CEPI mid-term review and COVID-19 response review: combined report

Lessons learned and next steps

Background

In 2019, an independent mid-term review (MTR) was initiated to assess CEPI's performance since its formation in 2017 through to December 2019. Following a competitive tender, MM Global Health Consulting was selected to undertake the independent review, which commenced in January 2020.

During this review process, COVID-19 emerged as a pandemic threat, which required CEPI to pivot its organisational focus to support global R&D and manufacturing response efforts. In view of the pandemic's impact on CEPI's operations, the mid-term review process was completed in April 2020 and interim results were reported. This was then complemented with the COVID-19 Response Review (CRR), to evaluate CEPI's response to the pandemic up to August, 2020.

A range of interviews with and surveys of CEPI's key stakeholders were undertaken to gather key insights and reflections on CEPI's performance against its 2017-2021 Business Plan and against a COVID-19 Investment Case and related response.

CEPI broadly welcomes the review and its findings as a fair reflection of an organization in its third year since establishment. CEPI notes that the MTR & CRR provided insights on four key areas of CEPI's strategy and operations:

1. Expanding on the original mission to be able to ensure timely and equitable access
2. Delivering on the strategy while responding to the pandemic
3. Aligning the governance and operational structures to the evolving needs and.
4. Strengthening partnerships and outreach.

Key Findings from the Combined Review

CEPI notes there was an overall positive view of the organisation and its operations. This includes that in its early years, CEPI had established strong goodwill and quickly achieved technical leadership. The report found that CEPI successfully executed a response to the COVID-19 pandemic during 2020 in a highly scrutinised, complex political environment.

CEPI also notes that the combined reports identified selected areas for improvement, including the need for some clarification on the long-term scope of work and hand-over to downstream partners. There were also findings indicating the need to refine some internal structures and processes. These findings have been acknowledged and informed the development of the 2022 - 2026 strategy.

- CEPI had mobilised broad political and social support for its mission and had contributed significantly to improving preparedness against epidemic infectious diseases. CEPI's response to the COVID-19 pandemic was also seen as the right course of action and in line with CEPI's original mission.

- Implementation of CEPI's equitable access provisions was considered to be "solid"; however, a judgment on its real impact will only be possible when the CEPI-supported vaccines are used in response to an epidemic or pandemic.

- There was overall agreement that CEPI had assembled a balanced portfolio for both the initial set of priority diseases as well as for COVID-19 vaccine candidates. Due to COVID-19, CEPI's progress on vaccine development for its core portfolio (excluding COVID-19) was slower than anticipated during 2020.

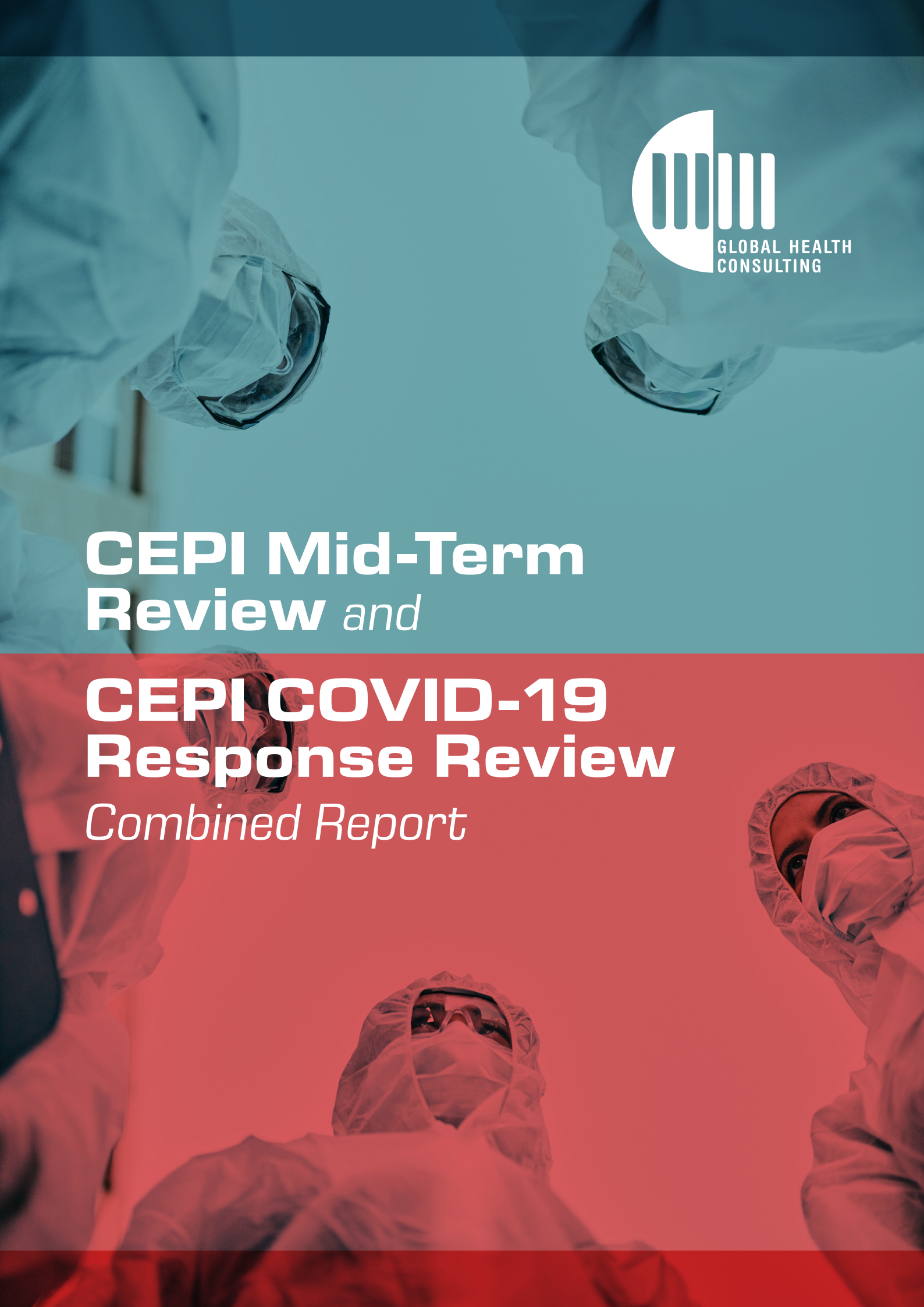
- Since its launch, and as part of its COVID-19 response, CEPI has made significant strides in forging collaborations across the R&D ecosystem. However, there is a need for greater clarity regarding CEPI's role in relation to implementation-partner organisations. Further collaboration with multinational companies was also identified as an area for development in addition to better incorporation of voices and perspectives from low-income and middle-income countries.

Response to Key Findings

CEPI aims to address the report's findings as it operationalises its 2022-26 strategy. In the next business cycle, CEPI will respond to key findings by:

- Contributing to and shaping a post-pandemic consensus to improve global epidemic and pandemic preparedness and response.
- Expanding collaborations and engagement with LMICs partners
- Improving consistency of risk-monitoring, including a review of the composition and operating practices of CEPI's overall portfolio investment governance structure to deliver effective overall portfolio oversight.
- Updating CEPI's governance structure with new Scientific Advisory Committee (SAC) membership to reflect its range of activities
- Assessing the role of the Joint Coordination Group (JCG), set-up of CEPI's secretariat and decision-making processes to guide the operationalisation of the 2022-26 strategy. An operations committee has also been established to work through the governance and organizational elements.
- Expanding partnerships with multinational companies and other stakeholders across the global health and R&D ecosystem
- Enhancing the mapping and connection of country R&D resources and capacities with global industry partners—with a particular focus on LMICs, academic institutions, and other public and private organisations in the global health ecosystem.
- Continuing to retain a nimble approach to organisational management as CEPI builds the capabilities needed for effective operations, sound investment management, and active engagement with coalition partners.
- Strengthening its policy and advocacy work to align and secure cross-sectoral support and sustainable funding for its mission.

For further information on the findings from this combined report on CEPI's operations, please direct any queries to sally.girgis-hjoberg@cepi.net



GLOBAL HEALTH CONSULTING

CEPI Mid-Term Review *and*

CEPI COVID-19 Response Review

Combined Report

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Executive Summary

Founded in 2017, the Coalition for Epidemic Preparedness Innovations (CEPI) is an international partnership that finances and coordinates the development of new vaccines to prevent and contain infectious disease epidemics. In early 2020 — when SARS-CoV-2 emerged — CEPI began financing and coordinating the development of vaccines to respond to the emerging virus, which has since become a global pandemic. At that time, the organisation's Mid-Term Review (MTR) was under way, with the goal of assessing CEPI's performance from its establishment through December 2019. In view of the pandemic's impact on CEPI, the MTR process was ended in late April 2020; interim results were reported and a new process — the COVID-19 Response Review (CRR) — was started. The CRR process focused on assessing the initial results of CEPI's engagement in the pandemic response. This report provides the combined findings of those two processes across the "activities" of CEPI's Theory of Change (ToC): mission, strategy development and gap analysis, governance and operations, partner and stakeholder engagement, advocacy and resource mobilisation, investment in candidates, platforms and enabling science, and expert assistance.

Expanding on the original mission to be able to ensure timely and equitable access

At the start of the MTR process in January 2020, CEPI was in its third year of existence, advancing a focused portfolio of vaccines against emerging infectious diseases (EIDs). It enjoyed **broad stakeholder support for its mission:** to *"accelerate the development of vaccines against emerging infectious diseases and enable equitable access to these vaccines for affected populations during outbreaks."* CEPI filled an important gap in the epidemic preparedness landscape and was perceived as having contributed significantly to improving preparedness against EIDs. Furthermore, CEPI was seen as having succeeded in mobilising broad political and social support for its mission.

The world changed dramatically in the following months. **CEPI engaged quickly in the response to the SARS-CoV-2 pandemic,** with an effort seen by a majority of stakeholders as successfully mobilising political and media attention and of making a major contribution in the initial phase of the pandemic response. The multiple positive judgements on this engagement and the recognition of CEPI's ability to quickly pivot in the new context are a testament to the strong support for, and trust in, the organisation.

> *CEPI's mission: "to accelerate the development of vaccines against emerging infectious diseases and enable equitable access to these vaccines for people during outbreaks."*

As result of its engagement in COVAX, **CEPI had to extend beyond its original roles of funder and facilitator.** It is now co-leading COVAX — in partnership with Gavi, the Vaccine Alliance and the World Health Organization (WHO) — expanding its reach beyond the scope of its original strategy even if consistently with its sustainable partnership approach. Stakeholders were strongly positive regarding CEPI's leadership role in this enterprise and saw CEPI's push for "speed, scale, and access" for COVID-19 vaccines as fully aligned with CEPI's mission of "enabling equitable access to vaccines." They also saw this effort as an important contribution to offset growing nationalist approaches. Stakeholders acknowledged that decisions were taken transparently through the governance structure and with their full support.

Irrespective of the pandemic, a broad agreement emerged on the need, for a global public health entity to take care of late-stage clinical development, manufacturing and to prepare for licensure. More specifically, in relation to COVID-19 vaccines, many stakeholders noted that securing sufficient manufacturing capacity is the critical gap for any effective response. Despite such general agreement, **differences emerged in stakeholder opinions on whether CEPI should be such entity and whether its mission could be achievable without directly engaging in these late development stages**. Some felt that funding late-stage development was an inevitable necessity and that the pandemic would force a change in the direction of the organisation, also beyond the COVID-19 vaccines. Others thought that the engagement in later stages should be limited to partnerships and catalytic investments. Interestingly, few stakeholders recognised that CEPI is currently already co-funding a Phase 3 clinical trial for a Chikungunya vaccine. Others assumed that late-stage development was already within the scope of the current business plan. On the matter of the scope of CEPI's engagement, some inconsistencies in CEPI's communications (including in published literature) and actions may have contributed to stakeholders' uncertainty in this area.

Overall, there was agreement for CEPI to play a more extensive role in ensuring that vaccines achieve registration and are rolled-out in sufficient quantities, whether by directly investing or by playing a more catalytic role. However, some concerns were raised regarding CEPI having sufficient resources to fund an expanded mission, as well as the Secretariat having sufficient bandwidth and capability, primarily given the increased demands on the organisation resulting from the SARS-CoV-2 pandemic. Beyond these areas, most stakeholders agreed that CEPI should focus on vaccines and that broadening CEPI's scope would be premature in view of current resources and capacity.

Delivering on CEPI's commitment to equitable access emerged as another key topic in relation to CEPI's mission. The "equitable access policy" has historically focused on CEPI's ability to impose obligations on its funding recipients. More recently, CEPI has strengthened its commitment to equitable access through an update to the equity policy and the creation of the Equitable Access Committee (EAC) of the Board. **CEPI has implemented a set of solid provisions to ensure equitable access from development partners spanning from ensuring projects continuity to the sharing of commercial returns; however, a judgment on their real impact will be only possible when those products will be used in response to an epidemic.** With the emergence of the SARS-CoV-2 pandemic — and in light of its global nature — the EAC indicated that the application of "equitable access" should be global, expanding CEPI's reach. While seen as a positive development, the shift to a global perspective has the potential to create misalignment for some of CEPI's donors, given the development-driven intent of funding and the global application of resources.

While the vision on equitable access is fully shared, divergent views and areas for improvement emerge at the operational level. First, private sector and civil society stakeholders showed differing and, in some instances, opposing views on CEPI's performance in this area, on the need for more or less flexibility on CEPI's approach, and on the specificity and strengths of enforcement provisions. Second, the need for clarity in relation to which countries are the ultimate beneficiaries of CEPI's equitable access approach emerged as critical for a successful implementation. Finally, the monitoring of awardees actions, in particular via the Stage Gate Review (SRG) process, and the potential impact on access — particularly regarding vaccine prices — is perceived by some as requiring more specificity and consistency.

Delivering on the strategy while responding to the pandemic

The **CEPI Results Framework** ambitiously sets outcome targets for 2022. The results reported in the Annual Progress Reports (APRs) in 2018 and 2019 were generally positive, with 7 of the 15 indicators being "on track" for both years, and only one indicator each year (the fundraising one) requiring "substantial action." Looking to the future, stakeholders were not too optimistic about CEPI's ability to meet 2022 targets, **acknowledging the significant impact of changing global health priorities as a result of the SARS-CoV-2 pandemic, its impact on CEPI's operations, as well as the presence of financial resource constraints.** The absence of process targets that could measure year-by-year was also noted as making it difficult to have a fact-based discussion on CEPI's ongoing performance, particularly in the initial years of operation. As such, some stakeholders have called for inclusion of process measures to provide an evidence-base to judge progress toward achieving targets.

On the core business area of **investments in vaccine candidates, platforms and enabling science,** stakeholders believe **CEPI has been effective in managing and adjusting its portfolio in response to evolving contexts.** Overall, there was agreement that CEPI has assembled a balanced portfolio for both the initial set of targeted diseases as well as for COVID-19 vaccine candidates, even if some questions were raised on the selection process, consistency in risk monitoring, and diversity of candidates/partners.

Related to the COVID-19 portfolio, two areas of concern were highlighted: 1. the overrepresentation of spike protein candidates and 2. the need for substantially larger investments to ensure that vaccines achieve timely registration. Of the nine funded vaccine candidates, four were from organizations that CEPI had previously funded, and that were in condition to immediately pivot their effort toward COVID-19 vaccine development, whereas 114 organizations responded to the Call for Proposals. Divergent views emerged during the MTR regarding CEPI's **development partners,** with some concerned that CEPI has not sufficiently partnered with multinational companies for vaccine development. Stakeholders noted that this could become a serious issue in the event of a vaccine requiring rapid scale-up, manufacturing and distribution. The situation is starting evolving in the COVID-19 portfolio.

Stakeholders acknowledge the efforts to establish **clear processes and criteria for down-selection among COVID-19 vaccines candidates**. Such processes are more complicated than for other vaccines because of the interactions between CEPI's original portfolio and the "global portfolio" containing all COVID-19 vaccines, as well as because the additional coordination required being the COVID-19 vaccine portfolio now part of the COVAX structure.

Finally, it was recognised that CEPI has **a comprehensive risk management process that collects, ranks and reviews organisational risks on a regular basis.** The top organisational risks identified by CEPI were broadly aligned with those identified by stakeholders and the desk review. Mitigating actions for the organisational risks are continuously tracked, even if some inconsistencies are registered in their reporting. Technical and organisational risks stemming from awardee development programmes are identified and tracked as part of the portfolio review process.

Aligning the governance and operational structures to the evolving needs

The overall judgement of stakeholders on CEPI's **governance and operations was positive, with CEPI's internal policy framework considered strong and providing solid accountability on operational matters.** CEPI has significantly adjusted its governance structure and operations in response to the pandemic and in consideration of its role in COVAX. Most stakeholders agree that CEPI's flexible governance structure enabled it to respond to the pandemic quickly and effectively. Increasing the input from grantees and at-risk countries was seen as beneficial. On the operational side, on one hand CEPI was able to pre-empt several aspects of the incoming pandemic with its processes and policies, on the other, timeliness of the flow of information and details of the documentation from Board and committee meetings could be further improved hence benefiting the overall perceptions of CEPI's transparency.

Further areas for improvement were identified in the **simplification and clarification of the governance and operational structure, in particular with regard to three advisory bodies: the Investors Council (IC), the Scientific Advisory Committee (SAC) and the Joint Coordination Group (JCG).** With respect to the IC, some stakeholders requested increased clarity on its role, representation, transparency, and communication in order to ensure it contributes effectively to CEPI's work. Regarding the SAC, the importance of which was recognised and highlighted repeatedly, questions were raised regarding the transparency of decision-making, size, and whether it has all the needed expertise. Some of those points also emerged in relation to the COVID-19 portfolio decisions, where the SAC was engaged in the early portfolio formation.

Finally, questions were raised both in the MTR and CRR in relation to the function of the JCG, and its most appropriate and effective modus operandi. This body was seen as critical in the mobilization of the coalition's partners, but Stakeholders seemed to lack a good understanding of its functioning and limited awareness of the impact of its work.

The **hard work, positive attitude and flexibility of Secretariat staff were appreciated and explicitly called-out** by many stakeholders. Stakeholders praised the Secretariat in particular for its agility and flexibility in responding to the pandemic. Perceptions of the Secretariat capacity and staff capabilities were also largely positive. Some concerns were flagged, in particular with reference to the impact of SARS-CoV-2 and the related need for additional activities to be included in the business plan, as well as the need to expand the set of expertise available in the Secretariat to oversee late-stage development, provide expert assistance to grantees and partners, and navigate complex political contexts. The additional work — combined with the Secretariat understaffing — is an area which continues to rank among the top CEPI organisational risks, even after some recent ramp-up of recruitment activities.

Strengthening partnerships and outreach

Stakeholders noted progress and improvement in the interactions with many coalition partners. At the same time, they identified a **need for greater clarity regarding CEPI's role in relationship to implementation partner organisations,** particularly Gavi, the Vaccine Alliance, and the WHO. In part, this need for clarity stems from unclear boundaries regarding the "hand-over" areas between partner organisations and confusion about which mutual obligations and accountabilities result from being part of the CEPI coalition. Stakeholders stressed the need to ensure continued transparency and timeliness of information sharing regarding COVAX, in view of the significant decision-making authority for COVID-19 vaccines.

However, opposing views were also highlighted: on one hand, CEPI is perceived as overstepping its boundaries while, on the other hand, some stakeholders ascribe responsibilities to CEPI that

are actually their own. Over the first months of the SARS-CoV-2 pandemic, CEPI has been perceived as making substantial progress in a fragmented and dynamic landscape. There is agreement that CEPI has connected appropriately with stakeholders and clearly strengthened its partnerships with Gavi and the WHO.

