International Coordinating Group on vaccine provision for yellow fever

Report of the annual meeting

23 September 2021
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## Abbreviations and acronyms

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<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>EYE</td>
<td>Eliminate Yellow Fever Epidemics</td>
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<tr>
<td>Gavi</td>
<td>Gavi, the Vaccine Alliance</td>
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<td>ICG</td>
<td>International Coordinating Group</td>
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<tr>
<td>IFRC</td>
<td>International Federation of Red Cross and Red Crescent Societies</td>
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<td>MSF</td>
<td>Médecins Sans Frontières</td>
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<tr>
<td>SD</td>
<td>Supply Division (of UNICEF)</td>
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<tr>
<td>UNICEF</td>
<td>United Nations Children’s Fund</td>
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<tr>
<td>WHO</td>
<td>World Health Organization</td>
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<td>YF</td>
<td>Yellow fever</td>
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1. Introduction

The International Coordinating Group (ICG) on vaccine provision was established in 1997 to respond to high-impact epidemic-prone diseases after a large epidemic of meningococcal meningitis in West Africa. The ICG stockpile of yellow fever (YF) vaccine was established in 2001 after a major YF outbreak in Guinea, during which there was a severe shortage of YF vaccine. Since then, vaccine stockpiles have been established for cholera (2013) and, most recently, Ebola virus disease (2021).

The four founding agencies of the ICG are the International Federation of Red Cross and Red Crescent Societies (IFRC), Médecins Sans Frontières (MSF), the United Nations Children’s Fund (UNICEF) and WHO. The ICG consults many partners, including technical experts and vaccine suppliers. Gavi, the Vaccine Alliance, is the principal funder of the YF vaccine stockpile. In performing its mandate, the ICG pursues its guiding principles of ensuring equitable, timely access to essential vaccines while maintaining its independence of decision-making based on objective assessment of scientific evidence.

The Eliminate Yellow Fever Epidemics (EYE) strategy is a comprehensive strategy for eliminating YF epidemics by 2026. One of its areas of work is annual allocation of doses to preventive campaigns in countries at high risk of YF outbreaks. It also supports other activities, including strengthening surveillance and laboratory capacity and promoting routine vaccination of children against YF.

The objectives of the ICG are to:

- allocate vaccine equitably by careful, objective assessment of risk based on epidemiological and operational criteria;
- deliver vaccines rapidly in response to infectious disease outbreaks;
- coordinate deployment of limited quantities of vaccines and other essential medicines;
- minimize wastage of vaccines and other supplies;
- advocate for readily available, low-cost vaccines and medicines;
- work with manufacturers through UNICEF and WHO to guarantee the availability of emergency stock supplies of vaccine; and
- follow standard operating procedures and establish financial mechanisms to purchase emergency vaccine supplies and ensure the sustainability of stocks.

The 2021 annual meeting of the ICG on provision of YF vaccines was held remotely on 23 September 2021. The participants included representatives of WHO Headquarters, including the ICG Secretariat, UNICEF, with participants both from headquarters and the Supply Division (SD), MSF, IFRC and Gavi. Representatives of vaccine manufacturers were also in attendance.

The objectives of the meeting were to:

- review the epidemiological situation of YF in 2020–2021;
- review the outbreaks and campaigns supported by ICG during 2020–2021;
- discuss YF vaccine demand in 2020–2021 and supply forecasts;
- discuss manufacturers’ production plans and future vaccine developments; and
- decide on the size of the YF stockpile for 2022.
2. Epidemiological update 2020–2021

Globally, the epidemiology of YF in 2020 was marked by widespread outbreaks on the African continent and particularly by re-emergence of YF outbreaks in West Africa in late 2020. The intensity of YF transmission on the continent decreased in the first six months of 2021, during which no major outbreaks were reported.

