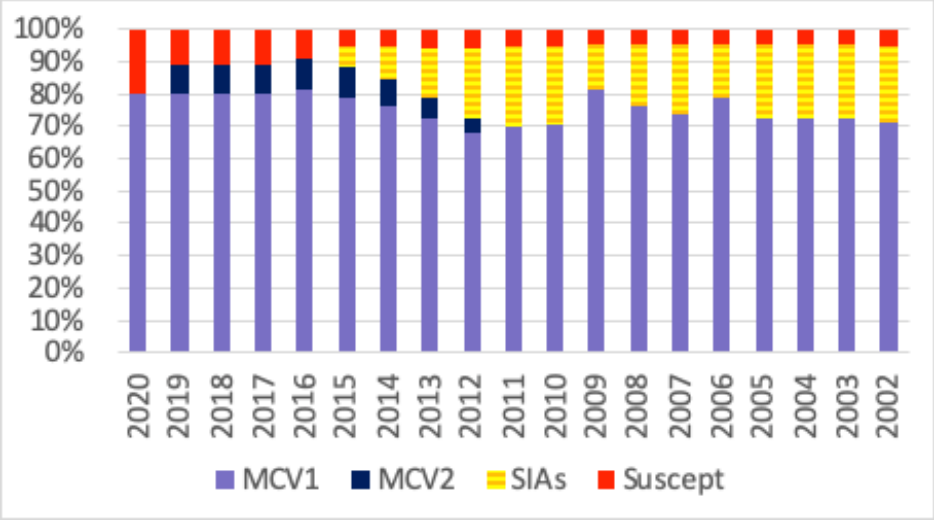


Figure 2b: Immunity profile as calculated from WUENIC data and WHO SIA data



The WHO MSP model underestimated <5-year-old immunity, leading to well over a susceptible birth cohort by 2020. In contrast, the calculations from WUENIC data and WHO SIA data suggest that if MCV1 and MCV2 stay at the current levels of 94% and 66% respectively, it will be 3 to 4 years later that the <5-year population will reach the birth cohort threshold. Of course, local outbreaks are still likely because of existing areas of lower coverage.
The WHO MSP model shows 100% immunity for >5-year-old children, which suggests a persisting gap of just under 5% because of the assumption that all SIA doses are given first to those already immune. Truth is likely to be between the two, but most SIAs will first reach those reached before, leaving an immunity gap.

The difference between the calculations from WUENIC data and WHO SIA data and the WHO MSP model is unlikely to be from coverage rate assumptions (the calculations used WUENIC which is the same as national data) and standard vaccine effectiveness assumptions. No explanation for the differences was forthcoming.

Recognizing that there may be an important immunity gap in children attending primary schools leads to the urgent need to reach them before they leave school. It is more effective and efficient to screen a child population at school or communal gathering than via a house-to-house search. The latter can be an important 'mop-up' for communities that are not reached by other means, but does not appear reasonable as a primary strategy to reach the unvaccinated population. One exception is a census, which remains sorely needed despite multiple SIAs.

Zambia had considered conducting a selective SIA in a district with high MCV2 coverage as a pilot, using a selective SIA as a foundation for establishing a census using the electronic registry "to integrate collection of data on missed children". After consultation with partners this approach was not further developed.

Recommendations

- Gavi and Alliance Partners to commission a review of WHO MSP and alternative modelling tools that can be used to identify and remedy gaps in measles immunity.

- Gavi Secretariat to convene technical partners to develop options for better use of Gavi flexibility in order to fill gaps in measles immunity more efficiently and effectively, given the wide range of situations of Gavi-eligible countries.

Issue 05: Measles second dose: age-eligibility and second year of life platform.
Most countries have traditionally limited the eligibility of vaccinations to infants <12 months of age. With the introduction of the second dose of measles-containing vaccine, the age eligibility needs to be increased and relevant country policies adapted and disseminated accordingly. However, there was limited evidence that the countries that applied for MCV2 introduction had carefully considered these issues, or would formalize the changes in policy and implement the change in practice. As all countries seek to eliminate measles, there should be no upper age limit for receipt of measles vaccine among previously unvaccinated children.

The IRC has noted in several previous reports the potential of school-entry checks and delivery of MCV2 for those children who were previously missed. This requires a policy change in most countries, paired with clear implementation instructions that countries appear reluctant to make.