CEPI's relationship with countries including their input into CEPI's governance and decision-making processes, as well as CEPI's responsibility for in-country capacity building and implementation — was identified as an **area requiring increased clarity and focus.** Respondents consistently called for better incorporation of country voices and perspectives. There was less consensus on CEPI's role in capacity building and the paucity of country insights is an essential limitation in this area.

CEPI's advocacy succeeded in engaging a wide range of stakeholders and mobilising political support, but is viewed as insufficient to raise enough funds to achieve its strategic objectives. The question of whether CEPI has sufficient resources to fund its mission has been identified through both the results framework and risk management processes as needing attention. Stakeholders noted that the SARS-CoV-2 pandemic needs — in particular engaging in late-stage product development and manufacturing — will further increase CEPI's resource needs. To address those needs, improved mechanisms to fund CEPI are needed, particularly to provide greater sustainability and more flexibility in emergencies. Stakeholders also noted that additional advocacy is required, and that partners should contribute by advocating for CEPI.

Conclusions

The combined findings of the MTR and the CRR emphasize that CEPI has established strong goodwill and achieved technical success. Across both reviews, a picture emerged of a young, dynamic organisation that is successfully executing in a highly scrutinised, complex political environment. The overall feedback is positive, recognising CEPI's tremendous effort and early progress. At a more granular level, some areas emerged where stakeholders shared concerns or suggested improvements, particularly regarding further clarifications of the long-term scope of work and mission of the organisation and the need to further refine some internal structures and processes. This will help to operationalise the strategy and establish an effective and transparent accountability framework across the coalition. Such a set of remarks is common for an organisation in its early stages. As a follow-up to the discussions that followed the preliminary release of the MTR results in May 2020, CEPI is already in the process of addressing several areas identified as part of its new strategy. Ultimately the SARS-Cov-2 pandemic will have an everlasting impact on CEPI; it will represent an "acid test" for the organisation's relevance and ability to generate impact. By influencing stakeholder perceptions, this pandemic will fundamentally define CEPI's future role in the global health ecosystem.

Methodological Disclaimer

As a consequence of the unfolding global health events, the MTR and CRR have some methodological limitations. The MTR findings are based on a limited sample size, were not discussed with the expert advisory group charged with the oversight of the process, and are not accompanied by recommendations. The CRR focuses only on the first 6 months of the response and has been structured with the primary goal of providing input into the development of the strategy; the CRR also does not provide any recommendations. Furthermore, access to Secretariat resources has been constrained by the workload of the pandemic response and by the travel restrictions. Nonetheless, it is our view as evaluators that in light of the solid and transparent methodology employed, the independence of the overall processes, the extensive insight gathering based on document and literature review, and surveys and interviews, the combined findings provide a significant and rigorous set of insights. The consistency in the findings across the two processes and the variety of the respondents also provides reassurance.

Profile of the Coalition for Epidemic Preparedness Innovations (CEPI)

The Coalition for Epidemic Preparedness Innovations (CEPI) is an international partnership that finances and coordinates the development of new vaccines to prevent and contain infectious disease epidemics. CEPI was founded in January 2017 by the governments of Norway and India, the Bill & Melinda Gates Foundation (BMGF), the Wellcome Trust, and the World Economic Forum (WEF) at the WEF Annual Meeting in Davos, Switzerland.

CEPI's vision, *"A world in which epidemics are no longer a threat to humanity,"* predicates its unique mission: *"to accelerate the development of vaccines against emerging infectious diseases and enable equitable access to these vaccines for affected populations during outbreaks."* Achieving that mission requires the achievement of three strategic objectives:

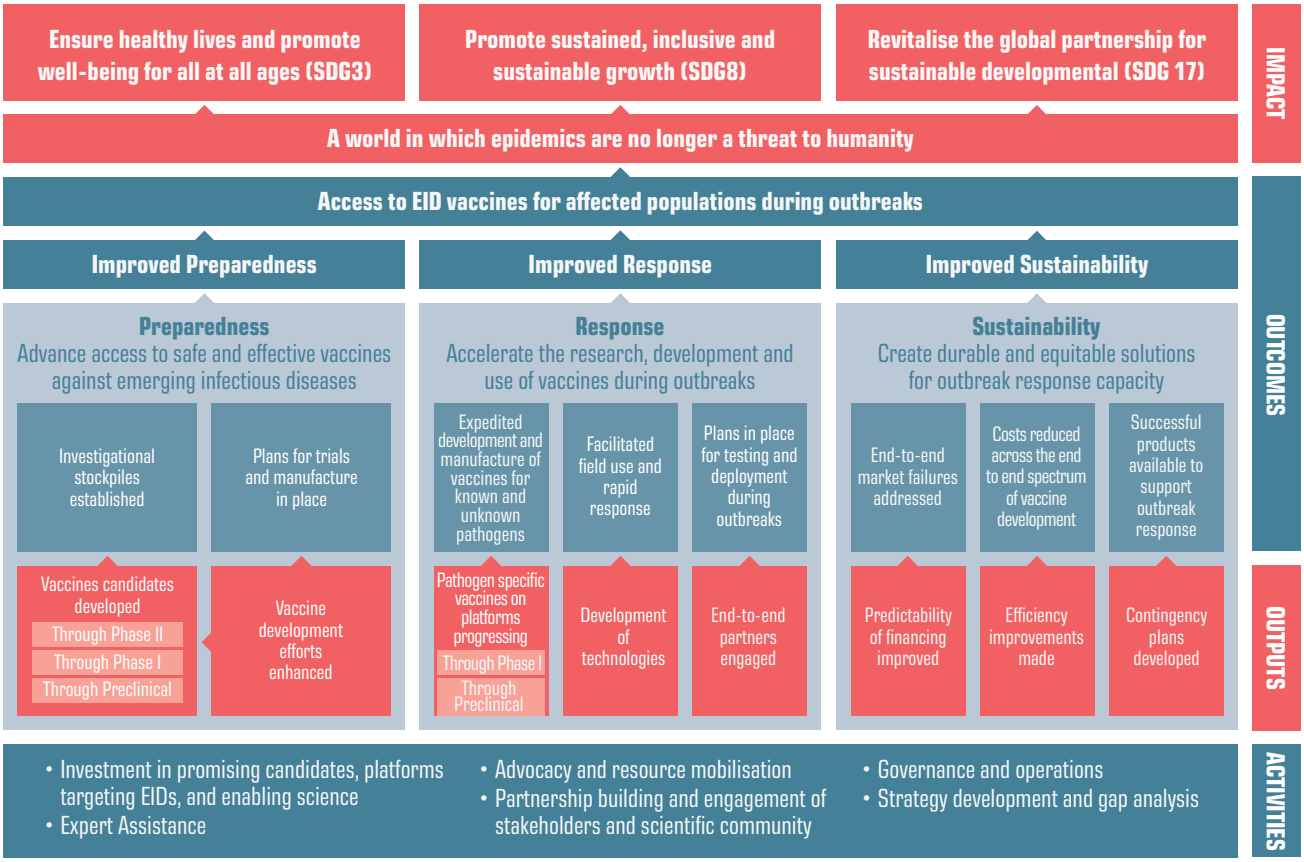
1. **Preparedness** – advance access to safe and effective vaccines against emerging infectious diseases
2. **Response** – accelerate the research, development and use of vaccines during outbreaks
3. **Sustainability** – create durable and equitable solutions for outbreak response capacity

Strategy

CEPI operates along two axes to achieve its objectives: (1) financing vaccine development against emerging infectious diseases with epidemic potential to create investigational stockpiles, and (2) facilitating efforts within and beyond its financing scope to ensure that vaccines developed are first available to populations when and where they are most needed, regardless of ability to pay.

The Coalition's work is grounded in CEPI's Theory of Change (ToC), which informs the current business plan for the 2019–2022 period[1] and is supported by both a **results framework** and a **risk register**[2].

FIGURE 1: Coalition for Epidemic Preparedness Innovations (CEPI) Theory of Change



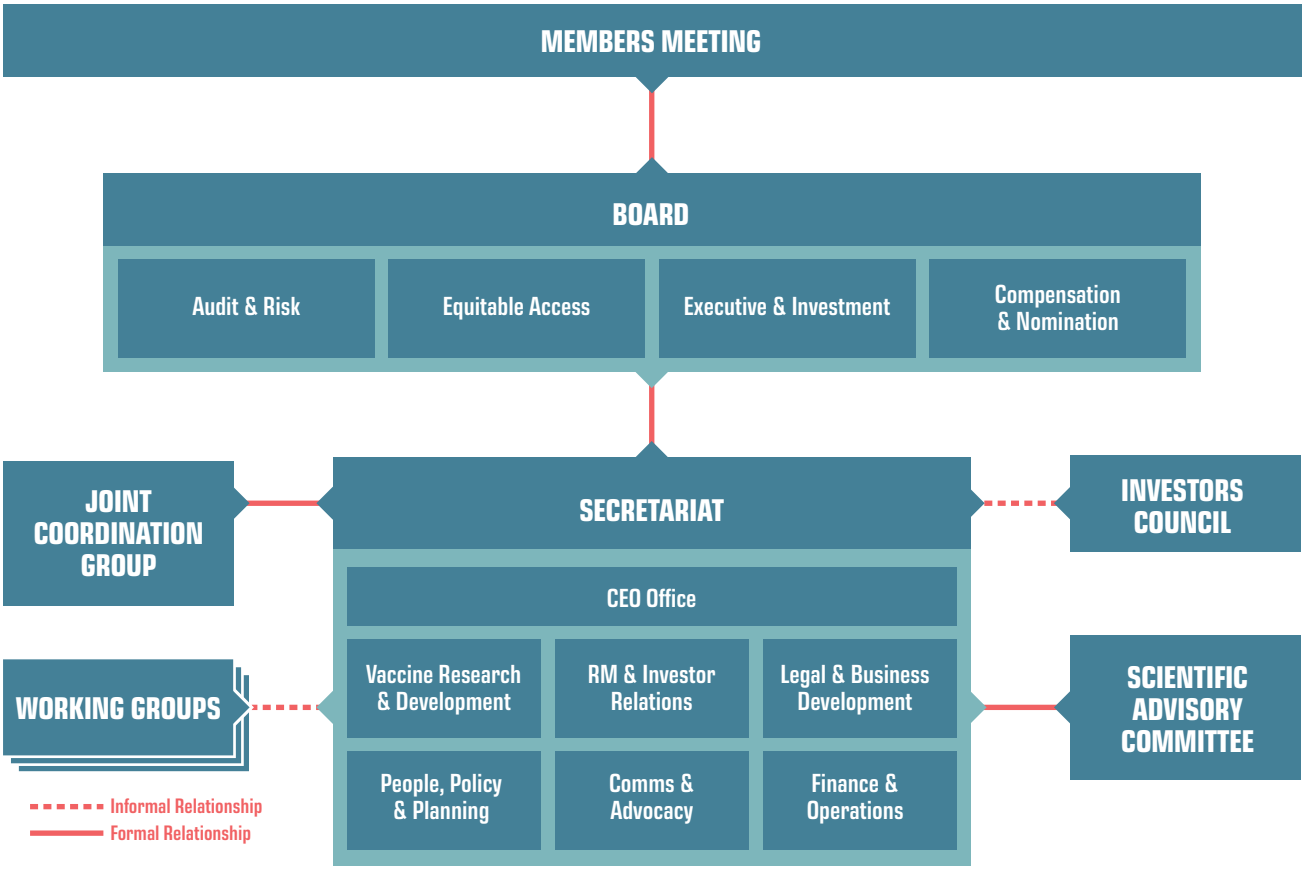
Governance

CEPI's operations are guided by a governance structure that aims to combine and leverage sound scientific assessment, evidence-based decision-making, and the highest operational standards and rigour in stewarding funds granted to entities charged with furthering its mission. An interim organisation was in place in 2016–2017, which transitioned to its permanent structure in early 2018.

The primary governing body is the Board, composed of 12 voting members (four investors and eight independent members representing different areas of competencies) and five observers. The Board sets strategy, provides guidance and makes decisions on CEPI's investments. The Investors Council (IC), composed by all investors in CEPI, provides guidance to CEPI and approves single investments of more than USD 100 million prior to Board consideration. Two additional advisory bodies support and guide CEPI's work: the Scientific Advisory Committee (SAC) and the Joint Coordination Group (JCG). The SAC acts as the principal scientific advisory group to the Board and Secretariat and consists of both voting and non-voting members that make recommendations on funding decisions. The JCG provides a forum for discussion with critical stakeholders; in this forum, CEPI plays a unique convening role amongst global health actors to promote an improved collective response to emerging infectious disease threats. Lastly, the CEPI Secretariat, from its three offices in Oslo (the Headquarter), London, and Washington, D.C, ensures the effective implementation of the strategy.

Four Board committees contribute to the smooth functioning of CEPI's governance: the Audit and Risk committee (ARC) in charge of monitoring and auditing CEPI's ongoing operations and of assessing the key areas of risk for the organisation, the Equity and Access Committee (EAC) created in 2019 with the task of providing strategic guidance to the Board and CEO on the implementation of CEPI's Equitable Access Policy, the Executive Investment Committee (EIC) in charge of providing strategic guidance to the CEO on matters relating to CEPI's vaccine development portfolio and proposed investments, and the Compensation and Nomination Committee charged with appointments and compensation.

Figure 2: CEPI Governance Structure



Reviews of CEPI's Performance

When entering into contracts with CEPI's first investors, it was always anticipated that an independent Mid-Term Review (MTR) would be undertaken by mid-2020. The MTR was initiated in December 2019 to focus on the organisational design, implementation and interim results of CEPI's operations.

During March 2020, as both the magnitude of the SARS-CoV-2 pandemic and the central role that CEPI was playing became evident, concerns emerged regarding stakeholders with the best knowledge of CEPI being unavailable to participate in the MTR. Moreover, the difficulty in assessing CEPI's overall performance independent of the pandemic became evident. By early April, when the survey was in progress and interviews were starting, a number of stakeholders and investors expressed concern that CEPI's shift in focus to SARS-CoV-2 was so profound that conducting an MTR during this unusual, unstable period was not appropriate and would not yield useful insights. After consultation with investors, CEPI opted to reconsider the overall MTR process in order to capture the early lessons emerging from the SARS-COV-2 response, thus improving the usefulness and timeliness of the review for CEPI, its partners and investors. As a result, the MTR data collection was suspended and the decision was made to focus on the findings that had emerged from the process up to that point and not to proceed with formulating recommendations. Subsequently, in June 2020, a COVID-19 Response Review (CRR) was launched to evaluate CEPI's response to the SARS-CoV-2 pandemic as a complement to the findings emerging from the MTR. The CRR shares several methodological design aspects with the MTR, albeit with the narrower goal of highlighting the "lessons learned" that could inform the parallel processes of developing and designing a new strategy. In view of this narrower goal and of the continuing instability of the global health ecosystem because of the SARS-CoV-2 pandemic, a specific review results framework and a process for formulating recommendations were not established, hence making the establishment of an independent oversight body unnecessary. As a result, the CRR process misses some elements of the ones recommended by the OECD for the evaluation of Development (DAC principles).[3]

Table 1: MTR and CRR "performance" vs. OECD principles for the Evaluation of Development Assistance[3]

Dimensions / Principles	MTR	CRR
Timeliness	Yes	Yes
Expert, competent and independent evaluators	Yes	Yes
Separation from line management	Yes	Yes
Independent oversight structure	Yes (up to April)	No
Reflect interest and needs of all parties	Yes	Yes
Review performance vs. an agreed results framework	Partially	No
Define recommendations and alternatives	No	No
Focus on sustainability	Yes	Yes
Transparency	Yes	Yes
Accessibility of findings	Yes	Yes

Despite the methodological limitations caused by the exceptional circumstances of the SARS-CoV-2 pandemic, impartiality, independence and transparency were maintained throughout the two reviews, and strong attention was dedicated to the usefulness of the process for CEPI in refining its design and strategy. For these reasons, it is our opinion — as independent expert evaluators — that the emerging findings and insights are sufficiently robust to be presented and provide a useful contribution toward the achievement of the original MTR objectives.

The Mid-Term Review

The MTR was intended to assess the extent to which the organisational design of CEPI is relevant and appropriate to achieving its stated objectives, and the extent to which its ongoing and planned activities are being successfully implemented. All activities and partners that have received (or are currently receiving) funding, all potential partners and awardees that have not yet received funds thus far and all governance structures that are in place to facilitate CEPI's mission were within the scope of the review.

The intended goals of the MTR were as follows:

- Identify key "lessons learned"
- Provide the basis for adjustments in direction through 2021
- Provide evidence-based recommendations to support both the Business Plan 2022 onward and investor decision-making
- Provide a basis for accountability by informing the public of CEPI's progress to date

In early January 2020, following a competitive procurement process, MMGH Consulting (MMGH) was selected to perform the MTR. The agency has extensive expertise in global health — particularly in immunisation and vaccine development — and has performed evaluations of other relevant bodies, such as the Strategic Advisory Group of Experts in Immunization of the World Health Organization (WHO).

A mixed-methods approach was designed consistent with the DAC principles. Insight gathering and data collection included a document and literature review, a stakeholder survey, and interviews with select stakeholders and Secretariat staff. This phase was followed by an analytical step.

An "Action Lab" was originally selected as the most appropriate approach to allow a diverse mix of stakeholders and Secretariat staff to reflect critically on the emerging data/findings and design potential interventions. For the reasons mentioned above, the Action Lab did not take place.

The review governance included the establishment of an independent Evaluation Advisory Committee (EvAC) to provide oversight of the evaluation process and to inform development of recommendations. EvAC members were selected based on specific areas of expertise, relevant experience, and diversity of gender, geographies, and vaccine development and partnership perspectives.

Based on the research questions defined with the CEPI Secretariat, a review framework was created comprising seven **Performance Areas** and 13 **Review Indicators (RIs)**. The review framework is grounded in the research questions and the activities within CEPI's Theory of Change. The full framework is available as Annex 2.

Table 2: CEPI MTR Review Framework

1. Mission
CEPI's strategic objectives enable it to achieve its mission CEPI's actions and investments are consistent with the principle of equitable access
2. Strategy Development and Gap Analysis
CEPI is on track to meet its strategic objectives CEPI has monitored progress in achieving its strategic objectives and implemented corrections as needed
3. Governance and Operations
CEPI's governance structures and processes support achieving its strategic objectives CEPI's organisational design and human/financial/technical resources are efficient and effective in achieving its strategic objectives CEPI's Secretariat structure enables it to achieve its strategic objectives
4. Partner and Stakeholder Engagement
CEPI's efforts have resulted in a more sustainable ecosystem for epidemic preparedness innovations CEPI engages meaningfully with partners and stakeholders and promotes shared accountability
5. Advocacy and Resource Mobilisation
CEPI has undertaken effective actions to sufficiently resource its business plan CEPI's advocacy efforts haves been successful in mobilising broader political and social support for CEPI's mission.
6. Investment in Candidates, Platforms and Enabling Science
CEPI has been successful in attracting and managing development partners capable of delivering on its 2022 targets CEPI has a balanced portfolio and is effective in managing it to achieve its 2022 targets
7. Expert Assistance
CEPI has been effective in providing expert assistance

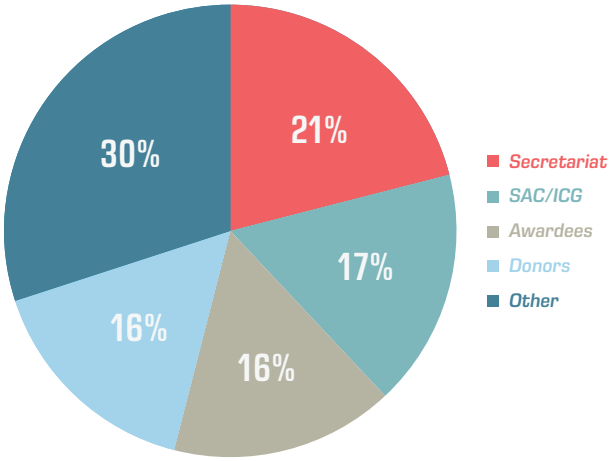
All the relevant CEPI internal documents, policies and reports (public and from various governance bodies) were consulted in tandem, with 106 articles selected via a desk review.