Between January and March 2020, YF outbreaks occurred in Ethiopia, South Sudan and Uganda, which conducted reactive vaccination campaigns after emergency vaccine requests to the ICG. Major outbreaks were notified in Guinea, Nigeria and Senegal in quick succession in the fourth quarter of 2020. In addition, between October 2020 and September 2021, several countries reported YF transmission with outbreak potential; these included Burkina Faso, Cameroon, Central African Republic, the Democratic Republic of the Congo and Mali, with a series of isolated cases reported in Côte d’Ivoire and Niger.

In Nigeria, there has been a resurgence of YF transmission since 2017. To address this high risk, the country has conducted large-scale, phased preventive mass vaccination campaigns in 22 of the country’s 37 states, with the intention of completing nationwide campaigns by 2024. YF outbreaks were documented in six states (Bauchi, Benue, Borno, Delta, Ebonyi and Enugu) during 2020. The response was based on planned state-wide preventive mass vaccination campaigns in Bauchi, Benue, Borno and Delta. To support the response in Ebonyi and Enugu, an emergency request was submitted to the ICG, and the request was approved to cover affected areas in selected local government areas. Between January and August 2021, at least 19 cases were reported among unvaccinated people, most in states in which there had been recent vaccination campaigns. The risk of onward transmission to Lagos and of potential urban YF outbreaks remains a concern.

Guinea and Senegal reported outbreaks in late 2020, showing possible intensification of YF virus transmission in West African countries with a relatively recent history of large-scale preventive campaigns. The gains from the past campaigns were not sustained in these instances because of disruptions to their health systems, such as outbreaks of Ebola virus disease, the global COVID-19 pandemic and movement of populations. Between December 2020 and August 2021, Cameroon reported the largest number of YF cases since 2010, which were widely distributed in six regions of the country. The relatively low rate of vaccination (< 60% in 2020) and the movement of populations both within Cameroon and across its borders, which may have diluted population immunity, increase the risk of outbreak transmission and amplification. The complex security situation in some regions further complicates investigation and response.

While preventive mass vaccination campaigns are under way or planned in all high-risk countries on the African continent, significant and growing gaps in immunity remain. These are due to low routine vaccination coverage in countries that had previously conducted mass vaccination campaigns, potential increases in transmission among mobile populations (e.g., migrant workers, pastoralists, nomads) and introduction of YF into urban areas, where the disease can amplify rapidly and spread internationally.

Requests and vaccination campaigns, 2020–2021

Meeting participants noted that a total of 26 million doses of YF vaccines have been supplied to respond to outbreak emergencies over the past five years (2017–2021). Table 1 summarizes the requests for YF vaccines made to the ICG during the period October 2020–September 2021, when the ICG received three emergency requests for YF vaccine from three countries for a total of 5,115,375 vaccine doses. All three vaccine requests were approved, of which two, from Guinea and Nigeria were fully approved. The request from Senegal was partially approved after incorporating revisions suggested by the ICG to focus the emergency campaign on a smaller geographical area, according to outbreak locations and the history of past vaccination campaigns with high coverage. No requests were received in 2021. A total of 4,076,470 doses (or 79.7% of the total requested) were approved for emergency response.

Table 1 Emergency requests to the International Coordinating Group for yellow fever vaccines, October 2020–September 2021

<table>
<thead>
<tr>
<th>Country</th>
<th>Date of request</th>
<th>No. of days for request circulation</th>
<th>No. of days for additional information</th>
<th>No of days to a decision</th>
<th>Approval</th>
<th>No. of days for delivery</th>
<th>No. of days to campaign start</th>
<th>No. of vaccine doses requested</th>
<th>No. of vaccine doses approved</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nigeria</td>
<td>29/11/2020</td>
<td>1 day</td>
<td>N/A</td>
<td>2 days</td>
<td>Full</td>
<td>7</td>
<td>28</td>
<td>3,058,228</td>
<td>3,058,228</td>
</tr>
<tr>
<td>Senegal</td>
<td>18/12/2020</td>
<td>Same day</td>
<td>4 days</td>
<td>1 day</td>
<td>Partial</td>
<td>7</td>
<td>47</td>
<td>1,893,382</td>
<td>854,477</td>
</tr>
<tr>
<td>Guinea</td>
<td>30/12/2020</td>
<td>1 day</td>
<td>N/A</td>
<td>2 days</td>
<td>Full</td>
<td>5</td>
<td>37</td>
<td>163,765</td>
<td>163,765</td>
</tr>
</tbody>
</table>