There was also no description of how reporting of doses of MCV1 given to children >12 months of age ('late doses') would be recorded. Ideally, MCV2 should only be recorded for those who had documentation of having previously received MCV1. In addition, screening and catch-up for other vaccines when attending the second-year visit are not mentioned. Similarly, beyond listing potential priority interventions, there is little description of plans for developing the second year of life (2YL) platform. Countries appear reluctant to separate vitamin A supplementation and deworming from planned Child Immunization Weeks. The IRC noted that countries' expectations on 2YL platform were loose and limited, and not clearly articulated.

Recommendations:
- Alliance Partners to provide specific TA to support expanded age eligibility policy development process, revision of guidelines, standards and other materials, and ensure that this is paired with clear implementation instructions. Support Ministry of Health collaboration with Ministry of Education on school entry check and link with HPV and TTCV boosters, as more immunization is happening in primary schools in countries.
- Gavi and Technical Partners should consider modifying target such as fully immunized child (FIC) at 12 months to FIC at 24 months. FIC at 12 months de-incentivises reporting of vaccines given to children >12 months of age.
- WHO to evaluate 2YL implementation in countries, assessing countries' perceptions and understanding of the 2YL platform, and their concrete operations.

AEFI

Functional AEFI surveillance systems are necessary to timely and efficiently address vaccine safety concerns, thus supporting the confidence and acceptance of national immunization programmes. AEFI surveillance systems can be assessed through the AEFI reporting rate (ratio of AEFI reports per 100 000 surviving infants per year) as a general indicator. A country is considered to have minimal capacity for AEFI surveillance if its AEFI reporting rate is at least 10 per 100,000.

Issue 06: IRC continues to see weak AEFI reporting and no analysis and use of vaccine safety data.
Although the IRC has repeatedly called for increased technical support for AEFI surveillance in countries, progress appears to be very slow. In this review cycle, all nine countries applying for support (Benin, Burkina Faso, Guinea, Guinea-Bissau, Sao Tome and Principe, Somalia, Uganda, Vietnam, Zambia) include 'Strengthening capacity for AEFI surveillance and response' as an objective in their cMYPs, but write about this in an unstructured way. Eight countries report having national AEFI review committees established, which is one of the pharmacovigilance activities included in the minimal capacity model, just as are clear mandates and well-defined structures and roles which are described by only one country. Looking at the minimal capacity indicator, only three countries have AEFI reporting rate above 10/100 000 surviving infants per year. Some countries state that they monitor AEFI only in mass campaigns and some state that they do not have 'systematic monitoring of AEFI'. However, none of the countries analyse or use their findings/data (Figure 3).

In spite of investments made so far and WHO strategy developed in 2011 with the goal to assist the countries 'to have at least minimal capacity for vaccine safety activities', strengthening of AEFI reporting and surveillance remains slow and a technically under-resourced global initiative. Not analysing and using the data may be considered as a missed opportunity to maximize value for money.

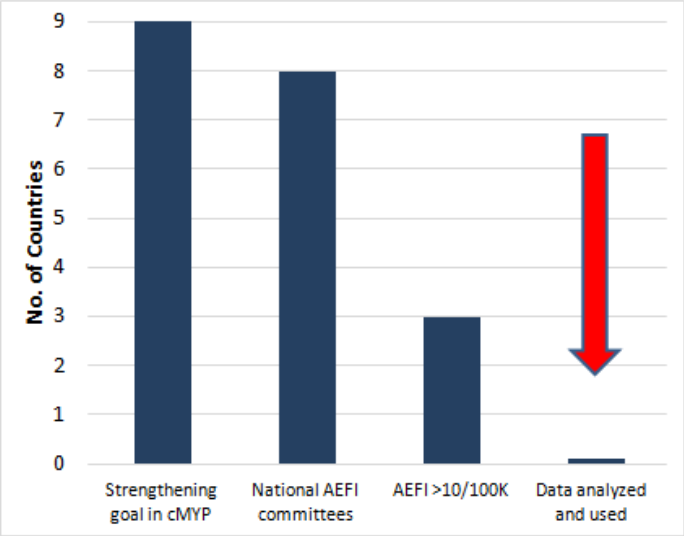


Figure 3: Information on AEFI surveillance systems obtained from countries' cMYPs

Recommendation:
As countries apply and obtain funds to strengthen capacity for AEFI surveillance and response through various support requests, Gavi should consider including in the Joint Appraisal a section on reporting, analysis and use of AEFI data, as well as on any emerging rumours or allegations with a potential to disrupt the national immunization programme. The AEFI reporting rate is useful for assessing trends over time, but it does not provide information on the quality of the reporting system or the actual capacity to deal with vaccine safety issues. As additional efforts are needed to provide meaningful support to enhance the AEFI surveillance to meet minimal standards, Gavi may consider providing such support along with requesting countries to report on performance.