An online survey was administered to 161 stakeholders and 15 Secretariat staff*, with 57 responses collected (32% response rate) by the time data collection was suspended.

Finally, structured *viva voce* interviews targeted 30 individuals at the senior management level within the "inner circle" of **global health partners — 10 Secretariat staff were consulted at the start of the process and 15 stakeholder interviews were completed before data collection was suspended, amounting to 50% of the targeted sample. Furthermore, 10 Secretariat staff were consulted at the start of the process.** Board members represented 33% of the stakeholder sample and JCG members represented 20%. As a result of the interruption of data collection, the number of responses to the survey and the number of interviews is limited. This somehow reduces the representativeness of the information collected. Furthermore, the influence of the evolving SARS-CoV-2 response (that ideally should not have factored into the MTR) was significant. Nonetheless, the findings reported — consisting of a majority of well-informed responders — provide significant insights.

In view of the changes in the MTR process, the Action Lab did not take place and the EvAC was disbanded in July 2020 and has not been engaged in the analysis or presentation of these findings.

Chart 1: *MTR Online Survey (n=57)*



MTR survey respondents split (Stakeholders and Secretariat) – The category "others" includes Board/Founders Implementation and countries

COVID-19 Response Review

The CRR intended to review the first six months of CEPI's response following the emergence of the SARS-CoV-2 pandemic. This unprecedented event altered investor urgency for the MTR, changed the timing of CEPI's 2.0 strategy development, and significantly diverted the focus of the CEPI Secretariat and global health partners toward the response.

All activities and partners that have received (or are currently receiving/applying for) funding for the development of COVID-19 vaccines and all governance structures that are in place to facilitate CEPI's mission were within the scope of this review. The review is limited to CEPI as an organisation and does not include the Vaccines Pillar of the ACT Accelerator (COVAX).

The overarching goal of the CRR was to assess CEPI's organisational design and ongoing/planned activities to ensure progress toward achieving CEPI's objectives, with a specific focus on COVID-19 vaccine development.

In view of the existing engagement in the MTR, the complementary nature of the CRR and the need for the two processes to converge, MMGH's contract was extended and modified to perform the CRR in conjunction with the interrupted MTR.

A mixed-methods approach — similar to the one used for the MTR — was designed, and included insight gathering, data collection and analysis based on document and literature review, a stakeholder and Secretariat survey, and stakeholder interviews. In light of the dynamic nature of the COVID-19 response and the concurrent process of strategy development, the focus was centred on the identification of relevant findings and not on the development of recommendations. For this reason, no independent oversight mechanism was established, and no Action Lab was planned.

* The MTR survey was administered to the Secretariat staff at a later stage, in combination with the CRR survey.

Table 3: CEPI CRR Framework

1. Mission

- Was the response consistent with CEPI's current mission?
- Has CEPI's mission changed?
- Was there an alternative to business plan changes?
- Were the full scope of changes and activities necessary?
- How has CEPI's role evolved in relation to other global immunization stakeholders?

2. Strategy Development and Gap Analysis

- Identifying and filling gaps in the business plan
- Process transparency and inclusion of partners
- Perception of changes by partners
- Articulation of implications on non-COVID portfolio

3. Governance and Operations

- Governance suitability for purpose
- Clarity, efficiency and timeliness of governance
- Stakeholder understanding of governance process and decisions
- Inclusivity of governance (particularly with partners/stakeholders)
- Transparency of governance

4. Partner and Stakeholder Engagement

- Ability to function as a coalition
- Understanding and agreement with CEPI's strategy and objectives
- Degree of engagement in decisions
- Role and contributions of JCG
- Inclusivity of partners
- Degree of accountability

5. Advocacy and Resource Mobilisation

- Investor understanding and alignment of objectives/risks/mission
- Investor expectation of outputs and outcomes
- Stakeholder perceptions and expectations of CEPI

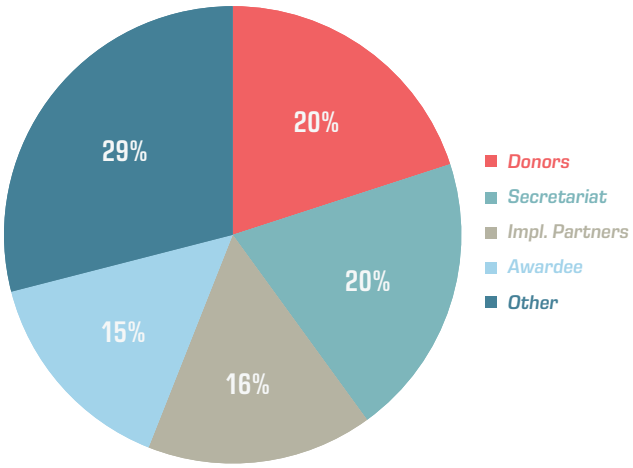
6. Investment in Candidates, Platforms and Enabling Science

- Contribution of disease X investments to COVID response
- Clarity, efficiency, and timeliness of selection process
- Role and contribution from the Scientific Advisory Committee
- Applicability of "normal" processes
- Understanding of down-selection process

The MTR framework, which aligns with CEPI's Theory of Change, was adapted to capture themes relevant to the CRR. These themes informed the structure of both the survey and interview guide, which were approved by the CEPI Secretariat. The full framework, survey questions and the interview guide are included as Annex 3.

Relevant CEPI internal documents, policies and reports (public and from various governance bodies) concerning the COVID-19 response were consulted, in tandem with 40 relevant articles selected via a systematic literature review. An online survey was administered to 154 stakeholders and 49 responses were collected (38% response rate), with comparable representation across stakeholder types. In parallel, an online survey was administered to 15 selected CEPI Secretariat staff and returned 12 responses (80% response rate). Finally, 27 structured *viva voce* interviews with stakeholders across the different groups were completed (75% of the targeted sample). There is some overlap between the stakeholders contributing to the CRR and those that contributed to the MTR (50% of the survey respondents and 22% of the interviewees), and to a lesser extent with those that participated in the CEPI Reputation Management Review.

Chart 2: CRR Survey (n=61)



CRR respondents split (stakeholders and Secretariat) – The category "others" includes Board/Founders, JGC/SAC members and countries

Similarly to the MTR, and thanks to the larger responder base, the CRR provides valuable insights that often confirm the ones emerging from the MTR, hence strengthening their significance.

Findings of the Mid-Term Review (MTR)

Findings of the Mid-Term Review (MTR)

Mission

Survey and interview responses indicated support for CEPI's mission, strategic objectives and broad acknowledgement of the progress achieved. Such support is consistent with the outcome of the "Reputation Management Research"* conducted in 2019 and with the majority of the findings in the desk review. In particular:

- Stakeholders strongly believed that **CEPI has improved the global health landscape** by increasing preparedness for epidemic disease outbreaks, as synthesised by the following: *"the recently launched Coalition for Epidemic Preparedness Innovations represents a critical step to address known viral threats, such as the Middle East respiratory syndrome coronavirus, Lassa fever and Nipah virus, for which vaccine or countermeasure development is challenging."*[5]
- Many stakeholders noted that **achieving the CEPI mission will require ensuring that vaccines complete late-stage clinical development and licensure.** Some stakeholders favour direct CEPI engagement, while others suggest strategic alignment with additional funders when feasible. Furthermore, some stakeholders called for ensuring manufacturing capacity to serve the needs of low-income countries.

Findings follow the structure outlined in Table 2 (on page 10) with the review indicators discussed in each section.

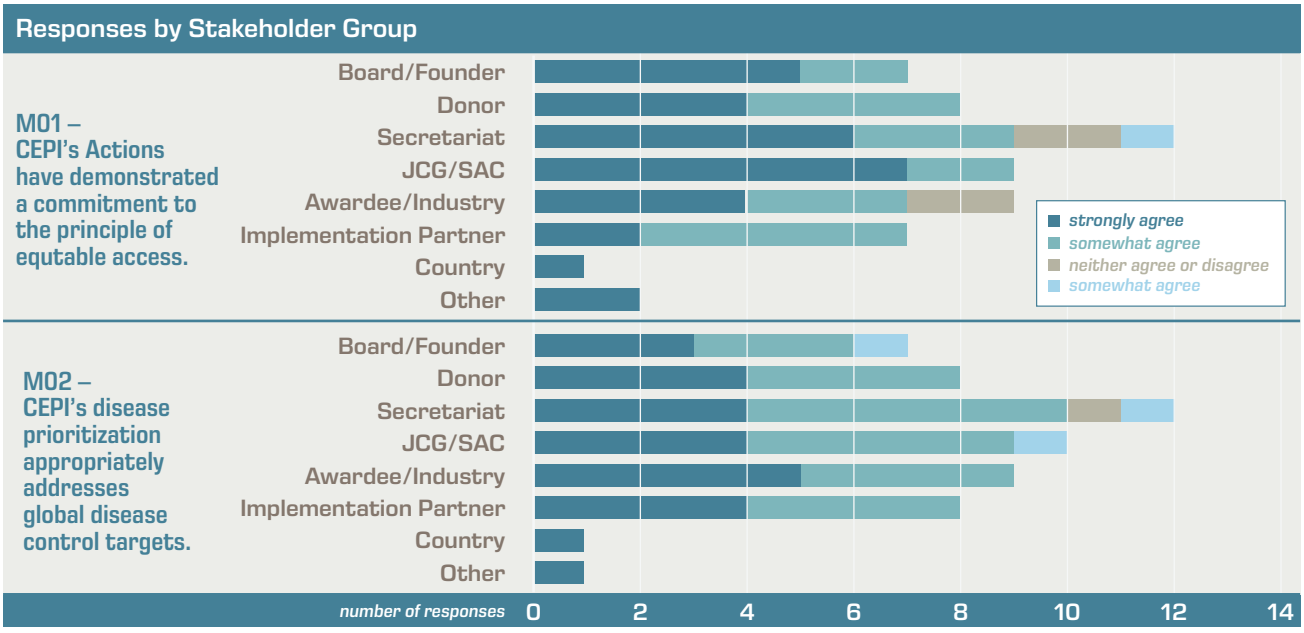
More nuanced views emerged, in particular regarding:

(a) the unmet downstream challenges of producing vaccines and rolling-out large immunisation programs, with the need for CEPI to coordinate with other actors to ensure achievement of its goals.

(b) the complex geopolitical situation CEPI needs to navigate to fully achieve its goals: "...[I]t remains highly uncertain the US Government could be tapped again for additional research and development funds [for CEPI]. Also of concern are the governance and distribution mechanisms of a global vaccine development fund, including how the list of vaccines is prioritized, and whether the scientists and administrators from donor countries would be willing to cede control of funds to an international entity in Geneva or elsewhere."[9]

Although a minority, these perspectives provide a sense of the variety of views on those aspects.

Figure 3: Respondents perception of progress toward CEPI's mission



* The Reputation Management Research was performed by the Brunswick Group during summer 2019 with the goal of (a) understanding CEPI's reputation and the factors that drive it and (b) use insights from this research to inform development of a reputation management plan. The assessment was based on information and insights captured via 35 stakeholder interviews and a desk review of 7 peer organisations.

"The recently launched Coalition for Epidemic Preparedness Innovations represents a critical step to address known viral threats, such as the Middle East respiratory syndrome coronavirus, Lassa fever and Nipah virus, for which vaccine or countermeasure development is challenging."[103]

Do CEPI's strategic objectives enable it to achieve its mission?

CEPI documented the **development of its strategic objectives** in two papers,[11, 12] describing the evolution of three task teams over the course of 2016, prior to the formal launch of the organisation in January 2017. Given the large number of stakeholders with diverse perspectives, the effort to develop well-defined strategic objectives and operating principles risked devolving into a social bargaining process that could generate ambiguous results or skew toward single stakeholder views..

To mitigate this risk, CEPI engaged in an extensive exploratory decision-analysis process to gather stakeholder input, means-ends mapping, group discussions, and a discrete-choice experiment.[11] In large part, the strategic objectives outlined in CEPI's ToC (up to the Outcomes component) closely mimic those articulated in the two CEPI publications.

As highlighted in both survey and interview responses, **to be successful in its ambitious mission will require going beyond CEPI's remit ending at Phase 2b – and accompany vaccine candidates toward licensure.** While respondents agreed that moving vaccines to licensure with manufacturing plans in place is the ultimate goal, some also cautioned against "scope creep." As a result, opposing views emerged. Some stakeholders favour direct CEPI engagement, — up to assuring that manufacturing capacity is available to serve the needs of low-income countries" — while others suggested a more indirect role focused on seeking strategic alignment with external funders (when feasible), and *"seeking co-funding arrangements to support late-stage development"*[13] as done in the case of CFP3.

The difference of views on CEPI's responsibility in late-stage vaccine development and the potential for unrealistic expectations among stakeholders, policymakers and the public has existed since the organisation's inception and has possibly been unintentionally driven by commentary from its champions and funders (and, in some cases, staff).

- One prominent donor noted that CEPI's goal *"is the capability to develop, test, and **release new vaccines** in a matter of months rather than years"* [emphasis added].[16] The average New England Journal of Medicine reader is unlikely to read that sentence and understand that CEPI will "release" unlicensed vaccines, if it retains its current remit.
- A report from a CEPI-sponsored workshop asserts that *"CEPI will also support innovations and effective processes **for licensing and using vaccines,** outcomes that may have impact beyond the specific diseases"* [emphasis added].[17] Many readers will understand "support" as financial.

Importantly, several survey and interview respondents noted that going beyond Phase 2b will require significant additional funding and capacity within CEPI.

Are CEPI's actions and investments consistent with the principle of equitable access?

Special attention was devoted by respondents to CEPI's considerable time and effort in crafting an equitable access policy that balances the divergent viewpoints of its stakeholders.[10] This **effort and CEPI's strong commitment to equitable access**

The need for CEPI to ensure that later-stage vaccine development is successful was recognised in the ToC through the inclusion of two indicators — **Indicator #6** *(Percent of vaccine "Partnership Agreements" that have manufacturing plans in place to enable vaccine production in response to an outbreak)* and **Indicator #19** *(Percent of vaccine "Partnership Agreements" in place that contain contingency plans for manufacturing),* both focusing on manufacturing aspects of vaccine candidates.

It should be noted that, with its current level of engagement and partnership, both indicators are on track as per the latest APR.

"CEPI's value, as summarized by one donor 'is the ability to develop, test, and release new vaccines in a matter of months rather than years.'"

were widely recognized by stakeholders, but the complexities of this topic and the short amount of time that has elapsed since its implementation make it difficult to assess CEPI's contributions at this point.

CEPI's approach to equitable access has evolved from its first policy established in 2017,[19] through a revision process[10] and new principle-based approach[20] (vs. the prior rule-based one) that is supported by inclusion of a commitment to equitable access in the CEPI mission statement. During its inception and interim phase in 2016-2017, the mission was: *"CEPI will stimulate, finance and co-ordinate vaccine development against emerging infectious diseases with epidemic potential, especially in cases where market incentives alone do not achieve this,"* and in 2018 the latter part of the mission changed to "*CEPI accelerates the development of vaccines against emerging infectious diseases and **enables equitable access** to these vaccines for affected populations during outbreaks."* The inclusion of "equitable access" in the mission statement appears to have been a way to indicate the overall importance of equitable access to CEPI, as well as a recognition of the difficulty in operationalizing specific equitable access commitments given CEPI's span of control.

The first equitable access policy (published in 2017) established the baseline expectation for how CEPI would manage this matter, including that **equitable access would focus on cost coverage for developers, management of intellectual property (IP) and shared risks and benefits.** Following an extensive consultation process and experience from the first call for proposals (CFP1), the December 2018 policy language changed toward the definition of a set of principles. It also provided a definition of what CEPI means by equitable access: *"Equitable access to epidemic vaccines in the context of an outbreak means that appropriate vaccines are first available to populations when and where they are needed to end an outbreak or curtail an epidemic, **regardless of ability to pay"*** — focusing its application to outbreak situations. The change in approach was guided by the desire of providing CEPI with more flexibility in its dealing with partners.[10] However, it raised concerns with some stakeholders that indicated how those changes risked diluting CEPI's ability to enforce its policy and its commitment.[101]

In April 2019, a document[21] detailing agreements made up until that point was published, with language referencing equitable access: "*... enable equitable access to these vaccines for people, **especially the poor and disadvantaged,** during outbreaks".*

The April 2019 document, while reflective of agreements signed at the time of publication, has not been updated and, at the time of this research, information is missing on two Nipah agreements. One of the contractual elements (Section 5) — agreed upon by all manufacturers — relates to the monitoring and implementation of equitable access in vaccine manufacturing and scientific work and suggests that a review of equitable access compliance be carried out during stage-gate reviews (SGRs). Review of documents submitted by four awardees supporting SGRs that occurred from late-2019 to early-2020 revealed a gap: only one of the four awardees referred to equitable access commitments in the documentation.

The establishment of the EAC was one other important step in the direction of the establishment of a stronger monitoring of equitable access. The EAC met for the first time in November 2019 and again in January 2020, reinforcing the suggestion of using SGRs to monitor equitable access commitments and

Additional monitoring of equitable access commitments is done through **Indicator #7:** *"Percent of development partners agreeing to terms consistent with equitable access policy."* This has been rated as "on-track" in both 2018 and 2019, pointing mainly to the Equitable Access Committee (EAC) as a means for tracking these commitments.

Additionally **Indicator #13:** the *"Percent of development partners with **plans** in place for equitable access"* — has also been rated as "on-track" in both 2018 and 2019. In 2019, the indicator comment that "access plans will be put in place when projects enter Phase II trials [and] in 2019, no projects progressed to phase II trials."

focus on procedural issues.[22] The February 2020 EAC meeting discussed management of recently signed agreements in the absence of an equitable access plan.[23]

At the **more operational level,** CEPI implemented a set of measures aimed at ensuring equitable access to the vaccines developed with its funding. Those measures include provisions aimed at:[21]

- **ensuring access to vaccines and platforms** – requiring establishments and maintenance of stockpiles, access to the vaccines and platform also after end of the agreement
- **ensuring project continuity** – for projects and platform, establishing step-in rights, defining preferred partners to continue the work
- **sharing of commercial returns**
- **data sharing and transparency**
- **monitoring implementation in manufacturing and scientific work**

Nevertheless, some questions were raised and some implementation aspects remained unclear. It was noted that CEPI's responsibility regarding equitable access was focused on clarifying elements of CEPI's relationship with its awardees and less on defining boundaries of CEPI's intentions and responsibilities on enabling access to countries, hence leaving some important areas not covered (e.g., are all countries beneficiaries of the access policy and if so are they benefiting in the same fashion?). Since the achievement of the goals in this area depends equally on the clarity of the principles and implementation of the policy, an open debate on how prescriptive the policy and how strong the enforcement measures in the contract should be. Overall, the situation points to future refinement work following the first years of implementation.

Indicator #7 (percent of development partners agreeing to terms consistent with equitable access policy) and Indicator #13 (percent of development partners with plans in place for equitable access) were rated as "on-track" in both 2018 and 2019.

Despite some of these operational inconsistencies, most stakeholders completing the survey agreed that **CEPI's actions demonstrated a commitment to the principle of equitable access**.