After delivery of vaccine doses in response to the emergency request from Nigeria, reactive mass vaccination campaigns were conducted in January 2021 in selected local government areas in two states (Enugu and Ebonyi) with doses from the emergency stockpile. Preventive mass vaccination campaigns were conducted in four states with YF outbreaks (Benue, Bauchi, Borno and Delta) and in states at imminent risk of outbreaks (Ondo, Osun and Oyo). The campaigns in the states with outbreaks targeted a total population of approximately 20 million, and a coverage rate of 75% was achieved.

In Senegal and Guinea, the reactive mass vaccination campaigns targeted a total of 917,000 people, with coverage of 85% in Senegal and 95% in Guinea according to post-campaign summary evaluations.

Performance outcomes in 2020–2021

The ICG currently has three key performance targets: requests are circulated to ICG members within one working day; the ICG decision-making body reaches a decision on approval of requests within two working days; and UNICEF SD delivers approved vaccines to the requesting country within seven days.
The key performance indicators for YF vaccine requests between October 2020 and September 2021 were as follows. The mean time to reach a decision on the three requests was 1.7 days (range, 1–2), and the mean delivery time after approval of the requests was 6.3 days (range, 5–7). Additional information was provided by Senegal after four days following a request from the ICG, which resulted in a mean processing time, defined as the time between receipt of requests to arrival of vaccines in the requesting countries, of 11.3 days (range, 10–12). The mean time for preparation of emergency requests was 32.3 days (range, 20–41), while the time to the start of campaigns after arrival of the vaccine in the country was 37.3 days (range, 28–47).

Although all three key performance targets were met for each of the three emergency requests received by the ICG for YF vaccine, it was noted that the delays between declaration of an outbreak and submission of an emergency request to the ICG, and between arrival of vaccine doses in a country and the start of vaccination campaigns should be improved. These delays adversely impact the timeliness of response to YF outbreaks; however, they are outside the control of the ICG partners. Although improvements were seen over early 2020 and the period October 2018–September 2019, during which the average time taken for request preparation was 54.2 days, further support should be provided to countries in preparing emergency ICG requests and implementing campaigns.

The ICG continues to implement its accountability framework fully and reports its key performance indicators annually to the Governance Oversight Committee to ensure the transparency and accountability of the ICG mechanism.

**Impact of the global COVID-19 pandemic on performance**

The global COVID-19 pandemic has had wide-ranging impacts on countries’ capacity to respond to other public health threats, including disruption of preventive YF vaccination campaigns.

During 2021, a study was conducted on the impact of COVID-19 on reactive mass vaccination campaigns for YF and cholera with stockpiled doses obtained for emergency requests. The study, mainly for members of and stakeholders in the ICG, was conducted by the ICG Secretariat and an external consultant. The aim was to investigate impacts on campaign timelines (from preparation of emergency requests to completion of campaigns) and overall cost.

The findings of an initial in-depth review of ICG-related documents for all emergency YF and cholera vaccine requests approved in 2020, including emergency request forms, were used to design the study and areas for further analysis. Video conferences were then held with requesting countries to explain the objectives of the assessment, and personnel responsible for completing ICG emergency request forms were consulted in developing a tool for quantifying the impact of COVID-19 on various aspects of emergency vaccine response.

The analysis tool was used to record disruptions to the preparation of reactive mass vaccination campaigns (categorized into nine activities), disruptions to implementation (seven activities) and impacts on budgets (for each activity and for the campaign overall). Delays to activities and implementation were categorized by number of months and whether they were attributable to COVID-19.