Issue 07: Co-administration of MCV and MenA vaccine

Two countries in this review cycle applied for MenA vaccine introduction in the routine programme and a catch-up campaign after a wide age-range preventive campaign that was conducted in the past. One country plans to introduce MenA vaccine at 9 months of age and co-administer it with the MCV, and the other country plans the MenA vaccine introduction at 9 months of age and co-administration with MCV and YF vaccines. While countries discuss forecasting, supply needs and cold-chain capacity in their introduction plans, less attention is given to organization of the session so that such integrated delivery, which would include administration of two or three vaccines in one sitting, would be adequate. Countries do not recognize and/or describe possible programmatic challenges that may result in a safety problem. Specifically, MenA, MCV and YF vaccines need to be reconstituted with their respective supplied diluent. Interchanging of these diluents, which may be a result of inadequate storing practices or inadequate time assigned for these interventions, should be strictly avoided. MenA vaccine diluent contains thiomersal as a preservative which would inactivate live vaccines such as MCV and YF. Therefore, mistakenly using Men A diluent to reconstitute MCV or YF vaccine would result in ineffective vaccines, and the lack of efficacy ultimately is a vaccine safety issue.

Recommendation:

When planning co-administration of MenA vaccine with other live vaccines, countries should consider how best to ensure use of correct diluent in their plans for training and supervision. Adequate in-field training and post-training support (i.e. job aids) should be provided as well as supportive supervision to ensure correct diluents are used for reconstitution of each vaccine.

Data Quality and Use

Issue 08: Use of inaccurate or outdated population data compromises planning.

Several countries in this round of the IRC reported vaccine coverage >100% and acknowledged that population data for determining targets (and related funding requests) was based on outdated or inaccurate census data. This is an ongoing challenge that can result in under- or over-estimation of target groups and coverage rates. While there are political difficulties in adjusting national population figures, it is critical that local planning should reflect what is known from existing administrative data or enumeration exercises. Vietnam noted in their application that they made such adjustments at the local level.

Recommendation:

For planning of subnational activities, countries should adjust target to reflect actual numbers enumerated in micro-planning. In their applications, countries reporting coverage >100% should include mention of how they will adjust target levels and vaccine requirement estimates to adjust for the inaccurate denominator data.

Issue 09: EPI information systems are still not integrated into DHIS2.

While progress is being made in some countries, none of the countries in the current IRC round had fully merged into the District Health Information Software 2 (DHIS2). This greatly limits the ability of EPI data to be sustainably collected and related to other health system data.

Recommendation:

Countries should be encouraged to accelerate integration into DHIS2 and to learn from the experience of early adopters. Designers of DHIS2 systems have generally indicated their willingness to adapt the system to incorporate essential EPI indicators.

Issue 10: Lack of appropriate indicators or indicators not linked to the objectives of applications.
Many of the applications in this round did not name any specific indicators (other than those prefilled in the GPF), so it is not clear how countries plan to monitor or evaluate their program activities and outcomes. On the other hand, one application listed a whole array of output and outcome indicators but with no information on where the data would come from, who would collect it, or how it would be used.

Recommendation
Secretariat prescreening of applications should include checks to ensure that countries include appropriate indicators in application and, if needed, technical partners should be asked to provide more support into the development of key indicators that are tied to critical objectives in the proposal.

CCEOP and Supply Chain Logistics

The IRC reviewed 2 CCEOP applications (Uganda and Vietnam) and one application for additional HSS funds for the provision of cold chain equipment (PNG). All 3 applications have been recommended for approval.

The second CCEOP of the countries and additional HSS funds applications were complementary to the preliminary requests for support to the platform. The documents provided (e.g., inventories, cold chain rehabilitation plan) were however not updated to take into account any changes since the previous CCEOP request. The second CCEOP requests in this IRC round could not meet the totality of estimated future CCE needs in the country.

Thanks to Gavi support, these countries will benefit from a high-performance cold chain. However, the cold chain management potentials, in particular the cold chain monitoring system, are not used optimally. Usage of data could improve the supply chain by preventing stock-outs, and strengthening predictive maintenance.

Some countries mentioned the risk of insufficient funding for cold chain equipment maintenance operations due to the decentralization process. The central level has limited capacity to ensure that this funding will be available. The sub-national level must therefore ensure effective advocacy based on rigorous planning to ensure that these funds are mobilized on time at the regional or district level.