Interview comments were also positive and revealed some of the complexities and uncertainties in the equitable access commitment. It was evident from the comments received that stakeholders and observers interpret the most critical aspects of equitable access differently, with some focusing on the physical availability of vaccines and others primarily on the affordability aspect. One stakeholder posed the underlying question: *"what do we mean by equitable access?"*

Strategy Development and Gap Analysis

CEPI's preliminary business plan for 2017-2021[24] outlined a mission to *"stimulate, finance, and co-ordinate vaccine development against emerging infectious diseases with epidemic potential,* ***especially in cases where market incentives alone do not achieve this,"*** to be attained via the achievement of four strategic objectives:

- **Preparedness:** advance late-stage emerging infectious disease (EID) vaccine development to enable testing in the initial stages of an outbreak
- **Response speed:** build technical and institutional platforms to accelerate research, development, manufacturing and clinical evaluation in an outbreak
- **Market predictability:** secure industry participation through partnerships that share the risks and benefits of vaccine development
- **Equity:** support the long-term development of regional capabilities for EID vaccine preparedness

In 2018, following the formalisation of the ToC, an updated business plan for 2019-2022[1] was developed to translate the ToC into measurable targets and actions under the new mission to *"accelerate the development of vaccines against EID and* ***enable equitable access to these vaccines for affected populations during outbreaks.***" The three strategic objectives identified as part of the ToC are:

- **Preparedness:** advance access to safe and effective vaccines against EID
- **Response:** accelerate the research and development and use of vaccines during outbreaks
- **Sustainability:** create durable and equitable solutions for outbreak response capacity.

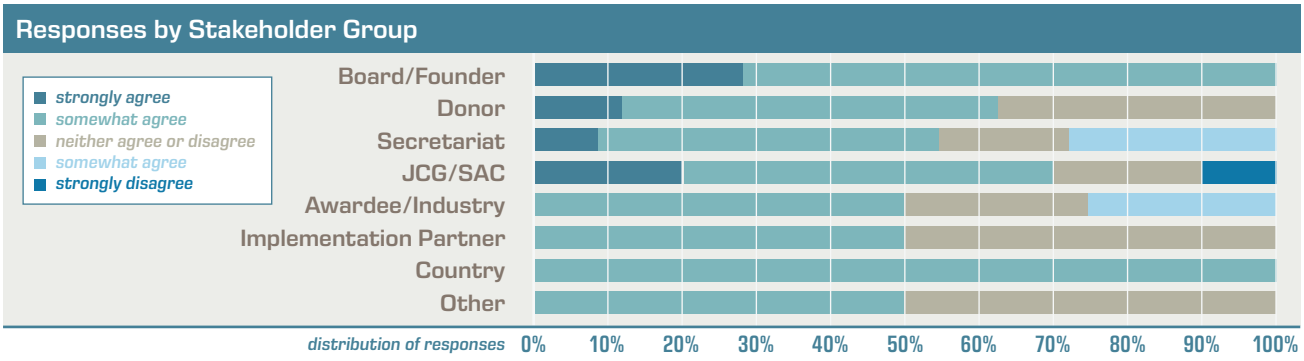
CEPI's mission: stimulate, finance, and co-ordinate vaccine development against emerging infectious diseases with epidemic potential, especially in cases where market incentives alone do not achieve this.

The subtle changes of the strategic objectives — particularly on sustainability — reflects a shift occurring in parallel with the establishment of the permanent governance structure, as well as reflecting the diversity of stakeholder perspectives on CEPI's role. Specifically, the drop of market predictability appeared guided by the fact that this appears more as a strategy than a goal. Equity (originally focusing on a generic development of capabilities) appears expanded by being subsumed under the broader definition of sustainability. No formal explanation of the changes was identified in documents. Evidence suggests that these changes have contributed to **some stakeholders interpreting the scope of CEPI's responsibilities differently**.

Is CEPI on-track to meet its strategic objectives?

Survey respondents and interviewees shared reservations about whether CEPI is on track to meet 2022 targets. CEPI's latest internal portfolio timeline and attrition projections indicate that the current portfolio is expected to deliver a mid-stage clinical pipeline with ready investigational stockpiles for each of Lassa, MERS and Nipah vaccine, and a late-stage Chikungunya pipeline by the end of 2023

Figure 4: Respondents' perception of the likelihood of CEPI meeting its 2022 targets



at the earliest.* This represents an overall delay of 1-2 years vs. CEPI's initial 5-year business plan targets. As pointed out by various stakeholders, the time requested to successfully establish a portfolio of products, resource limitations and, above all, the SARS-CoV-2 pandemic are identified as the factors impacting CEPI's ability to reach these targets. The latter factor is seen as the one that has most strongly impacted the organisation, and done so at different levels: (a) access to materials, (b) disruptions in the logistic of clinical trials, and (c) business continuity disruptions and priority changes.

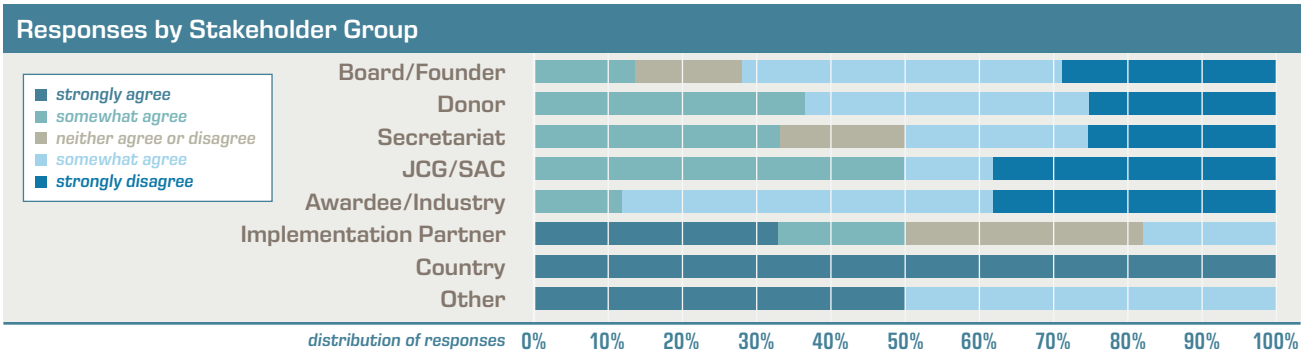
Respondents recognise the difficulty inherent in predicting outcomes for these indicators even more in the context of the SARS-CoV-2 pandemic, and suggested implementing process indicators to provide an ongoing actionable monitoring tool. As highlighted by one respondent, *"there are not a lot of process indicators, so stakeholders cannot really tell where we are in terms of process. The regular updates are a source of information beyond these indicators, but more formalized process indicators would be helpful."*

The great majority of stakeholders responding to the survey (93%) believed that CEPI has, at the time of the MTR, engaged effectively in the SARS-CoV-2 response, and several stakeholders commented on the likelihood that SARS-CoV-2 will delay CEPI's work in non-COVID-19 areas by reducing, at least temporarily, the focus and the resources.

The majority of survey respondents (80%) agreed that CEPI engaged effectively in the 2019 Ebola outbreak response. One divergent voice highlighted the theme of country involvement that returns in various parts of this MTR: *"the MoH [Ministry of Health] should have been involved. We fall into an easy and comfortable routine with the usual suspects. We don't get a critical mass of representatives from the Global South."* Multiple stakeholders believe that Ebola and SARS-CoV-2 have increased the profile of CEPI and the attention to global health security.

However, this positive notion is qualified by the fact that most stakeholders surveyed believe that CEPI does not have sufficient financial resources to achieve its business plan targets.

Figure 5: *Respondents' (52) perception that CEPI has sufficient financial resources to successfully implement its Business Plan*



Has CEPI monitored progress in achieving its strategic objectives and implemented corrections as needed?

Progress is measured against established targets through a set of 15 indicators, each aligned to an element of the ToC.

CEPI monitoring indicates that seven of the 15 indicators were "on-track" for 2018 and 2019. Three indicators are consistently rated as "action required" or more, consisting of:

- Agreements in place with downstream financing partners in place for each of CEPI's priority diseases (indicator 16)
- $1bn USD raised as multi-year contributions to CEPI (indicator 17)
- Percent of priority actions taken to achieve efficiencies (indicator 18)

A number of stakeholders — chiefly those with the greatest organisational knowledge — and CEPI staff agree that indicators requiring the most attention are those related to securing financial resources to

*Detailed information on CEPI's portfolio performance as per the end of 2020 is available in the Performance Annex (p. 54).

Figure 6: Progress of indicators by years

The results published in the 2018 and 2019 APRs[25,26] are translated according to the following scheme for display:
Substantial Action Required | Additional Action Required | Action Required | Action May Be Required | On Track

Indicator #	Indicator Description	2018	2019
5	Number of vaccine candidates in investigational stockpile for outbreak situations and ready for efficacy studies and emergency use		
6	Percent of vaccine Partnership Agreements that have manufacturing plans in place to enable vaccine production in response to an outbreak.		
7	Percent of vaccine development partners agreeing to terms that are fully consistent with CEPIs Equitable Access Policy		
8	Number of vaccine candidates – for each priority disease – advanced for each priority disease		
9	Number of available Biological Standards and validated assays (including Standard Operating Procedures) for evaluation of vaccine candidates against CEPI's priority pathogens		
10	Percent of vaccine candidates in clinical development (e.g., being tested in humans), with relevant engagement from national authorities—including regulators—in at-risk countries.		
11	Number of vaccine platform technologies that can be rapidly adapted to develop vaccines against unknown pathogens for use in humans		
12	Percent of vaccine development partners with necessary agreements in place for vaccines to be deployed and tested during an outbreak		
13	Percent of vaccine development partners with plans in place for equitable access fully consistent with CEPI's Equitable Access Policy		
14	Number CFP2 vaccine candidates progressing through preclinical and P1		
15	Annual analysis of available technologies and the gaps that currently exist		
16	Agreements with downstream financing partners in place for each of CEPI's priority diseases		
17	$1bn raised as multi-year contributions to CEPI		
18	Percent of priority actions taken to achieve efficiencies		
19	Percent of vaccine Partnership Agreements in place that contain contingency plans for manufacturing		

meet the business plan targets, which was added to CEPI's top organisational risks in 2019. These sentiments are supported by the five-year cash flow projection, which indicates a zero cash balance in 2022 in the absence of new investment (and assumes accurate attrition rates of R&D project investments).

The focus on overall resource needs contrasts somewhat with budget underspending for the areas with the largest proportion of spending, R&D project investments, where in 2018 $35 million USD was spent against a budget of $148 million USD (24%) and in 2019 $104 million USD was spent against a budget of $157 million USD (66%). [25] On this matter, it should be noted that the provisional budget established in 2017 at the moment of CEPI's foundation was established for a fully-new enterprise whose operations were still in the making and whose operational dynamics were unknown. In practice, the first awardee payment didn't start before April 2018, one year later; furthermore, the time required to conclude partnership agreements at the onset often took more time than originally envisaged, as a result of the due diligence processes and contract negotiations took longer than anticipated. Such dynamics continued in 2019 when, again, the contracting work was more time consuming than anticipated. Those circumstances — combined with awardees frequent delays in sending payment requests — resulted in the recorded overspending. Adjustments to the budgeting process to reflect a more in-depth understanding of the contracting and disbursement dynamics are underway.

CEPI's risk management is grounded in the Risk Management Policy,[27] which calls for a risk report to be presented at each Board meeting. **The risk register published in the 2018 and 2019 Annual Reports[25, 26] identified the same six organisational risks** (as presented in Table 4). In early 2020, the full risk register contained forty risks, each scored and assigned an identified owner and mitigation actions.

Table 4: CEPI's top risks 2019, CEPI Annual Progress Report 2019

Risk	Impact	Probability of Occurance	Risk Score	Level of Control
Understanding in Secretariat leading to too high workload, reduced quality, delays and not delivering on CEPI's mission	4	4	16	3
CEPI not developing safe and effective vaccines five years after launch	5	5	25	3
Insufficient collaboration with central partners (e.g., WHO, GAVI) leading to lack of coordination of resources related to outbreaks	5	4	20	2
Leakage of sensitive information	4	4	16	3
CEPI not acheiving its $1bn USD funding target	5	4	20	2
Abuse of power, misuse of public funds	5	3	16	3

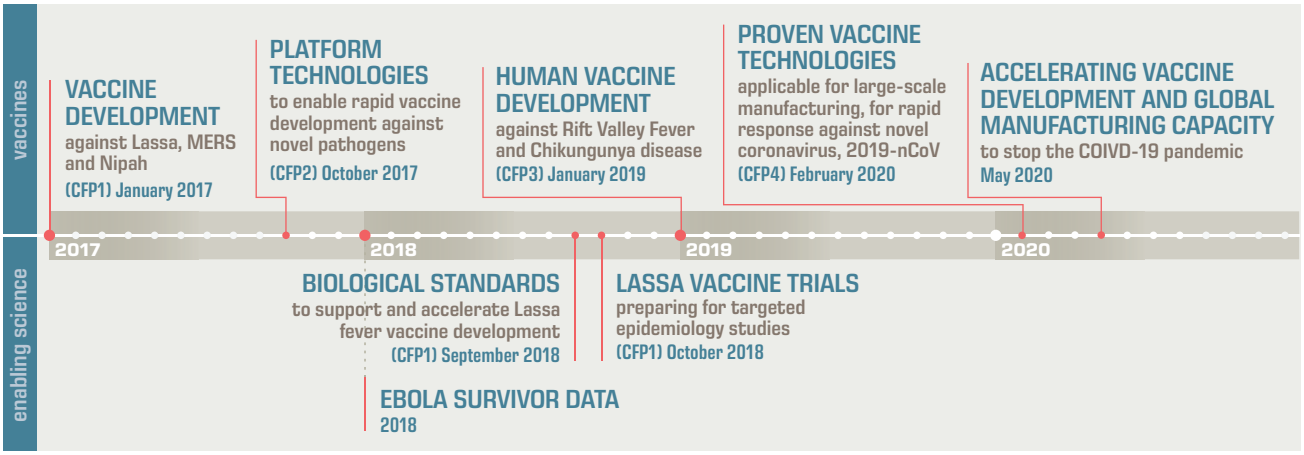
The first report was presented at the March 2018 Board meeting, with an update at the October 2018 meeting reiterating the intention to report the risk register at each future Board meeting. Risk management was set as a standing item of the ARC agenda and the ARC received regular updates on the increasingly sophisticated approach to risk management during 2019, which included a more refined scoring approach. While discussing risk on many agenda points and having access to the ARC documentation and decisions, the Board could benefit from a more structured discussion of the risks fully leveraging the risk register approach.

Operationally, as described by the R&D playbook, projects undergo multiple internal and external review steps, where risks are assessed and input is collected for the risk register.

While a lot of progresses have been achieved and further strengthening of the process is continuously ongoing, additional focus is warranted in two areas: the consistency of risk monitoring across the various processes and better leveraging the role of the SGR in monitoring risks. On the first topic, project risks and mitigation activities were documented in each of the two Integrated Product Development Plans (IPDPs), dated July and December 2019. Each IPDP contained a short list of risks that were not reflected in the risks expressed in the November 2019 Project Summaries,[28] prepared for the Annual Portfolio Review. On the second aspect, despite the stated objective of using the SGRs to monitor risks related to development projects, only one of four SGR documents prepared by development partners (dated between September 2019 and March 2020) contained an explicit list of risks.

Investments in Candidates, Platforms, Enabling Science and Expert Assistance

CEPI initiates the investment process by deciding on target diseases. CEPI then issues calls for proposals (CFPs), inviting applicants to submit funding proposals for projects to develop specific vaccine candidates or enabling science. Disease priorities were seen by stakeholders as appropriate. Some survey respondents made suggestions for additions (such as SARS-CoV-2) and deletions (Rift Valley fever, Nipah), and suggested a review of disease priorities. As per March 2020, CEPI has had CFPs for:



Has CEPI been successful in attracting and managing development partners capable of delivering on its 2022 targets?

At the time of the MTR, 55 entities from 15 countries have responded to the first 3 CFPs, whilst 13 entities have applied for more than one disease target. One of the applicants was a top five global vaccine company. Twenty contracts have been awarded to 15 entities, spanning a wide spectrum of technologies across eight countries. Contract awards involve up to 12 partners working in a consortium to support the awarded lead entity. Two of the 15 lead development partners currently have licensed other vaccines.

Stakeholder responses were mixed regarding whether CEPI has attracted capable development partners and technology.

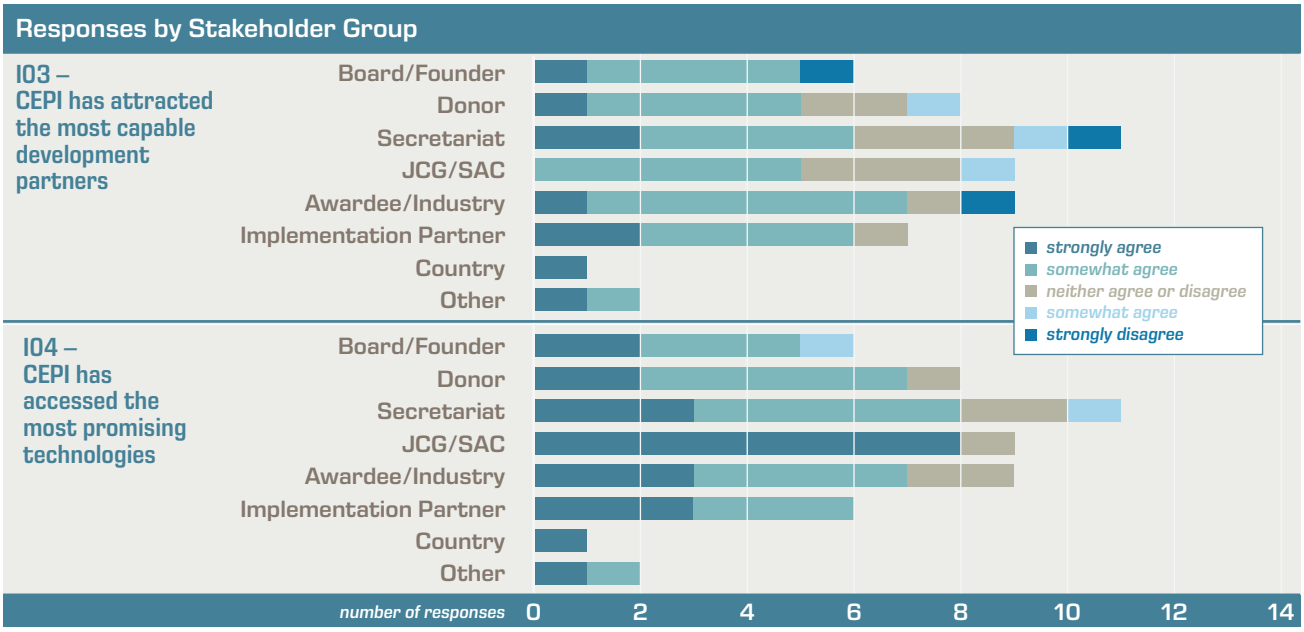
The responses illustrate the existence of divided opinions on the best type of development partner for CEPI and the benefits of different types.

- Several respondents noted that *"CEPI has not been able to attract big pharma"* also because of its access policy and the absence of pull incentives.
- Others pointed out that big pharma is less interested in early development of EID vaccines – CEPI was created exactly to address that issue – hence CEPI's portfolio is reflective of this situation.
- It was also noted that most of CEPI's development partners do not have experience taking vaccines to licensure and they lack capacity for regulatory, manufacturing and distribution.