Among the YF vaccine requests analysed, the analysis found for the first request that year, submitted by Uganda, that there were no reported delays attributable to COVID-19 in the preparatory phase of the reactive vaccination campaign but there was a severe delay of over four
months in training of campaign personnel and campaign implementation. While the original emergency request was approved by the ICG and vaccine doses arrived in the country in February 2020, campaigns did not take place until late August. Preparation of a request from South Sudan and the subsequent vaccination campaign were subject to delays due to COVID-19, which affected nearly all activities in the preparatory and implementation phases; including collecting information to support the emergency vaccine request, hiring and transporting personnel for the campaign, supply chain management, vaccination activities, social mobilization and campaign monitoring. Delays to campaigns were also recorded in a number of key activities after two emergency requests from Nigeria and Guinea, some of which could not be attributed to COVID-19. A campaign in Senegal also experienced delays, none of which were related to COVID-19, with delays in hiring campaign personnel, in vaccination, and in social mobilization during the campaign.

A score was calculated for each campaign according to the number of delays identified and the severity of each. The results suggested, however, that the length of delays was not associated with the severity of the COVID-19 outbreak in the receiving country, as measured from the cumulative incidence rate for COVID-19 in the country during the period studied.

For YF campaigns, the basic costs in the absence of COVID-19 were estimated to be US$ 0.23–1.16 per dose administered, while COVID-19 increased the cost by US$ 0.07–0.23 per dose administered, with the greatest increase in cost in Guinea. The main reasons for increased campaign costs were the requirement for personal protective equipment, promotion of demand among the populations targeted for campaigns, and supportive supervision of campaign personnel.

A number of limitations to the study include self-reporting of delays to campaigns by respondents in each country, potential recall bias in responses, confounding factors such as the timing of emergency requests and reactive campaigns in the holiday season and respondents’ subjective interpretation of categorization of delays and increases in cost as attributable to COVID-19.

Feedback from personnel in high-risk countries after large-scale preventive campaigns also identified adverse impacts of COVID-19 on YF preventive activities. Delays to preventive YF mass vaccination campaigns were noted in Nigeria that may be partly attributable to COVID-19. In addition, the health-care systems of several African countries have been disrupted, leading to delays in detection, testing, notification and in-depth investigation of YF cases.

Challenges in emergency vaccine response and lessons learnt in 2020–2021

Participants noted several challenges to emergency vaccine responses encountered during the previous year. First, while revisions to the ICG emergency request form, including new annexes, have improved requests submitted by countries, additional training in completion of request forms is necessary. It was suggested that training could be modelled on a recent online training package for outbreak investigation. Secondly, YF vaccines for emergency campaigns had been shipped to Nigeria in two lots because of limited air freight capacity. Thirdly, delays in laboratory confirmation were a major impediment to an effective response to emerging YF outbreaks. Fourthly, feedback from the field suggests that after-action reviews are not routinely conducted after campaigns and that opportunities to improve vaccination to mitigate the risk of further outbreaks might be missed.
Participants also discussed successes and lessons learnt. In Nigeria, measures to prevent COVID-19 earlier in 2020 were successfully adapted to emergency vaccination campaigns. In Guinea and Senegal, emergency vaccination campaigns on the two sides of the shared border were synchronized to ensure high coverage of mobile populations.

4. The yellow fever vaccine stockpile, supply, procurement and forecasting

The International Coordinating Group stockpile in 2020–2021

Between October 2020 and September 2021, the targeted size of the ICG YF vaccine stockpile was six million doses. There was consensus that the current emergency stockpile is sufficiently large to meet foreseeable needs, and ICG members agreed to maintain the stockpile at its current size, to be available at all times for emergency requests. YF vaccine doses that are nearing expiry will continue to be used in preventive and routine vaccination through the EYE Strategy, and the emergency stockpile will be replenished quickly by UNICEF SD to prevent any disruption.

Vaccine supply outlook and market shaping

Meeting participants noted that the supply of YF vaccine has increased over time. Over 70 million YF vaccine doses have been made available annually for emergency, preventive and routine use since 2018.