One of the requirements for the CCEOP and NVS is a recent update on the status of the EVM improvement plan (IP). Countries report progress on the implementation of EVM IP activities. Among reasons for delays in implementing activities are the lack of funding and the lack of leadership and management. Progress in IP implementation seems poorer at subnational and health service levels.

The IRC reviewed the CCL aspects of NVI and SIA applications of 7 countries. It was noted that vaccine storage capacity assessment in relationship to NVI remain insufficient despite some positive examples. In 2 countries (Guinea Bissau, Burkina Faso), these analyses were recently conducted on the occasion of the EVM assessment which provided a comprehensive, updated vaccine storage capacity analysis. In another case, the country submitted data that did not demonstrate adequate storage capacity or measures to ensure timely availability of storage capacity despite identified gaps. In other cases, countries simply state that capacity is sufficient without supporting these statements with evidence and data. Finally, countries considering the introduction of HPV vaccines did not present any analysis of the logistical feasibility or

adequacy of the cold chain. This is probably due to a lack of guidelines and the absence of a section covering these aspects in the application form and in the implementation plan template.

Issue 11: Leadership and management
Lack of leadership and management capacity of supply chain (SC) managers jeopardizes the use of the full potential of performing CCE and temperature monitoring devices, the use of data for planning and EVM IP implementation to ensure efficient supply chain. It also puts at risk SC and cold chain maintenance operation at subnational level due to insufficient decentralized funding.

Supply chain staff and cold chain managers should be equipped with skills to conduct evidence-based planning, business analytics for predictive SC, advocacy for resource mobilization and support to other levels.

Recommendations:

- Gavi and Alliance Partners to consider increasing efforts to empower supply chain and cold chain managers to conduct evidence-based planning, business analytics for predictive Supply Chain, advocacy for resource mobilization and support to other levels.
- Gavi and Alliance Partners to give special consideration for strengthening HR capacity at the region/district level which transforms strategy into local operation.

Issue 12: Updated planning.
Countries usually develop a cold chain rehabilitation plan to comply with Gavi requirements for CCEOP application. Countries also develop an improvement plan following the EVM assessment. Unlike the improvement plan, the implementation status of the rehabilitation plan is not regularly updated. Both plans are static and not regularly updated; they do not reflect the changing status and needs of the supply chain and cold chain.

Recommendations:

- Gavi partners to consider cold-chain (CC) rehabilitation plans and EVM implementation plans as living documents to be used by countries for guiding operations, monitoring progress, identifying emerging and evolving needs and guiding requests.
- Gavi Secretariat to require countries to provide updated status of the CC rehabilitation plan based on an updated and data supported inventory. This will provide countries and IRC with a better view on the country readiness for vaccine introduction and supplementary activities, in addition to the IP implementation status.

Coverage and Equity

Issue 13: High-coverage countries are beginning to focus more attention on special groups or areas identified in equity analyses, but specific strategies are not well identified.
While many countries are still trying to raise their overall coverage rates, some countries that have already achieved high coverage are starting to focus their attention on low-performing districts or special populations that are traditionally underserved. For example, Vietnam is proposing to start their phased introduction of rotavirus vaccine in remote mountainous areas and hard-to-reach populations like ethnic minorities. This will probably create extra challenges, but these groups may also be particularly vulnerable to diarrheal disease and therefore may benefit more from the vaccine. However, there was no specific information in the application about how delivery strategies might need to be adapted to better reach

these groups. Similarly, both Sao Tome and Principe and Zambia mentioned that they would use more intensive outreach efforts to reach identified low-coverage districts, but without specifying what those efforts would entail.

Recommendation:
Countries that are focusing on special populations that are traditionally inequitably served should consider linking Gavi new vaccine support to other sources of funding (including other Gavi funding) that have selective population focuses, like urban slums, refugees, and mobile populations to create productive synergies.

Issue 14: Countries did not demonstrate clear linkages between the inequity issues identified and particular strategies (or budgets) for reaching the underserved groups.
Among countries that submitted proposals, 7 (Benin, Guinea, Guinea-Bissau, Sao Tome and Principe, Somalia, Vietnam and Zambia) have provided equity analysis gaps by socio-economic and geographical characteristics based on recent available data from DHS, equity analysis reports, or MICs. Overall, low vaccination coverage is mostly among nomads, refugees, internally displaced populations, urban slums, and populations living in inaccessible areas. Despite this availability of detailed data, countries did not include any particular strategies and budgets for reaching these groups.