Development partners or potential future partners responded more negatively to the survey than other categories of stakeholders. Their comments indicate an overall feeling of disconnectedness to CEPI and illustrate the dimensions of the challenge: *"as one of the important stakeholders, industry needs to be more involved in discussions about the long-term strategic mission of CEPI. The types of commitments and global infrastructure needed to truly be more prepared will require thoughtful sustained investments by governments, NGOs and industry. Other parties need to be better educated on the risks industry faces as part of the overall ecosystem in pandemic preparedness. Having an industry voice … is vital to ensure that, when needed, industry can be successful" [emphasis added].*

Development partners have generally been performing **adequately on their contracts.** CEPI has performed external audits on awardees from CFP1 with some important (but not critical) findings and has recommended adjusting future due diligence practices as a result of these findings. Of the five SGRs that should have occurred within the timeframe of interest, four occurred as planned. **The overall performance monitoring of development partners remains under development.**

Figure 7: Respondents' perception of CEPI's partners and technologies



Has CEPI established a balanced portfolio and is it effectively managing it to achieve its 2022 targets?

Portfolios of investment against each disease target have been constructed and are monitored through a process established during early 2019, whereby each project passes through an SGR prior to moving into the next phase of development and financing. Most stakeholders view the system as being positive, though many commented that **it is too early to judge the success of the portfolio.** Since inception, just four SGRs have taken place, and all resulted in continuation of the projects.

In November 2019, an Annual Portfolio Review meeting invited 57 stakeholders (including members of the CEPI Board, IC, JCG, SAC and Coalition Partners) to provide feedback on CEPI's portfolio at that point in time. A long set of recommendations were documented, with seven major recommendations for further consideration, including items such as *"focus on active portfolio management activities to mature and de-risk the current portfolio," "clarify path forward for future development and access for MERS, Nipah and Disease X" and "continue funding for Lassa projects beyond Phase IIa to drive late-stage development and licensure."*

The process and timing through which investments are made has evolved significantly from the first CFP and **the time required to process applicants has decreased significantly.**

Three indicators of the monitoring framework focus on CEPI's performance in managing its investments across the different stages of clinical development, leading to the creation of investigational stockpiles (which would be in place to respond to outbreaks):

Indicator #5: number of vaccine candidates in investigational stockpile for outbreak situations and ready for efficacy studies and emergency use

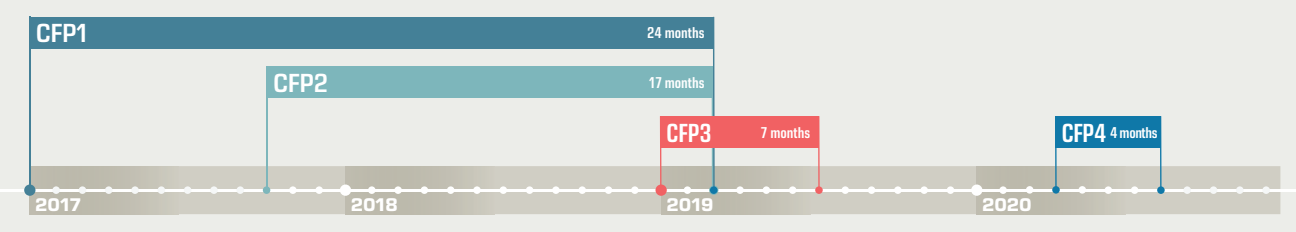
Indicator #8: number of vaccine candidates advanced through preclinical trials / Phase I / Phase II (depending on the disease)

Indicator #14: number of CFP2 vaccine candidates progressing through preclinical / Phase I

It should be noted that all 3 indicators have moved from "requiring action" status in 2018 to "action may be required" or "on track" in 2019, highlighting an important progression in the core business area of the organisation.

- CFP1 launched in January 2017 and the last of 13 agreements was signed in March 2019 (24 months). There were 33 applicants, 28 eligible applicants, 16 invited to submit a second phase proposal, and 14 that completed due diligence.
- CFP2 launched in October 2017 and the last of three agreements was signed in March 2019 (17 months). There were 25 applicants, 33 eligible

Figure 8: Months to completion of awards per CFP



applicants, 18 invited to submit a second phase proposal, and 6 entered due diligence. Two did not progress due to technical issues and one applicant withdrew.

- CFP3 launched in January 2019 and four agreements were signed by July 2019 (7 months), with one remaining under negotiation. There were 15 applicants, and 13 eligible applicants.

Although not completely in-scope for this analysis, the speed of awarding contracts for SARS-CoV-2 projects has been compressed significantly, with 10 agreements signed within four months, although some caveats do not make the records entirely comparable.

Stakeholders expressed views that **the investment process has improved and is well-managed.** A suggestion was made to provide companies with feedback on why they are declined and inform investor countries of funding decisions relating to companies located in their countries.

Investment and portfolio decisions begin with the **SAC, whose role is generally seen as positive,** even if some stakeholders expressed concerns about SAC expertise. To improve SAC effectiveness, the following suggestions emerged, some of which are currently under discussion as part of the new strategy:

- Reviewing the SAC roster, to ensure more developing country voices
- Having more developers on the SAC and fewer scientists
- Enhancing the connection between SAC and JCG
- Decreasing the size of the SAC
- Formalizing SAC governance: *"The Secretariat will need to further tighten up governance with regards to SAC skills and appropriate numbers. We will need to discuss a reservoir of experts for providing additional help, as an ad-hoc group or as subgroups/working groups to the SAC, which would allow the SAC itself to be smaller."*

Some of the following feedback on the SAC points to topics deserving additional investigation, in view of the level of risk involved: 1. the fact that discussions can be dominated by a small number of vocal participants, 2. the influential role assumed by consultant firms, and 3. the desire for go/no go stage gate decisions to be tougher.

The example of the selection of Chikungunya (CHIKV) virus as a target disease and the subsequent funding of vaccine candidate demonstrates some **apparent gaps in communication and/or a continuity in decision-making that resulted in funding for a Phase 3 clinical trial that — while consistent with CEPI's mission of facilitating progression toward licensure via different direct and indirect interventions — is not in alignment with the Business Plan[1], results framework and indicators.** While the confidential documentation does give a stronger sense of the multiple discussions on whether to fund CHIKV as a disease target, no evidence was found regarding the expansion of the business plan to be able to support the funding for a Phase 3 trial.

The process supporting **CFP3** is worth noting, both because it occurred after CEPI had gained some experience, relates the first real step in the late-stage development and because it triggered a resetting of Indicator #8, tracking the number of vaccine candidates developed.

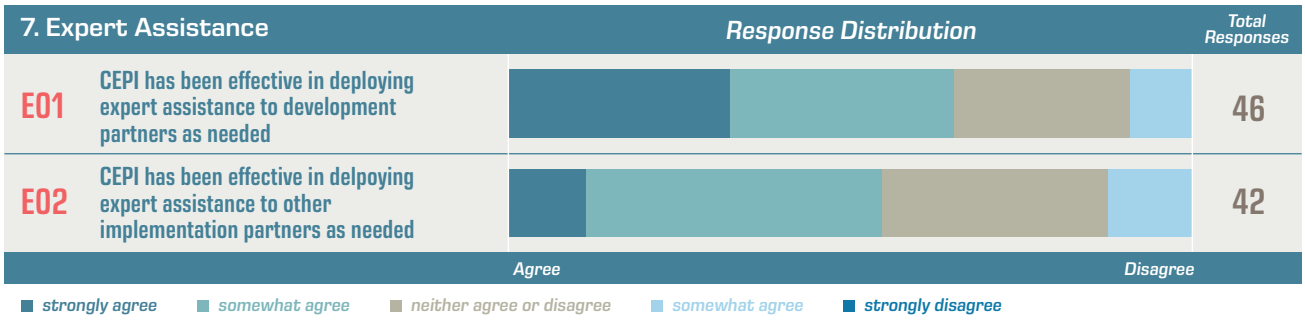
Has CEPI been effective in providing expert assistance?

Stakeholder perspectives on expert assistance are less positive than the ones concerning investment in vaccine development and there appears to be **a disconnect between CEPI's role in providing expert assistance to development and implementation partners, and Secretariat capacity.** Respondents were less familiar overall with this area of work of CEPI.

Some stakeholders felt there was too much reliance on consultants, and that CEPI should strengthen its Secretariat capacity to provide expert assistance. Others believe that CEPI should not provide such assistance, but instead leave that role to product development experts.

The perspectives vary significantly depending on point of view, from *"...CEPI does not have a lot of multinational companies in the portfolio, but actually works with a lot of small biotech firms. So, a lot of CEPI's staff costing has gone into increasing technical support for R&D development to its partners and this was a necessary development for the active portfolio development"* to *"it has been an element that may have slowed down some development. CEPI intends to be very helpful but they are not the experts and they should leave developments to the experts, not CEPI,"* and, finally, that *"awardees receive significant expertise from CEPI ... and CEPI provides a huge cost-savings for awardees"* through this expertise.

Figure 9: *Respondents' perception of CEPI's ability to deploy expert assistance*



Governance and Operations

Overall, the views of both interviewees and survey respondents regarding CEPI's governance and operations showed a **variety of perspectives depending on the component under discussion.**

Although the majority of survey respondents believe that CEPI's organisational design promotes shared accountability, several did not fully understand the roles of the Member Meetings and the Investors Council in CEPI's decision-making.

Respondents recommended that improving CEPI's landscape understanding and decision-making requires expertise from both industry and implementers from at-risk countries, which is better incorporated in CEPI's governance and operations.

Such perspectives are also included in earlier CEPI documents. The Board Effectiveness Review noted the need for more robust **performance management** — including defining and tracking key indicators — and recommended that the Board focus on **strategy** (not operations) and promote a stronger **risk management** approach.

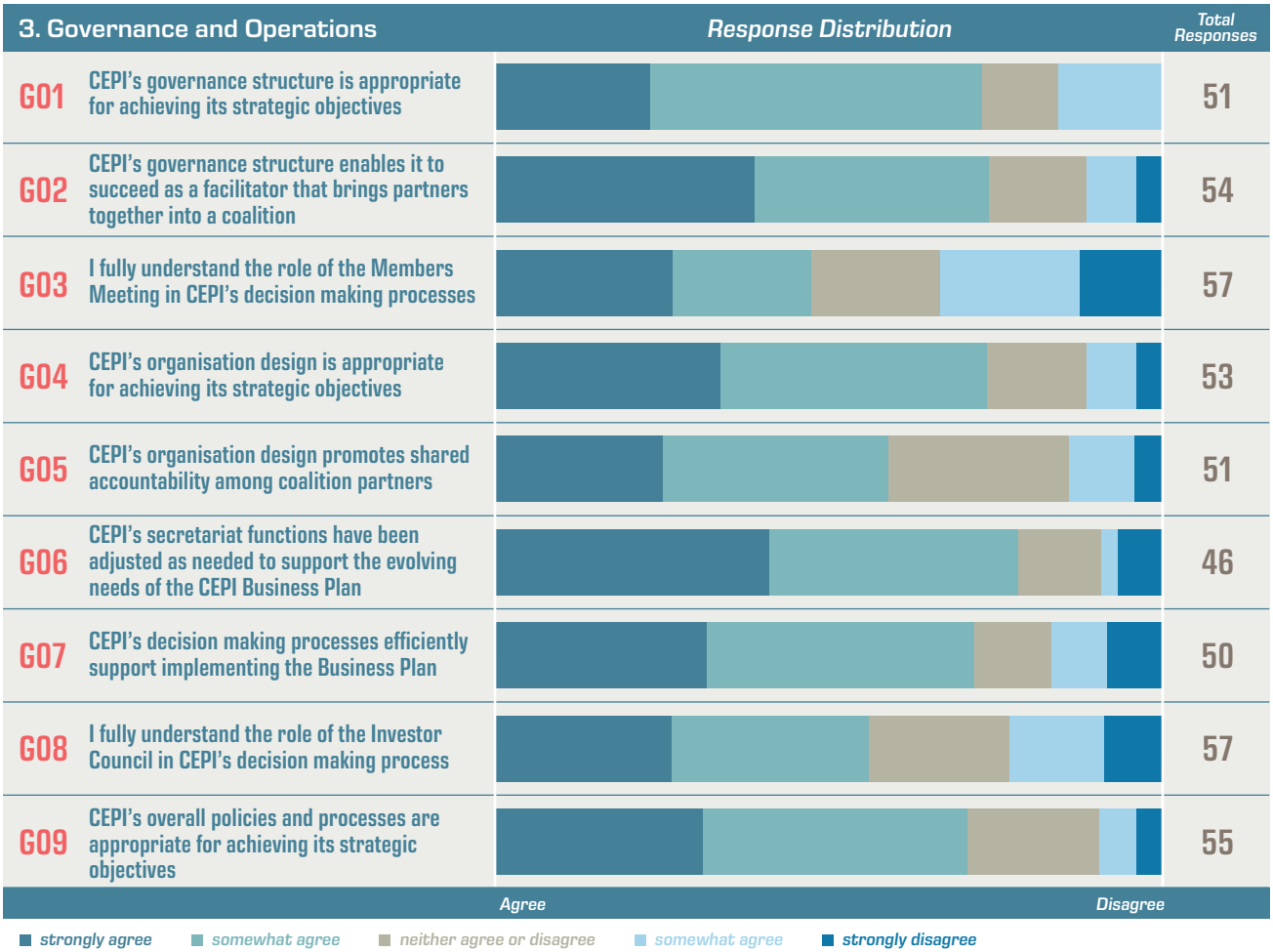
Do CEPI's governance structures and processes support achieving its strategic objectives?

CEPI's **governance and operations** were seen as functioning, although some gap areas were identified, particularly around the simplification and clarification of the overall governance and operational structure. This includes improvements to the function of both the SAC and the JCG.

In addition, both board members and investors asserted the role of the Investors Council (IC) needs review. This is consistent with the findings of the Board Effectiveness Review.[30]

Beyond the IC, some stakeholders expressed concern that certain investors' specific interests may have too much direct influence on the organisation's decision. The potential impact of investors' interests can be deduced from one document recommending that the U.S. government invest in CEPI, because *"if the United*

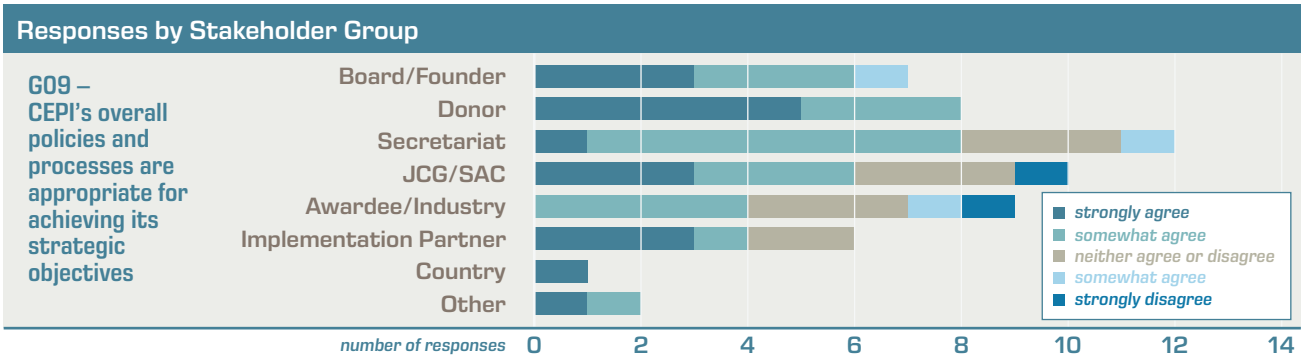
Figure 10: Respondents' perception of CEPI's governance and operations



States becomes a coalition partner, it will acquire a seat at the table early in the evolution of this promising new partnership, which will enable it to influence CEPI's decision process" [emphasis added]. This would allow the U.S. government to *"better align CEPI investments with other U.S. programmes and direct bilateral investments and motivate other donors, companies, and philanthropies to join the coalition."*[29] **Those interests at play should not be seen exclusively as a concern, but highlight the importance for CEPI to continue in its ongoing efforts to establish policies and strengthen transparency of its processes to ensure that potential conflicts of interests are duly managed."**

Operationally, the timeliness and level of details of the flow of information — including decisions and documentation from Board and Board committee meetings, and identified action items can be improved to avoid perception of lack of transparency. CEPI's recently instituted tracker will likely help this.

Figure 11: Respondents' perception of CEPI's policies and processes



While CEPI's internal policy framework provides solid accountability on operational matters, respondents noted areas for improvement in this area. Awardees, industry stakeholders, Secretariat staff and SAC/JCG members expressed less satisfaction in this area than donors, founders and Board members did.

The document review substantiated that CEPI has a **comprehensive library of internal policies,** covering a wide range of important operational risks and their mitigation. It is important that appropriate processes are implemented to ensure that these policies are tracked and evaluated.

Are CEPI's organisational design and human/financial/technical resources efficient and effective in achieving its strategic objectives?

Perspectives on CEPI Secretariat operations, capacity, and capabilities were largely positive with the hard work, positive attitude and flexibility of the staff being appreciated and explicitly called-out by many stakeholders. CEPI's capacity, resource management and budget constraints have emerged in successive risk reviews. The 2019 Annual Progress Report (APR) identified understaffing and high workload in the Secretariat as a significant risk with potential impact on quality, delays, and the inability to fully deliver on CEPI's mission.[31] The output of the survey, interviews and the desk review all substantiate the concerns that CEPI's resourcing — chiefly human capital and financial resources — are insufficient for its current remit. On this matter, the results of the Secretariat survey are consistent with the external perception of stretched human and financial resources.

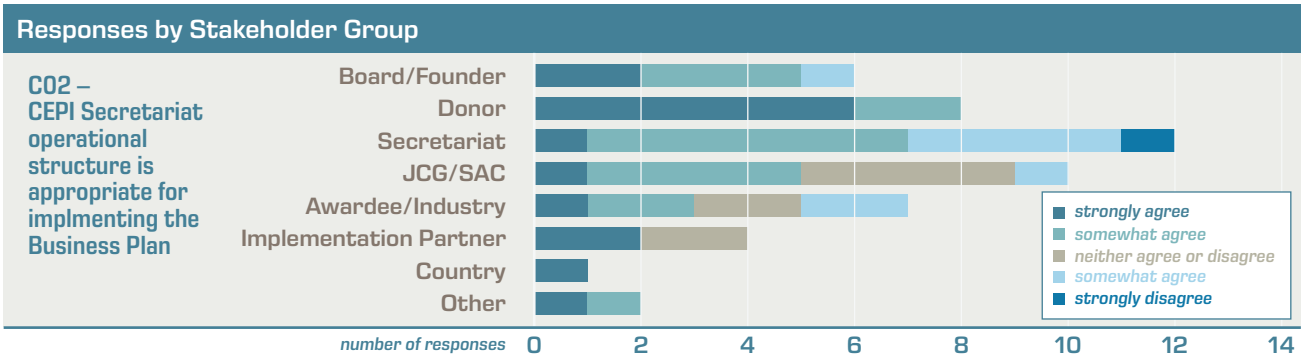
Interviewees assert that **additional capacity and capabilities** are needed within the Secretariat to improve technical expertise, commercial knowledge and policy/political abilities, which will improve CEPI's ability to effectively asses the implications of immunisation programme implementation on vaccine development in at-risk countries. As one interviewee noted: *"Doing input to output is easy. Doing output to outcome will require different kinds of people."*

Another respondent noted that CEPI needs *"more capability and capacity on the commercial side of the organization — because now [we are] trying to get vaccines to people rapidly. Manufacturing, supply allocation; much more resource mobilization and investment into the political side of things."* Panelists at a National Academy of Sciences workshop noted that CEPI will need to partner with experienced companies because it **lacks experience in approval and licensure**, as well as the fact that public health is inherently political and health diplomacy comprises incentivizing governments to achieve health goals. A ***"sophisticated health diplomacy and advocacy strategy will be needed to promote preparedness issues on political and financing agendas."***[18]

Does CEPI's Secretariat structure enable it to achieve its strategic objectives?