Four vaccine supply agreements are currently in place as part of the previous multi-year tender, and the ICG emergency stockpile will be maintained by two suppliers. The contracted quantities indicate that the YF vaccine supply will increase gradually over the next two years. The supply for emergency use is considered to be adequate, although it was noted that the current supply might be exhausted in the event of a large-scale urban YF outbreak in an area with low population immunity, or the occurrence of multiple outbreaks in quick succession.

The representative of Gavi updated participants on the current status of the YF vaccine market and its work in market shaping. Gavi’s estimates of low and high supply for the remainder of the current decade indicate that a total of 450–650 million YF vaccine doses will be available for emergency, preventive and routine use during 2022–2026, and 0.9–1.5 billion will be available for 2022–2030. Given Gavi's high supply estimate, YF vaccine supply is expected to be nearly sufficient to meet the EYE Strategy objectives for 2022 and 2023; however, it is insufficient to meet the demand reflected in countries’ adjusted plans for preventive and routine immunization.

Meeting participants raised the issue of YF vaccine supply and demand after 2025 and how supply and demand will be balanced once the vaccine supply has reached a high level after successful market shaping. In view of future demand, participants underlined the importance of ensuring the sustainability of YF vaccine supply and continued progress in conducting preventive campaigns and routine childhood immunization in all countries at risk of YF outbreaks. They agreed that the ICG and Gavi would examine future market-shaping strategies and future deployment of the increased output of YF vaccines. A session on these issues would be included in the upcoming 2021 EYE Strategy Partners meeting.
Manufacturers’ updates

Representatives of the manufacturers that currently supply YF vaccines for the ICG emergency stockpile for preventive and routine immunization in high-risk countries within the EYE Strategy – Sanofi, Chumakov, Institut Pasteur Dakar and Bio-Manguinhos – described their progress realizing their production plans.

Sanofi continues to invest in the quality of its products, regulatory compliance, production capacity and innovation. The company is developing a next-generation YF vaccine, which is expected to be granted first regulatory approval towards the end of the current decade, pending the results of ongoing clinical trials. Chumakov is investing in expanding its production capacity, including building a new facility that will house new YF vaccine lines. The primary production facility at Institut Pasteur Dakar has been undergoing refurbishment since 2019, and YF vaccine output is expected to increase in the coming years. Bio-Manguinhos, which produces YF vaccines in 5- and 10-dose presentations, reported disruption to production of the former product due to conversion of its facility to produce COVID-19 vaccines in 2020. Full production of YF vaccines is expected to recommence in 2022, and the company remains committed to developing new YF vaccine products. Bio-Manguinhos is seeking to reduce production lead times and expand its production capacity in the longer term by constructing a new facility, for which public bidding was launched in 2021.

5. Eliminate Yellow Fever Epidemics strategy update

Since establishment of the EYE strategy in 2017, over 145 million people in Africa have received protection from YF in mass vaccination campaigns, including 48 million in 2020. Despite significant work to build countries’ capacity to confirm and respond to YF outbreaks and preventive and routine vaccination in all high-risk countries, large-scale YF outbreaks could occur in locations that have not yet achieved high levels of population immunity.

While it is expected that up to a further 70 million people will receive protection from YF in Africa during 2021, vaccination of over 16 million of these people could be delayed. Although preventive campaigns were scheduled in Congo, the Democratic Republic of the Congo and Nigeria in 2021, major delays have occurred in some activities in the Democratic Republic of the Congo and Nigeria. It is expected that preventive campaigns in 2022 will reach more people in those countries, in addition to phased preventive campaigns in Uganda. From 2023 onwards, it is expected that campaigns will be conducted in other countries at risk of YF outbreaks – Chad, Equatorial Guinea, Ethiopia, Gabon, Guinea-Bissau, Niger and South Sudan. Their timing will depend on approval of their applications to Gavi and on finding funding for countries not eligible for funding by Gavi and also on decisions on vaccine allocation by the EYE programme management group.

Nationwide routine immunization was introduced in Sudan in 2021, with parallel catch-up vaccination campaigns. Routine immunization is expected to start in Uganda in early 2022 (with a slight delay from the introduction originally planned), and in Ethiopia and South Sudan from 2023.