Recommendations:

- Countries to improve their use of information from equity analyses to guide delivery strategies and budgets. Information should be used, for example, to tailor communication strategies and the balance of fixed versus outreach approaches, as well as to allocate resources. Countries should also consider integrated service packages, particularly for remote or refugee populations, which may be more effective than single interventions for unreached groups.
- Countries and technical partners to evaluate how specifically conducted equity analyses are being used by countries to prioritize interventions and develop strategies, and if not, why not. Also, technical partners should evaluate methodologies used to support equity analyses and make recommendations on best practices.

Budget and Financial Sustainability

Budget issues were prominent in all applications. They included issues related to observance of budget guidelines, the correct use of the budget template, as well as issues related to unit prices, activity scale, duplication, double-accounting and funding sources.

Issue 15: Budget guidelines and budget template
Many countries still face difficulty following the Gavi budget guidelines as well as using the budget template. This difficulty is manifested as follows:

- Major discrepancies between requested budgets in the applications and/or the plans of action, and calculated budgets in the budget template were noted for most applications. There were also discrepancies between budget ceilings and budgeted amounts, leading to over-budgeting in some cases and to under-budgeting in others.
- Categorization of inputs and activities was often not done properly, resulting in unusable summary tables. To make sense of proposed budgets, the reviewers often had to categorize activities and build new budget summary tables.
- Budget calculations assumptions were seldom provided, making it difficult for the reviewers to better evaluate the programmatic rationale of proposed activities and budgets. Lump sum

allocations to activities without detailed specification of activity inputs, unit prices and quantities were identified in many applications. For instance, the applications of Burkina Faso, Guinea-Bissau, Sao Tome & Principe, Zambia and Vietnam were marked by inclusion of lump sums taken as unit costs, with little assumption details.

- The guidance on the categorization of per diem allowances is still not clear. As a result, countries tend to classify DSA under HR cost category, which therefore inflates HR cost beyond the acceptable 20%-30% range set in the Gavi guidelines.
- A newly emerging issue is the manipulation of the budget template. In two different instances, there was a clear violation of the template mechanics. Viet Nam's Rotavirus VIG included direct force-spreading of the government's contribution of US$548,000 along budget lines even though the amount had not been part of the detailed calculation and distribution in the body of the template. The highlighted "budget exceptions" were ignored.

Recommendations:

- Gavi should consider supporting building country capacity in budget preparation.
- Gavi should further clarify the policy on per-diems and its classification in the budget template.
- Gavi should consider pre-screening of all budget submissions in all applications, regardless of the amount requested.

Issue 16: Unit prices, activity scale and budgets

Unit prices tend to be inflated. For example, the unit price for printing a vaccination card varies from US$0.10 in one application to US$5 in another. Similarly, the cost of printing a banner varies from US$15 to US$65 between applications, and the unit price of buying a freezer can be as much as US$500. Although they tend to be inflated, unit costs are not the major drivers of budgets. The budgetary impact of the unit volumes related to the scale of activities appears to be significantly larger on budgets than that of unit prices. In addition, the programmatic rationale for proposed activity scales is often not provided or not valid. For example, in one application it is stated that to conduct a measles campaign, 6,967 vaccinators along with about 9,000 support staff would be recruited or would be paid incentives at a cost of US$675,924. Considering this number of vaccinators, the size of the target population and the number of vaccination days, we calculated that each vaccinator would administer only about 45 doses per day, which is significantly below a recommended vaccinator norm for fixed and/or mobile post. In other words, it is possible to significantly reduce the number of vaccinators and the number of support staff and still achieve the same results at lower costs.

In addition, some cost categories generally earmarked large shares of budgets. This is the case of supplies (59% of the total budget in one case), human resources costs (47% of the total budget in another case) and per diems with varying proportions in the applications. As expected, the share of human resources costs and per diems are significantly higher for campaigns than for routine immunization.

It was also noticed that calculated budgets tend to prioritize activities differently than action plans, placing a different emphasis on activities through budget allocations. More generally, it was noticed that there were frequent disconnects between budgets and strategic documents including action plans. In one extreme case, budgeted activities did not match action plan activities.

Recommendations:

- Gavi and Alliance Partners to facilitate the creation of a database on unit prices for different regions (West Africa, East Africa, Asia) showing reasonable price ranges.
- Ensure greater involvement of Gavi Alliance partners at country level in budget preparation.