A majority of survey respondents considered the Secretariat structures as appropriate, with those who are more removed from the technical aspects of the organisation more positive than those engaged in technical aspects. Some stakeholders mentioned the Secretariat being spread across three location both as a potential constraint for its effective functioning, but also acknowledged the potential enrichment coming from the different cultures involved.

Figure 12: Respondents' perception on the appropriateness of CEPI's operational structure



Partner and Stakeholder Engagement

Most observers agree that CEPI is making a critical contribution to the global health ecosystem. Survey and interview responses are similarly positive. However, multiple respondents noted the need for CEPI to clarify its role in relation to other organisations, including:

- Clarifying CEPI's role in relationship to the roles of other epidemic preparedness organisations, particularly Gavi and the WHO
- Clarifying CEPI's role with respect to regulatory affairs, late-stage development, and manufacturing
- Improving collaboration with the WHO, including the Regional Office for Africa (AFRO)

This specific topic is understood and being addressed in the new strategy.

Does CEPI engage meaningfully with partners and stakeholders and promote shared accountability?

CEPI received **high marks for engaging with development and implementation partners**, and with stakeholders in affected and potentially affected countries. CEPI instead received more **mixed reviews on managing multiple perspectives, including the risk of trying to please everyone.**

With specific reference to the engagement with at-risk countries, respondents cited different areas where enhancements should be pursued:

- Participation in CEPI decision-making, including roles on the Board and in SAC

Have CEPI's efforts resulted in a more sustainable ecosystem for epidemic preparedness innovations?

Survey respondents give CEPI **mixed reviews in its role as a facilitator of effective partnerships** in the coalition and with other stakeholders. The complex global health ecosystem does not simplify CEPI's task of aligning and clarifying the roles and relationships of external stakeholders, many of which have been historically challenging.

A comment encapsulating CEPI's challenge in this realm: "CEPI does align well with other global health initiatives, but communication of this could be improved. This would help improve understanding of how CEPI complements existing structures and **to make clearer where CEPI 'hands off' to others."**

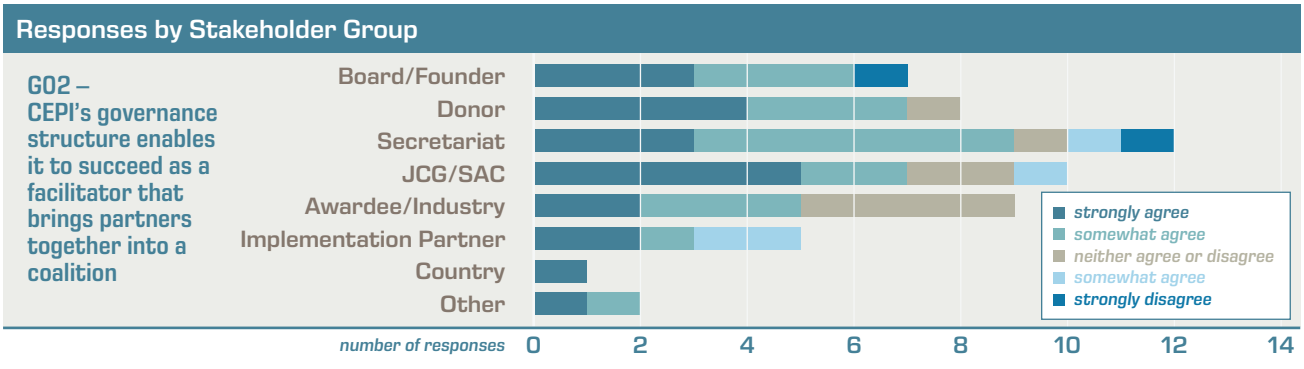
Two indicators capture CEPI's impact on improving partnering among coalition members and stakeholders at global, regional and country level:

Indicator #10: percent of vaccine candidates in clinical development (e.g. being tested in humans), with relevant engagement from national authorities—including regulators—in at risk countries.

Indicator #12: percent of vaccine development partners with necessary agreements in place for vaccines to be deployed and tested during an outbreak

Both indicators score well in APRs, indicating successful performance by CEPI.

Figure 13: Respondents' perception of CEPI's governance structure as an enabler for stakeholder engagement



- Engagement with institutions in potentially affected countries
- Clinical trial capacity, late-stage development and post-registration matters
- Decision-making on vaccine prioritisation, trial use, etc.

The Reputation Management Research conducted in 2019[32] identifies important positive attributes driving perceptions of CEPI in relation to its partner and stakeholder engagements: transparency, accountability, integrity, ethical standards, and being a good steward. In this research, third-sector stakeholders identified issues related to transparency and accountability as potential areas for improvement, chiefly related to equitable access and polarised views of the private sector and civil society emerged, highlighting the importance for CEPI of managing the balance between those two important stakeholders.

Finally, mutual accountability is an area of potential concern, as clearly highlighted in one comment, ***"CEPI needs a strategy for its coalition aspect."*** Of survey respondents, 14% did *not* agree that CEPI's organisational design promotes shared accountability, and 21% think that additional contributions are needed from implementation partners. Comments included a call to *"simplification,"* a recommendation to improve industry input throughout the organisation (particularly on the SAC) and a concern that the JCG was not having the needed impact on the coalition. This is consistent with concerns expressed by different stakeholders in interviews about the function of the JCG but seems not to fully reflect the work of this body. In the specific, the JCG has provided a forum for discussion on key themes for CEPI's success, such as regulatory harmonisation, use of bar coding or GMO regulations. Furthermore, on Lassa, additional resources were secured on the regulatory space as result of the JCG effort and engagements with AVAREF.

Given the centrality of the JCG to the achievement of CEPI's outputs and outcomes, particular attention may be warranted here. *"The purpose of the JCG is to address barriers to advancing and delivering vaccines and to align priorities between member institutions and the broader ecosystem engaged in developing and implementing vaccine policies and strategies."*[2] The JCG is composed of nine permanent member institutions: the WHO, the European Medicines Agency, the U.S. Federal Drug Administration, African Vaccine Regulatory Forum, Médecins Sans Frontières, International Federation of Red Cross and Red Crescent Societies, National Institute for Biological Standards and Control, Wellcome Trust and UNICEF. Other members can be invited on a non-permanent basis to address challenges specific to the stage of development in CEPI's portfolio. Respondents specifically mentioned increasing involvement from industry, grantees and at-risk countries, and noted that the JCG is primarily an information-sharing forum, rather than a body for strategic planning and action. In that regard, it appears that a common understanding is missing on the role of the JCG and on the appropriate pathways for its work to impact on CEPI's work. As a practical example, the suggestions enumerated at the close of the March 2019 summary are not accompanied by action steps.[33, 34]

Advocacy and Resource Mobilisation

CEPI's 2017-2019 Communications and Advocacy Approach[35] focuses on five core areas: 1) build a core community, 2) showcase capabilities and expertise, 3) construct a "tailored and purposeful" knowledge content pipeline, 4) build a robust dissemination machine, and 5) provide communications support for a number of critical objectives, including:

- Support resource mobilisation
- Ensure CEPI becomes an active participant in key debates
- Embed CEPI as a permanent player in the global health system
- Build "proof of context" as investments bear fruit

For a young organisation, CEPI has made ample progress in addressing these objectives. Survey respondents were overwhelmingly in agreement (88%) that **CEPI's advocacy has mobilised broader political and social support for its mission.** But overarching views from survey respondents and interviewees are that CEPI lacks sufficient resources, as noted above. Investors and Board members agree that resource mobilisation needs to be strengthened and, importantly, that the Board itself must engage more strategically in those areas.[30]

Two indicators provide additional perspective on this area:

Indicator #16: agreements with downstream financing partners in place for each of CEPI's priority diseases

Indicator #17: $1bn raised as multi-year contributions to CEPI

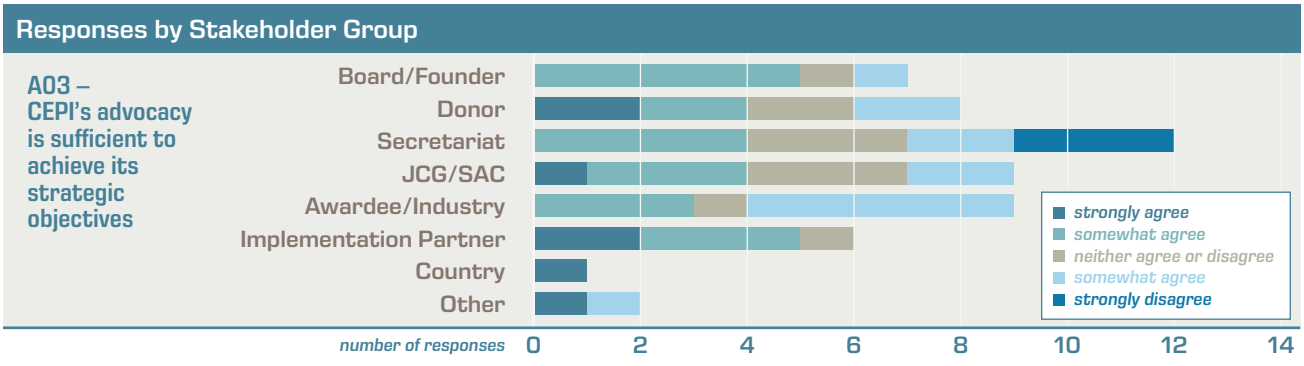
Both indicators show insufficient progress and the need for continued attention on the related areas.

Has CEPI undertaken effective actions to sufficiently resource its business plan?

The 2019 APR identifies CEPI not reaching its $1 billion USD funding target as a significant risk (one of the two highest-scoring) with a fairly high level of control.[31] Budget constraints were also recognized as one of the organisations' top six risks.[36] **Stakeholders stated that CEPI will need additional resources to address SARS-CoV-2 and to engage in late-stage product development and manufacturing.** Overarching opinions are summarised in the following contribution: while CEPI is *"filling an important gap by supporting the early development of vaccines for diseases of epidemic potential, there are reasons to question whether current levels of investment are adequate. CEPI's initial business plan proposed investing $600 million to $1 billion in vaccine R&D.[94] However, a recent analysis conducted by the organization determined that funding the early development of vaccine candidates against all 11 diseases originally included on the WHO's R&D Blueprint priority list in 2015 would likely cost between $2.8 billion and $3.7 billion USD. This does not account for the cost of scaling up vaccine production and delivery in the event of an outbreak, nor does it cover all of the potential epidemic threats."*[37]

Several stakeholders observed **that improved mechanisms to fund CEPI are needed.** These mechanisms would provide greater sustainability and more flexibility in emergencies. As described by one interviewee: *"all the financing instruments we have in a crisis like this are geared to supporting sovereign states — World Bank, regional development banks, the Global Fund, etc. There is no mechanism for supranational financing,"* adding that CEPI needs to look into that in order to inform policy discussions. An example of an innovative funding mechanism is cited in the 2019 APR, which describes the "frontloading mechanism" executed through Gavi's International Financing Facility for Immunisation (IFFIm), providing CEPI-ready funds financed over time through IFFIm bonds.[31]

Figure 14: Respondents' perception of whether CEPI's advocacy is sufficient to achieve its strategic objectives



Has CEPI's advocacy effort been successful in mobilising broader political and social support for CEPI's mission?

Stakeholders and interviewees believe that CEPI's advocacy has succeeded in engaging a wider diversity of stakeholders and mobilising political support. This is confirmed by the desk review that highlights how CEPI has generated support and enthusiasm for its purpose and efforts. While successful, there is a perception that this may still be insufficient in supporting the full achievement of its strategic objectives. Interviewees noted that additional advocacy is needed, and that partners should contribute to advocacy for CEPI. SARS-CoV-2 is seen as contributing to the creation of greater awareness about CEPI and providing immediate opportunities for advocacy and resource mobilisation.

CASE STUDY: CHIKUNGUNYA VIRUS SELECTION

During September 2018, the SAC recommendation on whether to include Chikungunya virus (CHIKV) as a target disease read "launch an RFP for vaccines against all WHO priority diseases not currently funded, including CHIKV. Include criteria such as, but not limited to: *"a vaccine against a widespread infection for which a product is feasible by 2021."*[40] *A second SAC meeting during September 2018 resulted in "no unison view in regard to CEPI investing in Chikungunya vaccines. On the positive side, the feasibility of the vaccine development (pipeline, mechanism of protection, disease burden) as well as the possibility of CEPI taking part in an achievement by 2022, whereas others expressed concern that Phase III studies could be extremely challenging."*[41]

The October 2018 Board paper noted discussion including consideration that: *"Investing in late-stage R&D for Chikungunya, RVF and Zika will: a) maximize CEPI's chance of meeting vaccine R&D preparedness targets — i.e., 2-3 Phase IIb/III-ready vaccine candidates for 2-3 priority pathogens — by 2022."* SAC recommendations were characterized as: *"Launch a new CFP in 2019 (and prepare a follow-on CFP for 2020) on vaccine development for Chikungunya, RVF, and Zika, including Phase II studies and/or preparatory activities for Phase III trials."*[43] The corresponding confidential Board meeting minutes instead provided a slightly different view with respect to the process followed to get the decision. While this may be the result of inconsistent recording — and different approaches to documenting the Board and SAC decisions — questions emerge with respect to the transparency and completeness of public record.

The CFP documents note that[46]:

- *For Chikungunya vaccines: support the rapid progression of the most advanced Chikungunya vaccine candidates through mid-stage and late-stage clinical development, and support activities enabling future phase III testing, including identification of correlates of protection and their validation.*
- *CFP-3i Programme offers the chance to progress your field of expertise and be recognized for it,* ***with non-dilutive funding (of both direct and a proportion of indirect costs) and the opportunity to own and use all resulting IP, data and materials.*** *Projects under the CFP-3i Programme* ***may lead to the manufacture of an investigational stockpile of vaccine*** *at CEPI/another funder's cost and ultimately licensure and stockpile of an approved product.*

Meeting minutes of the SAC discussions on the CFP proposals provide only partial visibility into the rationale for the final SAC recommendation, in relation to the engagement on Chikungunya. Finally, it was announced in June 2019 that, among others, *"CEPI awards up to US$21 million to Themis Bioscience for Phase 3 Chikungunya Vaccine Development,"* while during the same timeframe a peer-reviewed publication asserted that the span of CEPI's operations extend to Phase 2b.[47]

Findings of the COVID Response Review (CRR)

Findings of the COVID Response Review (CRR)

Mission

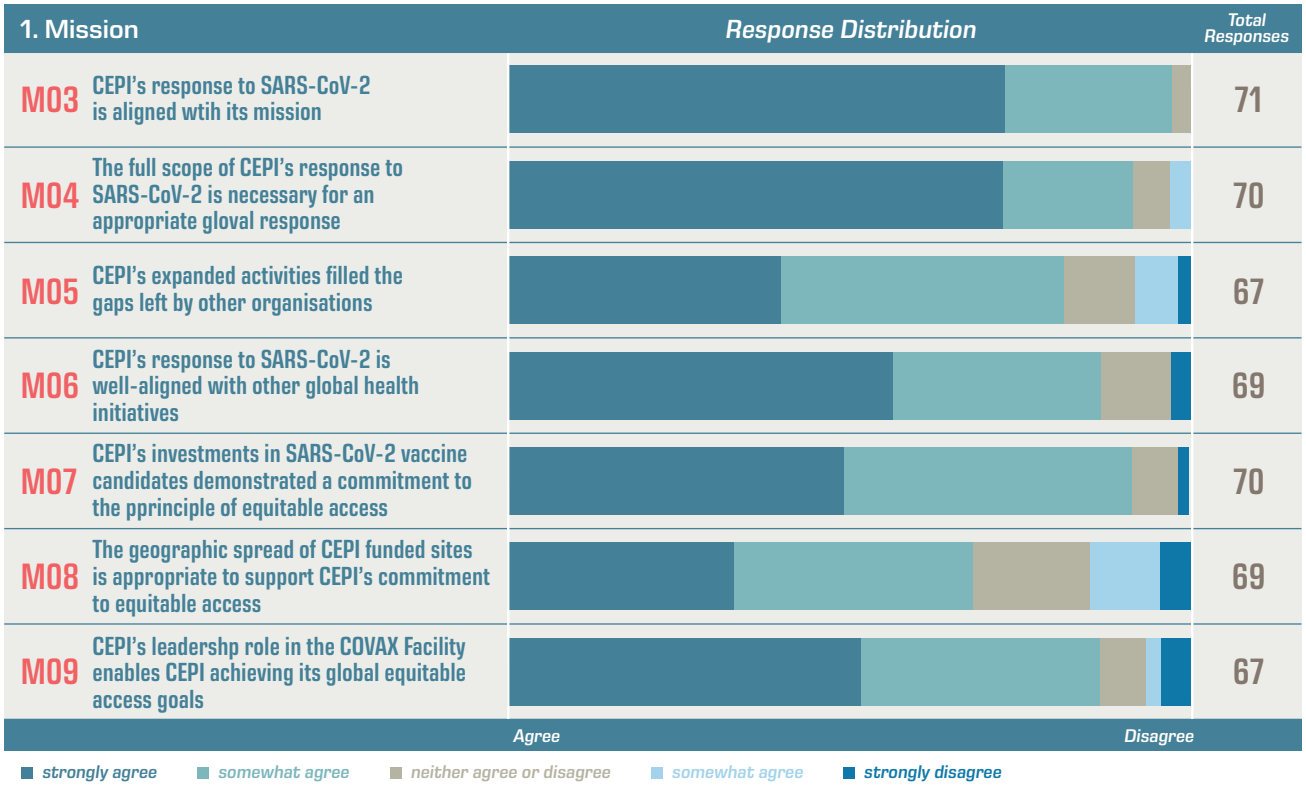
The emergence of a new pathogen capable of causing an epidemic is aligned with CEPI's **"disease X" platform approach, which was mobilised early to initiate vaccine research and development on the emergent SARS-CoV-2 virus.** As the extent of the epidemic became clear and the epidemic turned into a pandemic, CEPI found itself operating outside its original business plan boundaries (which primarily targeted the availability of investigational stockpiles at the end of phase IIb, with no further engagement in manufacturing or distribution). The changes were openly discussed and documented through Board and other governance meetings[48-50] and are highlighted by shifting the focus for development to "speed, scale and access" and funding later stages of the development cycle (including manufacturing). This raised the requirement for funding to a whole new level, in the area of 2 billion USD.

Survey and interview responses indicated strong **support for CEPI's response to SARS-CoV-2.** They agreed that CEPI's response is aligned with CEPI's mission, with no dissenting opinions in either the survey or interviews (Figure 16, M03). Expressions of support were confirmed in the interview process, as summarised by one of the respondents: *"COVID is disease X, which was a founding approach for CEPI."*

Respondents also recognized the **change in CEPI's role and scope, agreeing that this change was necessary** (*Figure 3*, M04-M06) and a natural evolution for CEPI. Some went further, calling explicitly for CEPI to take a role in securing manufacturing capacity. They saw this area, much more than discovery and development, as the weakest link in the overall process of securing equitable access to vaccines and the one most exposed to the growing threat of nationalism.