One cause for concern is resurgence of YF outbreaks in areas with a history of large-scale preventive mass campaigns, particularly in West and Central Africa. Cameroon and Central African Republic, where cases were reported and routine immunization coverage was below 60% in 2020, are at particular risk of new outbreaks. The threat of urban outbreaks remains, with
potential high transmission intensity in dense urban populations withlow immunity. Suboptimal routine immunization services, insufficient capacity for surveillance and outbreak investigation and subnational differences in the coverage of preventive campaigns result in areas with insufficient immunity. Further work is necessary to strengthen routine immunization in all high-risk countries, to develop guidance on urban risk management of YF outbreaks to ensure readiness, response and recovery and to characterize the risk of YF outbreaks in countries at moderate risk.

Participants noted that, while YF outbreaks present public health crises, they also represent an opportunity to increase population immunity and to enhance capacity to prevent future outbreaks.

Criteria for approval of emergency vaccine requests from regions in which preventive campaigns have been conducted

Meeting participants discussed the recent increasing frequency of YF outbreaks in countries that have conducted mass preventive vaccination campaigns. These countries include those in West and Central Africa in which campaigns were conducted before 2016, such as Cameroon, Guinea and Senegal, which are reporting resurgences of YF cases and outbreaks.

Their history of campaigns complicates characterization and risk assessment of YF transmission in these countries. This is also hindered by the lack of data from disease surveillance and of sufficiently detailed estimates of the coverage of previous routine and preventive vaccination campaigns.

The participants agreed that, as more frequent emergency requests are expected for YF vaccines in the future, a strategy should be developed as a basis for ICG decisions and to ensure appropriate responses. The strategy would require a WHO-led expert consultation with significant input from ICG members, which would be expected to answer questions about the ICG decision-making process, the criteria for approval of emergency requests, the type of information the ICG would require and how the information would be collected.

It was suggested that risk profiles could be developed for countries and subnational regions based of variables such as when previous YF mass vaccination campaigns were conducted, campaign coverage (perhaps from coverage of measles campaigns if data on YF campaigns are unavailable), whether catch-up campaigns were also conducted and other factors, such as population mobility and routine YF vaccine coverage. It was agreed that a meeting be held to evaluate the available information and gaps.

ICG members noted the importance of clearly defining how additional information is to be collected (e.g., in an annex to the current ICG emergency request form recording countries’ experiences, challenges and lessons learnt from previous YF vaccination campaigns and outbreaks) and also considering how any new criteria for request approval would be applied to urban contexts. It was agreed that the ICG and its partners would hold a consultation on criteria for approval of emergency requests for YF vaccines in areas where preventive immunization campaigns have recently taken place, with particular attention to urban areas, and identify additional sources of information to inform decision-making. The meeting participants expressed interest in the consultation and agreed to a preparatory call before larger sessions.
6. Meeting decisions and action points

A number of action points were noted and decisions taken with respect to the ICG YF vaccine stockpile.

- The ICG YF vaccine stockpile is to be maintained at its current size of 6 million doses, to be available at all times for emergency requests.
- The ICG and its partners will hold a consultation on criteria for approval of emergency requests for YF vaccines in areas where preventive immunization campaigns have recently taken place. The consultation will pay particular attention to the situation in urban areas and will identify additional sources of information necessary for decision-making.
- The ICG and Gavi will also examine how the increased output of YF vaccines will be deployed, future market-shaping strategies and ensuring the long-term sustainability of the vaccine supply, particularly for the period 2025–2030. A session on these issues will be included in the upcoming 2021 EYE Strategy partners’ meeting.
- Although online resources for training in outbreak investigation have been made available to improve countries’ capacity to collect information to support emergency vaccine requests, the ICG recognized that additional training materials should be made available on completion of ICG emergency request forms.
- In addition, the ICG will continue to make ICG emergency request forms more user-friendly.

Participants agreed to these action points by consensus and expressed their commitment to implement them in the coming year.