Issue 17: Double accounting, duplication and funding sources

Double accounting of the same activities and budgets was found in some applications, particularly in those with more than one budget. In one case, a total of US$730,523 was accounted twice for a set of the same activities.

Significant duplication of activities and budgets was found in applications with two or more budgets. Such duplication results from planning and budgeting similar activities separately in each budget. For example, training of health workers is included in each budget of different interventions (e.g. MCV2 and MenA introduction into routine) which are taking place around the same time and involve the same health workers. In one specific case, we calculated savings of about US$900,000 could be achieved by integrating similar activities across four different interventions and associated budgets.

Funding sources raise a different set of issues in the reviewed applications. Frequent discrepancies in funding sources between narratives of applications and their budgets are noted. In general, applications tend to show different funding sources, while budgets tend to show only Gavi contributions, and ignore government and other donor contributions. This raises the risk that the same activities are potentially charged to different funding sources at the same time. In one specific case where government, Gavi and other donor contributions were all accounted for in the calculated budget, it was noticed that the same activities were charged to Gavi in one budget and to UNICEF in another budget. These findings emphasize the need for a greater Alliance partners' involvement in budget preparation at country level.

Recommendation:

- Gavi to consider enforcing the requirement for countries to name all funding sources and committed amounts in applications and budget templates.

Governance

All 11 applicant countries had an established ICC, though in Timor-Leste the EPI working groups act as the ICC. In addition to Timor-Leste, three other countries did not provide ICC ToRs, namely PNG and Uganda, submitting CCEOP proposals, and Burkina Faso (HPV). In two countries, the ICC is integrated in a larger coordinating body addressing broader health issues (in Zambia, all reproductive, MCH and nutrition activities and in Sao Tomé and Principe, all Global Fund, Gavi and UNFPA support). In all countries submitting ICC ToRs, membership included representation from NGOs and CSOs, though in Zambia the inclusion of non-governmental representatives is a recent addition.

9 out of 11 countries submitted the minutes of the meeting for the review and endorsement of their Gavi applications. Somalia did not present an updated endorsement by the ICC as it was a resubmission within 6 months of the previous application. Guinea MCV2 introduction and M follow-up application was also a re-submission, but more recent ICC minutes were presented reporting discussion of the previous IRC report and endorsement of the new application. The ICC's regular functionality was demonstrated in eight countries that provided minutes of previous ICC meetings, though in three cases they only referred to endorsement of previous Gavi applications.

Only six countries reported having established a NITAG (Benin, Burkina Faso, Guinea, Timor-Leste, Vietnam and Zambia) with ToRs submitted from one of them (Zambia). In addition, Sao Tomé and Principe has made a proposal to the CCM (ICC) to establish a NITAG. The IRC noted that NITAG seems to be more involved in the Gavi application process as meeting minutes and recommendations were submitted by six countries (Benin, Burkina Faso, Guinea, Timor-Leste, Vietnam (dated 2015) and Zambia). Among the three

countries submitting CCEOP proposals, one (Uganda) has formally established and submitted the ToRs of the Immunisation Supply Chain Management Committee, while Vietnam reported plans for formally establishing a National Logistics Working Group (NLWG).

Issue 18: Need for ICC endorsement of re-submitted applications in order to improve re-review outcome.
The IRC noted in previous reports that allowing countries to re-submit an application within 6 months without a new review and endorsement by the ICC may lead to an inadequate quality of resubmitted application and unfavourable review outcome due to lack of partners' engagement and ICC oversight on how well the revised proposal addresses the IRC comments. This was clearly noted in two countries that were re-reviewed; the application of one country was still not considered satisfactory by the IRC, whilst in the case of the other country, it was clear from the minutes that the ICC reviewed both the comments of the IRC on the previous application and the program responses to the issues raised before endorsing the revised proposal, which led to a positive review outcome.

Recommendation:
Gavi should consider modifying the application policy and guidelines to request countries ICCs to review and endorse all the applications before re-submission, regardless of the time frame from the initial submission.

Technical Assistance

Issue 19: The IRC has previously noted both improvements and challenges with the TA provided to countries for developing proposals.
Again, in this round, there was a contrast between countries clearly benefitting from high quality TA in developing their applications and others where apparently TA quality was poor or inadequately utilized. For example, one country re-submission failed to respond adequately to most action points identified by the previous IRC review, despite substantial TA being present in the country. Another country did not modify correctly the timing of vaccine introduction and campaign plans according to WHO guidelines even after the issue was raised by the Secretariat pre-screening. In several applications, the countries failed to use TA to inform planning based on available country data, especially in developing tailored activities to address identified barriers to equity and coverage in specific population groups.