When asked whether, in hindsight, CEPI should have been engaging in late-stage vaccine development and manufacturing from its inception, respondents were divided evenly. Half were satisfied with the previous scope — well summarised in the comment *"CEPI 1.0 was good as it was and it would not have been possible to do more"* — and half thought that it would have

Figure 15: Survey Responses – Mission



been useful if CEPI had already engaged in late-stage clinical development or manufacturing. Such a view was, however, conditional to the availability of sufficient resources, as highlighted in the remark: *"if CEPI had the funding and bandwidth, then yes. It would have been terrific to progress with a developer into late-stage development and manufacturing."*

At the same time, while supporting the evolution in CEPI's engagement, some raised questions in relation to CEPI's involvement in the SARS-CoV-2 response and its timing. They pointed to the fact that developing a COVID-19 vaccine did not represent the typical situation of market failure — which CEPI was originally created to address — given the massive private and governmental flow of investments. In their perspective, CEPI's role should be primarily focused on the pre-pandemic period, to ensure preparedness when market forces are not put into action. Such perspective, however, does not acknowledge the importance of global reach, equity, and public health impact (ending the pandemic), all dimensions that, even in the event of a global pandemic, are generally not effectively addressed by market forces which tend to focus primarily and at first on the most profitable markets, as the 2009 H1N1 pandemic demonstrated. It should be noted that many of CEPI's decisions to engage in development funding were made prior to understanding the full impact of the pandemic and the availability of alternative funding sources for vaccine developers. Evidence suggests that CEPI understood that it would be "co-funding" vaccines that ideally would have undergone full clinical development, manufacturing and distribution, and has been pragmatic, to the degree possible, regarding its investments in vaccine candidates and the management of the candidate portfolio in a complex environment.

CEPI's role with respect to other stakeholders has evolved and it has effectively merged into the **ACT Accelerators Vaccine Pillar** (a.k.a. COVAX), with activities focused on COVID-19 vaccines. Until late summer, the roles of each organisation were not immediately apparent in public information, though they have been more specifically defined in confidential documents. The gap was filled recently with the publication of a comprehensive overview.[52]

Survey responses were generally positive regarding CEPI's role in COVAX *(Figure 15)* and many respondents applauded this engagement. Respondents were very positive regarding the evolution of CEPI's role in R&D and in ensuring leadership in that field. They noted the need to collaborate with other organisations, particularly Gavi and the WHO, in shaping an effective division of labour in a pandemic-response ecosystem that is highly dynamic. A minority expressed some concerns, noting that such engagement could create unforeseen difficulties in resource mobilisation for CEPI's core work and confusion regarding CEPI's role as an organisation and as part of COVAX. In addition, it was noted that the engagement in COVAX further stressed the already limited Secretariat capacity. Overall, all acknowledged that the landscape is evolving rapidly, and that the full scale of the benefits of CEPI's role in COVAX is to be determined.

Successfully dealing with the market failures that prevent vaccine access is a necessary — but not sufficient — condition to achieve CEPI's mission. **Ensuring equity in access** is the second, equally important, component. Overall, there was broad agreement among stakeholders that **CEPI has demonstrated a commitment to the principle of equitable access** (*Figure 15*, M07). Respondents cited CEPI's role in COVAX and its willingness to adapt as key evidence of this.

Equitable access is a goal where general concerns are growing regarding COVID-19 vaccines because of increasing nationalistic tendencies. CEPI (in partnership with the World Bank) was actively engaged in defining goals for response, and articulated some potential constructs to ensure global access,[53] through its co-convening of an early consultation on the goals of speed, manufacturing and deployment at-scale of a COVID-19 vaccine. The review further highlighted the importance of the "access" dimension as a pivotal component of the SARS-CoV-2 response. Differently from the other CEPI vaccines, COVID-19 access equates to "global,"[49] a new perspective albeit not in contrast with CEPI's equitable access principles. As a result, CEPI's reliance on defining access through its contractual agreements as put in place for the prior CFPs, had to evolve and the COVID-19 vaccine contracts were developed and initially envisioned with the addition of a reference to an upcoming allocation system[54] necessary to address the very-likely initial excess demand. The focus then shifted from ensuring access to enforcement through "step 2 agreements"[49] that would require 100% of funded manufacturers output to be allocated through a global mechanism,

*CEPI strives to "...enable equitable access to these vaccines for people, **especially the poor and disadvantaged,** during outbreaks".*

with some deviations included for direct funding received from individual governments.[55] In this evolving framework, several decisions were taken on the matter of equitable access. One decision in particular highlights CEPI's continuous effort to foster the principles of equitable access: the refusal of the proposal of one potential awardee as a result of its refusal to accept equitable access provisions outside of low- and middle-income countries.[56] A discussion followed on the refund of capital expenses in the event that the product was to provide commercial benefits.[50] During the June 2020 Board meeting, a paper summarizing the terms of partnership agreements was shared with the Board.

Perceptions varied on whether the geographic spread of CEPI-funded development and manufacturing sites is appropriate to support equitable access. Respondents noted that development partners are concentrated in Europe and (to a lesser degree) in the USA and Asia, with little representation of other regions and low- and middle-income countries. They noted that greater involvement from countries where infectious diseases are likely to emerge will accelerate future responses. Two respondents noted that, while insufficient, the geographic spread of CEPI's investments is appropriate, given the urgency of the situation and existing capacity, the available partners that applied and the existing capacity in the Secretariat.

Finally, as already emerged in the MTR, some questions were raised about the clarity of the definition and goals of CEPI's efforts toward equitable access, as clearly emerging from one comment: *"equitable access goals are not entirely clear to us. I don't hold CEPI accountable to that and I think that there are very few people who do know how that will evolve. I believe that CEPI has limited vision on how this will all play out."*

When considering the **operational aspects of the ongoing changes that CEPI is undergoing,** it becomes clear that the response to the SARS-CoV-2 pandemic *de facto* shifted CEPI from a purely development-driven organisation to one with a very relevant health emergency response dimension. This change goes beyond the pure expansion in operational scope for the organisation; multiple other implications are involved, on the legal, financial, country and donor-relations fronts. Challenges of this kind are not unique to CEPI and are shared with many other players in the global health ecosystem in response to the SARS-CoV-2 pandemic. This is due to lack of clarity and alignment on the terms and scope of the engagement (e.g., in respect of the nature and source of the contributions vs. eligibility for official development assistance (ODA) status), of the beneficiary countries (e.g., UMICs and HICs vs. LMICs and LICs) and on the counterparts in the investor countries (e.g., development vs. health department). To deal with these changes, CEPI had to activate additional channels of communication, in particular with donor governments .

At the same time, it should not be forgotten that the whole global health and immunisation ecosystem is changing and new operational frameworks are being developed. The speed of these processes is necessarily much slower than the decisions required to respond to the pandemic, leaving many contradictions temporarily unresolved. The findings and warnings that emerge from reviews like this one can prove valuable for effectively addressing them in the near future.

Strategy Development and Gap Analysis

Operationally, the response to SARS-CoV-2 has resulted in a deviation from CEPI's business plan and theory of change. The analysis of the documents and decisions taken in the first months of 2020 highlights **a clear understanding by the CEPI Secretariat and key stakeholders of the magnitude of the challenge, and of the required adaptation of CEPI's modus operandi.** This is identified by the following decisions and discussions:

- Assessing the risks introduced by not only the SARS-CoV-2 response, but also to the core portfolio were identified and discussed by the Audit and Risk Committee (ARC) as early as March[57] and have been managed within the Board-approved risk management framework.
- The impact on CEPI's "core" programmes — both in terms of programme delays and reduced spending, versus the budget resulting from the increased focus on SARS-CoV-2 response — has become clear. Discussions on forward management of both the cost and delays began during June.[58]
- Implications for the new strategy were discussed as early as March,[48] where it was asserted that *"CEPI is clearly moving beyond the previous end point of up to proof-of-concept and should take this opportunity to clarify its end point,"* while others noted that CEPI should make sure it can deliver on vaccine development before expanding.

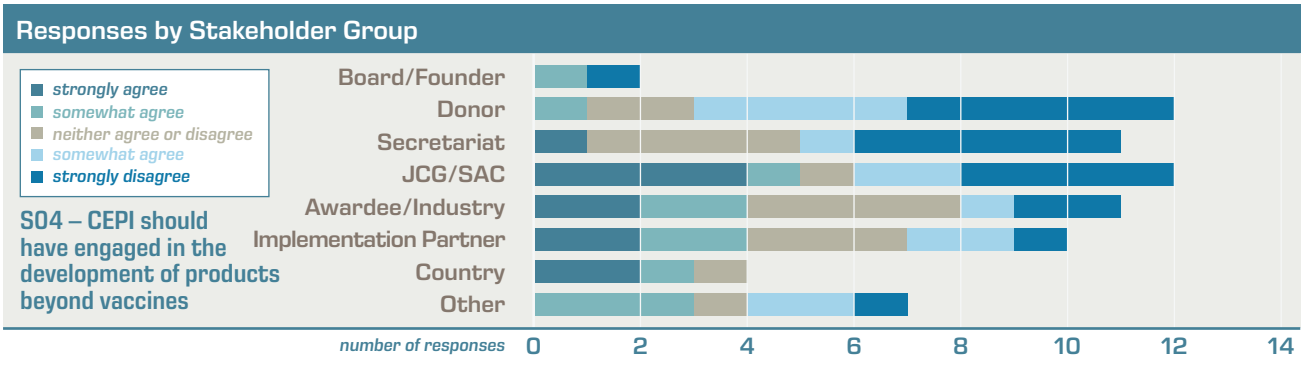
Investors and other stakeholders generally agreed that decisions — in particular those concerning the expansion of CEPI's scope in relation to the SARS-CoV-2 response — were taken in a timely manner.

When asked whether CEPI should have responded in additional or alternative ways, a majority of stakeholders **endorsed the current scope** (Figure 16) and **strongly indicated their preference for CEPI in retaining its focus on vaccines.** Comments suggested that CEPI focus on its strengths: that additional resources, capacity and capabilities would be needed to expand beyond vaccines; and that progress in vaccines is already complex and challenging, particularly in the current environment, thus making it even more challenging to focus on anything else.

It should be noted that a small number of respondents called for investment in diagnostics, noting their importance in epidemic and pandemic detection and response, as well as in vaccine development. Others called on CEPI to explore developing monoclonal antibodies as part of a "full package" of response to both epidemics and pandemics.

Finally, as part of the desk review and specifically the CEPI-authored article on *"Designing Pull Funding for a COVID-19 Vaccine,"* the question was raised of whether CEPI may aspire to increase its role from a "push funder" into providing more market-based incentives.[59]

Figure 16: Perception of CEPI's role beyond vaccines



Investments in Candidates, Platforms and Enabling Science

The successful **connection between CEPI's "Disease X" and other coronavirus investments** and its rapid response to SARS-CoV-2 (*Figure 17*, I07) was identified by many respondents, synthesised by the following comments:

- *"CEPI had previously developed a SARS portfolio and platforms through disease X that provided a good starting point. Hard to say what else anybody could have done."*
- *"For COVID (as was the case for the other priority diseases) the platform approach has been appropriate and led to appropriate technology diversity in the portfolio and is allowing addressing of all relevant aspects."*

Funding proposals for 117 COVID-19 vaccine candidates were received from 114 organisations. Of the 114 responding organisations, 19 had previously applied for funding from CEPI. By the end of August, after careful screening and consideration for the available resources, CEPI had funded nine candidates, two of which transitioned from *platform funding* and three of which were receiving funding for another disease target, leaving four organisations being funded for the first time due to SARS-CoV-2. Of the original three platform technologies in the CEPI portfolio, two have transitioned to development of COVID-19 vaccines and constitute 20% of the current portfolio (consisting of 9 SARS-CoV-2 vaccines). The two candidates derived from platform technologies are both in Phase 2 clinical development, with two additional candidates having entered Phase 3 development. Funding for the candidates has ranged from less than $1 million USD to $388 million USD (*see graph*).

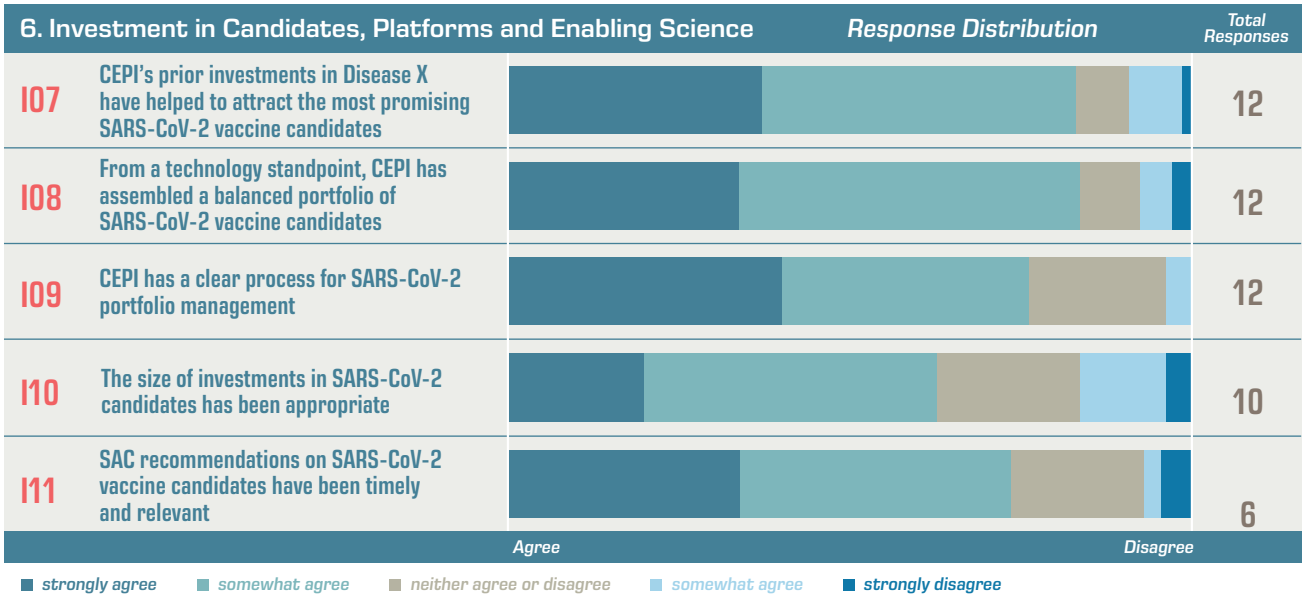
At the time of this review*, eight of the nine portfolio candidates have entered clinical development, representing 25% of the 31 global candidates identified as being in clinical development according to WHO (as of 25 August 2020).[56,73]

A majority of survey responses "somewhat agreed" that CEPI has **assembled a balanced portfolio of COVID-19 vaccine candidates** (*Figure 17*, I08); all agreed that it is still premature to draw conclusions on the matter. Those who did not agree commented on the level of risk connected with the choice of unproven technologies (seen as a more appropriate area for government initiatives like BARDA), the existence of specific technology gaps, or noted an over-reliance on *Spike* protein-based candidates.

Finally, stakeholders expressed mixed views regarding the **size of CEPI investments** (*Figure 17*, I10). While many considered them appropriate, 16% felt they were inappropriate. Most respondents noted that they were too small (comparing CEPI's effort to the ones of BARDA/OWS) and highlighted the need to engage in more partnerships with large vaccine developers.

Many respondents commented positively on **CEPI's processes for making and managing investments in COVID-19 vaccine candidates**. Several made positive comments on the selection process, in

Figure 17: *Survey Responses – Investment in Candidates, Platforms and Enabling Science*



* The CRR was performed between end of June and end of August 2020

particular to the quality of the experts reviewing and selecting candidates, as well as on the timeliness of the process. This was noteworthy; despite the tremendous pressure multiple agreements were signed spanning from antigen selection to manufacturing.

On the other hand, some stakeholders flagged specific aspects of the selection process indicating that the full understanding and visibility of the product development and understanding of manufacturing could have been improved to avoid being too academic. The potential for extending the breadth of the outreach toward potential new development partners and the lack of communication of the rationale of the selection process and rationale for those results in particular for the candidates not selected was also noted. In reality CEPI offers to those candidates the opportunity for discussion upon request.

While guidance and decision-making on funding and progression of COVID-19 vaccine candidates began through core CEPI processes, these gradually gave way to a new system that has effectively centred on the vaccine pillar of the ACT Accelerator (COVAX) as the core mechanism for decision making. Different challenges and dynamics are emerging as result of the evolution.

The CEPI **Scientific Advisory Committee (SAC)** was engaged in advising on both the initiation of Calls for Proposals and on investing in COVID-19 vaccine candidates, as per its "Terms of Reference."[70]

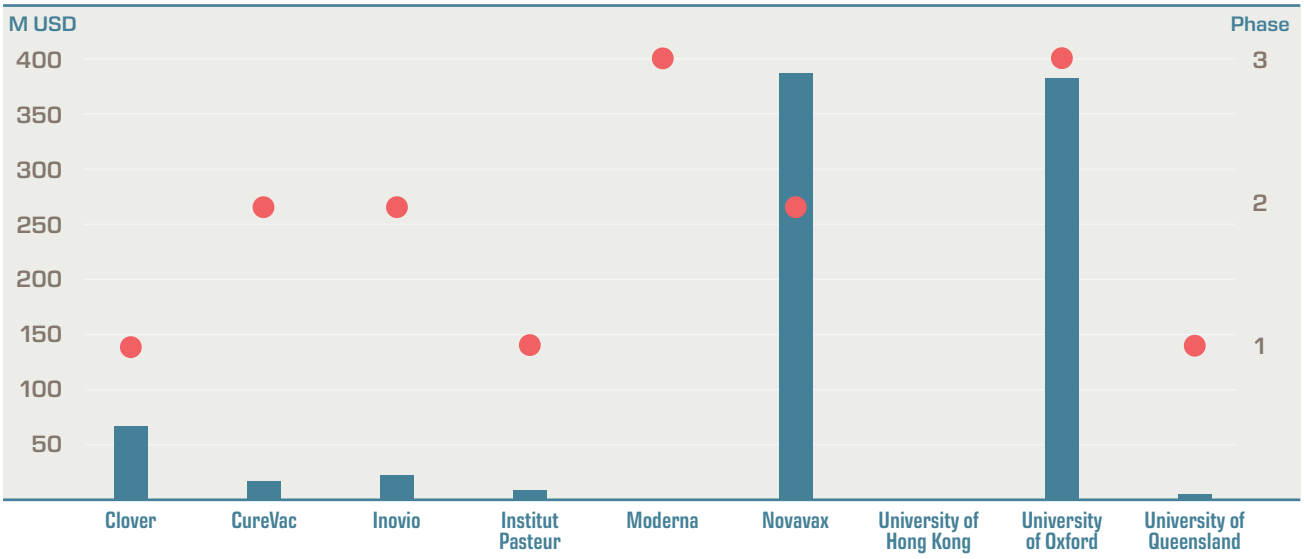
Views on SAC recommendations were generally positive (*Figure 17*, I11), and comments noted that the SAC provides useful input. Some respondents noted room for improvement in communications with the SAC.

The source of Scientific Advice for COVID-19 vaccine has evolved and adjusted over the first 8 months of 2020. March and May SAC meeting minutes indicate the forum being used for information sharing, primarily with CEPI and the WHO providing updates. General discussion of the SAC were noted, as was the fact that *"the role of the SAC in the ACT Accelerator is still to be defined."*[71] Questions regarding the suitability of the SAC for providing guidance on COVID-19 vaccines were highlighted through both an ARC request for an overview of the SAC composition[57] and a note during the April board meeting that stated *"expert review needs to go beyond the current SAC."*[60] After June, as part of CEPI's engagement in COVAX,[61] the SAC's responsibility in relation to the COVID-19 vaccine portfolio has been transferred to COVAX. The definition of the advisory needs and the establishment of the most appropriate processes was underway at the moment of this review. The role of the SAC will remain critical for the other vaccines in the CEPI portfolio.