Annex 1. Meeting agenda

Objectives:

- Review the outbreaks and campaigns supported by ICG during 2020–2021.
- Discuss vaccine demand in 2020–2021 and the forecast supply.
- Discuss manufacturers’ production plans and future vaccine developments.
- Decide on the size and composition of the stockpile for 2022.

Chair: Myriam Henkens

<table>
<thead>
<tr>
<th>Time</th>
<th>Topic</th>
<th>Presenter</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:00–14:05</td>
<td>Introduction, objectives and expected outcome of the meeting</td>
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</tr>
<tr>
<td>14:05–14:40</td>
<td>Yellow fever epidemiological situation 2020–2021 and review of responses and lesson learnt (investigation, campaigns, monitoring and reporting) (10 min)</td>
<td>Jennifer Horton (WHO)</td>
</tr>
<tr>
<td></td>
<td>Discussion (10 min)</td>
<td>All</td>
</tr>
<tr>
<td></td>
<td>ICG performance – review of key indicators (5 min)</td>
<td>Mohammad Salim Reza (ICG Secretariat)</td>
</tr>
<tr>
<td></td>
<td>Discussion (10 min)</td>
<td>All</td>
</tr>
<tr>
<td>Time</td>
<td>Session/Activity</td>
<td>Speaker/Info</td>
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<tr>
<td>14:40–15:10</td>
<td>Update on EYE strategy and practical implications of outbreak resurgence in countries with previous preventive campaigns (10 min)</td>
<td>Laurence Cibrelus (WHO)</td>
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<tr>
<td></td>
<td>Discussion (20 min)</td>
<td>All</td>
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<tr>
<td>15:10–15:30</td>
<td>COVID-19 impact for reactive campaigns approved by ICG in 2020 (10 minutes)</td>
<td>Mohammad Salim Reza (ICG Secretariat)</td>
</tr>
<tr>
<td></td>
<td>Discussion (10 minutes)</td>
<td>All</td>
</tr>
<tr>
<td>15:30–15:40</td>
<td>Break</td>
<td></td>
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<tr>
<td>15:40–15:50</td>
<td>Vaccine procurement and deployment</td>
<td>Antonia Naydenov (UNICEF SD)</td>
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<tr>
<td>15:50–16:00</td>
<td>Vaccine supply forecast for 2022</td>
<td>Antonia Naydenov (UNICEF SD)</td>
</tr>
<tr>
<td>16:00–16:10</td>
<td>Market shaping update</td>
<td>Margarita Xydia Charmanta (Gavi)</td>
</tr>
<tr>
<td>16:10–16:20</td>
<td>Discussion (10 min)</td>
<td>All</td>
</tr>
<tr>
<td>16:20–16:50</td>
<td>Manufacturers’ production plans and future vaccine developments (YF). Followed by discussion</td>
<td>BioManguinhos, Sanofi-Pasteur, Chumakov Institute, Institut Pasteur Dakar</td>
</tr>
<tr>
<td>16:50–17:00</td>
<td>Discussion: YF stockpile size requirements</td>
<td>ICG members, UNICEF SD and Gavi</td>
</tr>
<tr>
<td>17:00</td>
<td>Conclusions</td>
<td>Chair</td>
</tr>
</tbody>
</table>
Annex 2. List of participants

ICG members
Myriam Henkens
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Yodit Sahlemariam, Health Specialist, UNICEF, New York City (NY), USA
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Laurence Cibrelus, Team lead, High Impact Epidemics (EHI)/Health Emergency Interventions (HEI), WHO, Geneva, Switzerland
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Richard Mihigo, Medical Officer, Vaccine Preventable Diseases (VPD)
Blaise Bathondoli, Medical Officer, VPD
William Komakech, Epidemiologist, Emergency Preparedness (EMP)
Ambroise Talisuna, Health Security Advisor, EMP

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Pierre Formenty, Unit Head a.i., EHI/HEI
Emmanuel Musa, Team lead, EHI/HEI
Philippe Barboza, Team lead, EHI/HEI
Peter Mbondji, Consultant, EHI/HEI

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