The IRC also noted again in many applications a disconnect between good, comprehensive introduction or campaign plans and budget allocations that often seemed unrelated to the plan. The disconnect appeared to result from different people writing the plan and developing the budget and not working as a team. Combined with poorly developed budget templates, these were often weak components in otherwise well-developed applications.

Recommendations:
- Gavi to systematically collect data on the application development process and the contribution of both national and international TA.
- Gavi to explore the greater use of local TA (institutions and individuals) that would be more cost-effective, be better in tune with the local context, develop local capacities, and promote local solutions.
- Gavi to support training of national staff on the use of Gavi budget template and specific TA on budgeting (local recruited).

Yellow Fever Diagnostics Support

The IRC commends Gavi for establishing this new window of support for 26 African countries at risk of Yellow Fever (YF) epidemics. There is clearly a need for better diagnostics, for both antibody (IgM), Enzyme Immunoasssay (ELISA) and nucleic acid testing using polymerase chain reaction (PCR). Both tests are needed, as the PCR test may no longer be positive if specimens are collected more than 10 days after the onset of symptoms, while IgM takes a few days to turn positive but will remain positive for longer.

The new Gavi support provides for reagents, testing equipment, bio-safety cabinets and personal protective equipment. The support for PCR kits and testing equipment awaits the validation of an appropriate test that is expected in the relatively near future. In addition to these supports, Gavi is also providing support to strengthen the YF laboratory network and to support and fund the shipment of samples from national laboratories to the regional reference laboratory (RRL).

Three IRC members reviewed proposals from 6 countries, based on the country applications and laboratory capacity assessments (LCA) from 2018. The reviewers were asked to approve the volume of supplies and type of equipment proposed by the Secretariat based on the country applications. All six applications were recommended for approval. Specific suggestions were also made for each country to help improve performance. The overall IRC did not review the recommendations but was provided the results of the review and discussed this new support.

Issues 20: Delayed collection of samples and late shipments

For most countries, the majority of specimens were collected within 10 days of symptom onset, suggesting the potential to use PCR testing alone – once this becomes available. As the purpose of the testing is early detection of outbreaks, rather than for clinical management, early testing is more important than perfect testing.

However, there was often a long delay between sample collection and shipment due to lack of funding and the process for getting the sample from the field to the laboratory was often not clear. The reviewers noted the low positivity rate identified in all laboratories, which likely reflects low YF incidence, but could also relate to the time-temperature loss and eventual loss of text effectiveness from the delays in shipment and inadequate storage. Of note, some laboratories did not have working cold chain.

There was little or no relation between the cases in the WHO database for these six countries and the number of positive samples detected by the national laboratory and confirmed by the RRL. Confirmatory testing is important because false positives can arise from other infections or recent vaccination. For at least one country lack of funds for international shipment prevented confirmatory testing at the RRL.
Most countries did not have in place long-term sustainable financing for YF specimen testing, maintenance contracts for the laboratory and no dedicated resources for transportation of specimens.

Recommendations:

- Once the Alliance supports procurement of a PCR test, it would be ideal if this was a multiplex testing that would also increase surveillance of typhoid, hepatitis, and other viral haemorrhagic fevers of interest to Gavi, as well as other diseases of local importance.
- While the immediate priority is to enhance laboratory performance, the Alliance should also address the need to ensure that there are appropriate procedures for when and whom to test, and to ensure rapid shipment of samples to the laboratory.

- Countries need to develop long-term sustainability financing for their national YF laboratory. The sustainability plan needs to be part of the application, should indicate specific funding source and should budget for maintenance of equipment, specimen transportation and essential training for the laboratory technical staff.
- Applications for support should indicate how the country will address the constraints identified by the LCA, that will not be covered by the Gavi support.

4. Conclusions

Many of the key issues noted during this review round have been identified in previous reviews, and the IRC is pleased to note that the Gavi Secretariat and Alliance Partners continue efforts to address them. There is definitely need to continue strengthening country capacity to improve the quality of applications, as well the subsequent implementation of planned activities.

Budgeting continues to be a major challenge as evidenced by the poor quality of many budgets, and the disconnect with the plans. Whilst Gavi continues support to countries to improve this situation, consideration should also be given to the pre-screening of all budget submissions in all applications, regardless of the amount requested. There are numerous instances where the budgets were not properly prepared. For example, one country presented a joint NVS application, but with separate budgets, resulting in a significant duplication of resources. Alliance partners should support countries developing joint NVS applications with integrated budgets that optimise joint activities. Integrated planning and budgeting should also be encouraged for countries that are focusing on special populations that are traditionally inequitably served by linking Gavi new vaccine support to other sources of funding (including other Gavi funding) that have selective population focuses, like urban slums, refugees, or mobile populations, to create productive synergies.

Data quality and use underlies effective planning, and countries need to improve their use of information from equity analyses and other studies to guide development of delivery strategies, budgeting and reporting. In effect, although the availability of data is improving, it does not always inform strategy development and timely reporting. Gavi and in-country partners should continue supporting countries to use available data optimally, for strategic planning as well as for reporting, especially on key issues like:

- Translation of situational analyses to tailored strategies and innovative interventions, e.g., for control of measles, to maximize Gavi flexibility policy.
- Reporting on AEFI surveillance performance; countries should be encouraged to consider it an essential part of the immunization program.
- Adjustment of targets to reflect actual numbers enumerated in micro-planning during planning of subnational activities. In their applications, countries reporting coverage >100% should include mention of how they will adjust target levels and vaccine requirement estimates to adjust for the inaccurate denominator data.

The IRC commends Gavi for establishing the Yellow Fever Diagnostics Support window for 26 African countries at risk of Yellow Fever epidemics. There is clear justification for this, especially in view of the challenges associated with Global Health Security and the focus on prevention, early diagnosis and response. These countries have very weak laboratories, and the 2018 Laboratory Capacity Assessments (LCA) clearly identified numerous deficiencies, many of which cannot be addressed by Gavi support alone. The IRC recommends that applications for support should indicate how the country will address the other constraints identified by the LCA. Countries also need to develop long-term sustainability plans for their national YF laboratories; this needs to be part of the application and should indicate budget and source

of funding for key activities like maintenance of equipment, specimen transportation and essential training for the laboratory technical staff.

5. Acknowledgements

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Annex A: List of IRC Members

NAME	NATIONALITY	PROFESSION/ SPECIALIZATION	GENDER	FRENCH	EXPERTISE
***BARRY**, Pathé	Guinea	Independent Consultant	M	FR	HSS, National Health Strategies, Health Policy, Primary Health Care
CARIC, Aleksandra	Croatia	Independent Consultant	F	FR	Measles, Mass vaccination campaigns, AEFI, Program Management
***COSTA,** Celestino	Guinea-Bissau	Independent Consultant	M	FR	Cold Chain, Immunization, HSS, Emergency Responses, Primary Health Care
HERSH, Bradley	USA	Independent Consultant	M	FR	Health Policy, Immunization/ NVS, Outbreaks, Campaigns, Measles and Rubella Control
JAILLARD, Philippe	France	Program Leader, EpiLinks	M	FR	Immunization Systems; Supply Chain and Logistics
KAMARA, Clifford (*Chair*)	Sierra Leone	Independent Consultant	M		Health Development, Health Systems Strengthening, Program Management
KARZON, Toagoe	Liberia	Financial Controller, Redemption Hospital, Liberia	M		Project Funding, Financial Reporting and Budget Control, Audits
LAZZARI, Stefano	Italy	Independent Consultant	M	FR	Outbreak, epidemic and Emergency Response, HSS, Monitoring and Evaluation, Grant Management
MANSOOR, Osman	New Zealand	Public Health Physician	M	FR	Measles, Immunization Programs, Epidemiology and Monitoring, Supply Chain and Logistics
***McKEOWN**, Scott	USA	Independent Consultant	M	FR	Epidemiology, Information Systems, Health Service Delivery, Immunization including Campaigns, Cold Chain Maintenance
MOUNIER-JACK, Sandra (*Vice Chair*)	France, UK	Associate Professor, LSHTM	F	FR	HPV, Measles, Immunization Programs, HSS, Health Policy and Health Financing
NKOWANE, Benjamin	Zambia	Independent Consultant	M		Measles, Epidemiology, Mass Vaccination Campaigns, Technical Support for Field Operations in Risk Areas
STASSEN, Mario	Netherlands	Independent Consultant	M		Supply Chain and Logistics
***TIBOUTI,** Abdelmajid	Morocco, Canada	Independent Consultant	M	FR	Financial and Budget analysis, Health Economics, Health Financing Strategies, Program M&E
***TSU**, Vivien	USA	Clinical Professor, University of Washington, Seattle	F		Epidemiology, New Public Health Interventions, Women's Reproductive Health, HPV, JE

*New Members