CEPI's portfolio management process for COVID-19 Vaccines (*Figure 17*, I09), received positive stakeholder feedback overall. However — in both interview and survey comments — they also voiced concern regarding the criteria and processes for "down-selection" among candidates. Portfolio management is complicated by the interactions between the CEPI portfolio and the "global portfolio" of COVID-19 vaccines.

Bi-weekly meetings of the SARS-CoV-2 **Portfolio Strategy and Management Board** (PSMB) provided the central decision-making body for progressing vaccine candidates through June 2020, at which point decision-making authority transitioned to the RDMIC. For projects in progress, a new process

Figure 18: CEPI COVID-19 candidate portfolio



modelled on Stage Gate Reviews has been created,72 as an adapted version of CEPI's SGR process, still under CEPI leadership via its Project Leads. The review process is under the responsibility of the Stage Gate Review Committee (SGRC), as an extension of the COVAX Technology Review Group (TRG). Recommendations from the SGRC are to be approved during one of the weekly meetings of the RDMIC. The streamlined process addresses the urgent needs of COVID-19 vaccine development, maintains the technical lead with CEPI and provides a clear accountability framework for decisions.

Governance and Operations

Beginning in February 2020, the **governance bodies adapted to the needs of the SARS-CoV-2 pandemic** by increasing the number of meetings and level of communication across governance functions. This increased activity was needed to facilitate a series of changes to decision-making, primarily adjusting to CEPI's participation in the ACT Accelerator Vaccines Pillar. Taken together, documented evidence shows that the governance structure experienced significant adjustment to fit the purpose of response to SARS-CoV-2, that it was able to make those adjustments effectively and that participating stakeholders were engaged in the process.

The majority of stakeholders surveyed expressed positive views on CEPI's governance structure (*Figure 19,* G10). In total, more than two-thirds of respondents agreed that it enabled CEPI to address the emerging needs of the SARS-CoV-2 response. In text comments, they praised its agility and flexibility. A minority of respondents did not agree; they remarked on its complexity, delayed communication, and lack of transparency, especially in relation to the setup phase of COVAX. Multiple stakeholders noted that CEPI's policies will need to be updated in the near future as result of the changes resulting from the SARS-CoV-1 response.

Stakeholder records indicate robust discussions since the start of the SARS-CoV-2 pandemic and public statements on the outcomes of these discussions were consistently posted on CEPI's website, though publication of meeting minutes of different governance bodies were often delayed by more than one month.

Significant **changes in governance roles and responsibilities** have been introduced, including responsibility for financial approval of vaccine candidate investments (first from the Board to the EIC, with time and dollar amount limits).[60] The EIC endorsed transferring that decision-making power to the Research, Development and Manufacturing Investment Committee (RDMIC) of COVAX,[61] with specific considerations for oversight by CEPI (including membership of the RDMIC) and definition of appropriate provisions that protects CEPI's space of accountability.[102]

The change in **responsibility for financial approvals** has also affected the role of the IC and specifically article 11.4 of the Articles of Association, which states that "*any single investment proposal by the CEO to commit CEPI funds exceeding USD 100M shall be subject to the review and approval of the Investors Council before the final decision is made by the CEPI Board.*"[62] In July, after assessing various alternatives, a new modus operandi was agreed upon by the IC, in relation IC oversights of investments between USD 100M and USD 400M that were delegated to the COVAX investment governance structure on a "no objection" basis. The change reflects the ability of CEPI and the will of its stakeholders to adapt to the needs of the SARS-CoV-2 pandemic.

Some uncertainties regarding the role of the IC and decision-making continue, as evidenced by the IC's request for an update of the investment case and for articulation of how funding needs will evolve.[48]

At the April 16th IC meeting, a proposal was made for a "COVID Donors Group," to establish a mechanism for information-sharing between donors with SARS-CoV-2 earmarked funding that were not eligible for IC membership. Donors outside the IC, in absence of NDA, receive non-confidential portfolio updates on a regular basis.

Figure 19: *Survey Responses – Governance and Operations*

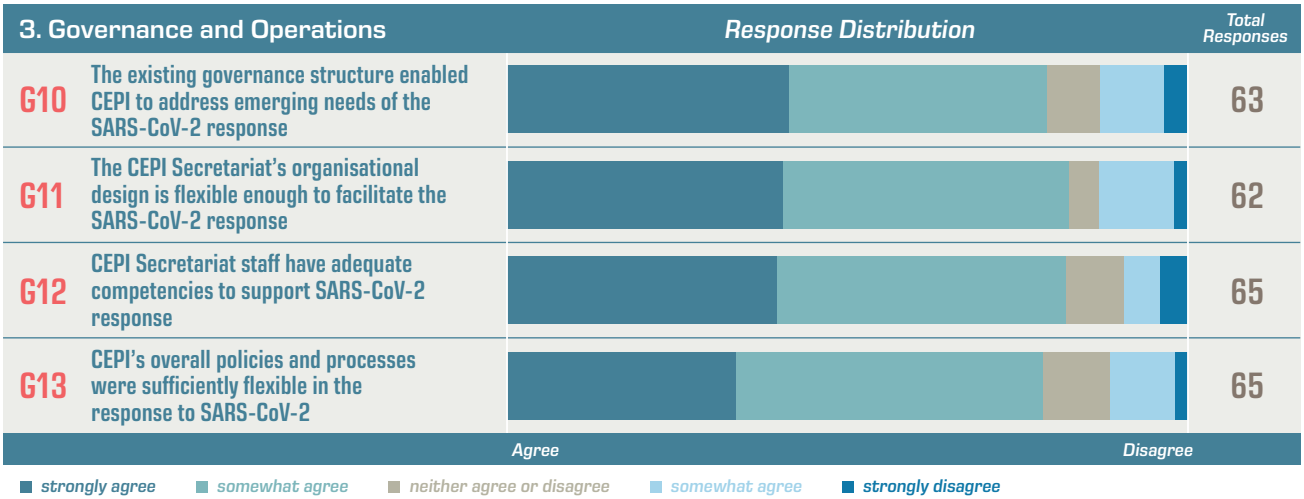


Table 5: Governance meetings and reporting

Governance body	Number of meetings and months of meeting	Number of minutes published on website and timespan between meeting and publication dates		
		As of 25 August, 2020	Within 2 months	Within 1 month
Board	4 – March, April, May, June	3	2	0
Investors Council (IC)	8 – March, 2x April, 2x May, 3x June	n/a	n/a	n/a
Audit and Risk Committee (ARC)	3- March, May, June	3	1	1
Executive and Investment Committee (EIC)	6 – 2x April, 2x May, June, July + 3 written sessions	6	5	0
Equitable Access Committee (EAC)	4- March, April, 2x May	4	3	0
Scientific Advisory Committee (SAC)	2 – March, May	2	2	0
Joint Coordinating Group (JCG)	2 – March, April	2	0	0

Regarding contracting issues, the Board delegated authority to deal to the Chair for arising contractual issues — working with the CEO and consulting the EAC as needed — and informing the EIC.[63]

Overall, when surveyed on the flexibility of CEPI's policies and processes, stakeholders also expressed mixed views (*Figure 19,* G13). Some saw this flexibility as a comparative advantage for CEPI seen as an organisation that can more easily than the partners adapt to the fast changing environment in which it operates, while others saw it as a potential source of risks when it comes to internal consistency and maintenance of alignment with CEPI's mission and operation principles.

In November 2019, shortly before the start of the SARS-CoV-2 pandemic, CEPI implemented an Emergency Response planning process, inclusive of a Rapid Response Plan and a proposed set of response-enabling activities; these are preparedness activities that must be implemented before and during an outbreak for a successful CEPI outbreak response. Availability of this plan guided CEPI's response to the pandemic.

Survey respondents noted that the CEPI Secretariat has demonstrated agility and flexibility, hiring a significant number of additional staff and working with consultants to quickly address the emerging needs of the pandemic building capacity and broadening its skill-set. Despite the extraordinary nature of the pandemic, this allowed CEPI to perform remarkably well, although an increased risk of staff burnout and other resiliency issues was highlighted. Some of the Secretariat's adaptations are seen as interim measures, and respondents noted the need for review and refinement of the Secretariat's organisational design. once the pandemic is over. Based on learnings emerging from the response to SARS-CoV-2, some questions were raised about the future needs in relation to CEPI Secretariat's competencies (Figure 19, G11 and G12); those questions were primarily referring to the capacity of CEPI's staff, the lack of certain capabilities and the reliance on external consultants and consultancy outlets.

Partner and Stakeholder Engagement

CEPI played an early role in convening the broader group of global immunisation stakeholders to respond to the SARS-CoV-2 pandemic and to work together and fund the development of COVID-19 vaccines.[64] A majority of respondents agreed that CEPI has connected well with all relevant partners in the SARS-CoV-2 response (*Figure 20*, P10), in particular with public sector health care organizations at the global level. The potential for broader engagement with regional actors and with private sector partners both within and outside of the health care sector (e.g., industry, financial sector, civil society, etc.,) was highlighted by some respondents, as summarised in the following: *"ensuring all critical stakeholder(s)/ stakeholder groups have a seat around the table throughout our work in one way or another will be crucial to reach our mission."*

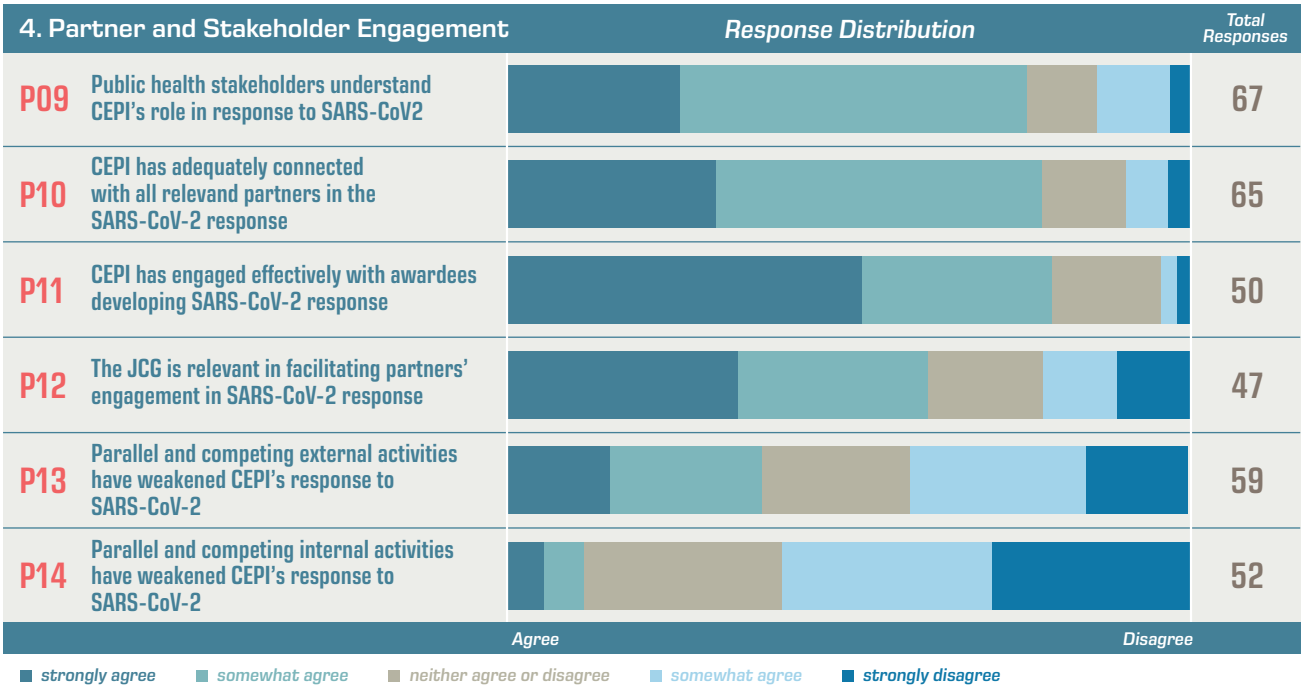
Survey results showed some lack of clarity in **stakeholders understanding of CEPI's role in response to SARS-CoV-2** (*Figure 20*, P09). Text comments were similarly mixed. There was apparent confusion over CEPI's role in this complex and dynamic landscape, as represented by the following comment: *"I do not fully understand the nuances of how CEPI has been moving around in this space. It is still so dynamic, and I am struggling to see how it is evolving over time. I think that it makes a lot of sense that this evolves and that CEPI continues to find where they should be engaged."*

Respondents to surveys and interview questions highlighted CEPI's unique role and the importance of **alignment with other organisations, especially with the WHO and Gavi,** in an area historically characterised by an unnecessary fragmentation. In particular, the relation between CEPI and Gavi as co-conveners of the ACT Accelerator Vaccines Pillar[66] is seen as critical, as this structure has effectively supplanted others with respect to COVID-19 vaccine development and deployment.

The relationship with the WHO is also seen as critical to the success of CEPI, even if the degree of WHO perceived engagement in COVAX has varied throughout these first months. While there was no mention of any leadership function in March/April, *"CEPI and Gavi are anticipated to lead the vaccine pillar,"*[60] *later in August COVAX was discussed as "a collaboration between CEPI, Gavi and the WHO."*[52] Overall, most of the stakeholders noted that alignment with the WHO and Gavi has improved, despite the challenges posed by the pandemic. For instance, when CEPI actively called for *"establishing a globally fair vaccine-allocation system,"*[65] at first there was no acknowledgement of the potential role of the WHO in guiding global allocation while WHO's responsibility was recognised in the following months.

Stakeholder **perceptions of the JCG were the least positive** (*Figure 20*, P12), with many stating that the group has had relatively little impact. The JCG met in

Figure 20: Survey Responses – Partner and Stakeholder Engagement



March and April 2020 to update members on current activities, including discussion of an allocation system for COVID-19 vaccines and the ACT Accelerator. In March, the JCG considered establishing a "delivery working group,"[67] but no evidence of that group was found. In April, as recommended by all key stakeholders, the functions focused on SARS-CoV-2 response subsumed within the ACT Accelerator[68] to avoid unnecessary duplication of efforts. The JCG met again in September, discussing matters other than the COVID-19 vaccine.

Some questions remain with respect to the other areas of work of CEPI beyond development of COVID-19 vaccines. One of the responders summarises the general sentiment on this topic: "*while I think the JCG function could play a very valuable role in facilitating stakeholder alignment and engagement, I think that CEPI and the JCG have not yet figured out how best to make this happen.*"

Finally, respondents did not agree that **parallel and competing internal and external activities** weakened CEPI's response to SARS-CoV-2 (*Figure 20*, P13 and P14). In contrast, they noted that the focus on SARS-CoV-2 had diverted resources away from CEPI's pre-pandemic priorities, which was perceived as a necessary step in light of the pandemic.

Advocacy and Resource Mobilisation

Survey respondents agreed strongly that **CEPI's investors are aligned with the mission and objectives of the SARS-CoV-2 response** (*Figure 21*, A04 and A05). CEPI was considered *"very efficient and effective in its early stages, as a young institution, with clear strengths."* As a result, expectations for CEPI's success are high.

Most survey responses also agreed that **CEPI's investors understand the risks of the SARS-CoV-2 response** (*Figure 21*, A06). Some specific areas were indicated as requiring additional clarity for individuals outside the "circle of the experts": *"people still don't understand the level of technical complexity and the risks associated with vaccine development in a pandemic. The investments were technically risky but necessary investments. Not everybody understood the reasons for the magnitude of the investments that were necessary."* Furthermore, the political and public pressures driving investor actions were also acknowledged. Overall, most comments on CEPI's advocacy activities called for greater advocacy and communication support for CEPI's mission, including a clarification of its role in pandemic preparedness.

Perspectives on **resource mobilisation** were less positive (*Figure 21*, A07) in particular with respect to the outcome of those activities. Multiple respondents noted that CEPI has effectively mobilised sizable resources, leveraging its governance structure and the compelling investment case of the COVID-19 vaccine. However, others noted that despite effective mobilisation, substantial additional resources are still needed for CEPI to successfully achieve its goals.

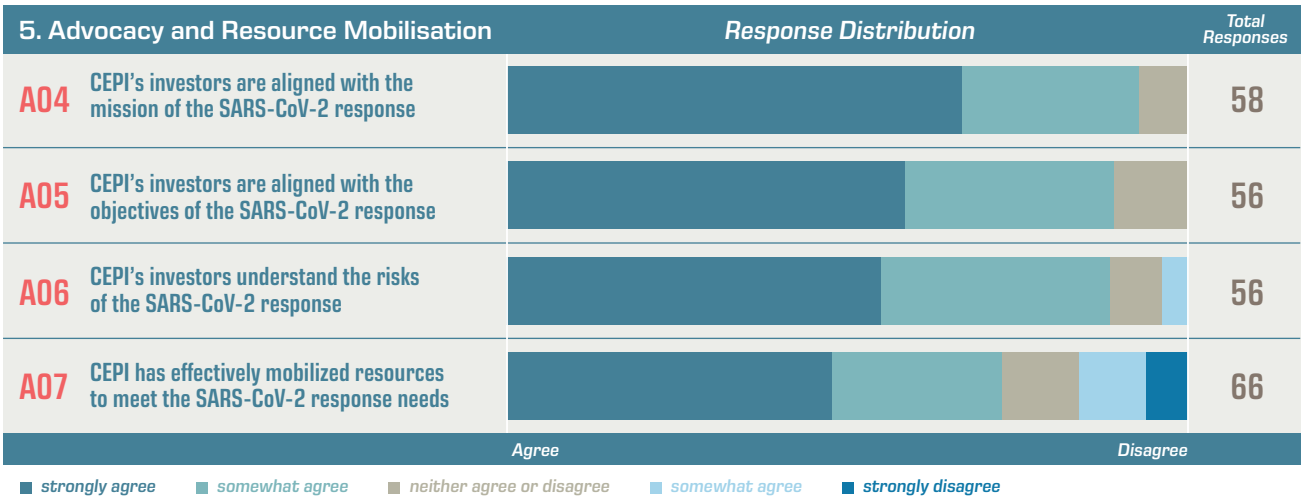
Overall, resource mobilisation for COVID-19 vaccines has received ample global attention and CEPI staff have highlighted its needs in various publications. As of 24 August 2020, USD 1.4B had been committed toward vaccine research and development and an additional USD 1B is sought to move the portfolio forward.

Finally, respondents also commented on the tension caused by the overall resource mobilisation for the ACT Accelerator in relation to the direct mobilisation for CEPI itself.

> *"This is why my country decided to join. We really like the innovative approach, the governance, with funders, civil society, businesses in CEPI and the legal nature of the organization. CEPI was the place where early discussions were held. This helped a lot in organizing our thoughts on the best possible strategy development."*

Respondents noted a potential area for discussion in relation to COVID-19 vaccine candidates and the funding criteria of the OECD's official development assistance (ODA) 69 The stakeholders that saw a potential issue noted that if the OECD did not consider SARS-CoV-2 a disease that is disproportionately impacting people in developing countries, hence reconsidering its classification as

Figure 21: *Survey Responses – Advocacy and Resource Mobilisation*



ODA, this could affect national decisions and fund allocations. To address this potential issue, CEPI has already built a case to maintain the designation of funding to CEPI as 100% ODA compliant. While an explicit policy on the geographic or financial focus of CEPI's funding (as is the case for organisation's like Gavi or the Global Fund) is missing, CEPI's position on equitable access is a testimony of the organisation's focus on developing countries. As clearly stated in the memo to the IC, CEPI's mission is "to accelerate the development of vaccines against emerging infectious diseases and ensure equitable access to these vaccines for people in developing countries during outbreaks,"[69] as well as that "the primary objective of CEPI's access commitment is to contribute to economic and social benefit amongst developing countries by securing equitable access where epidemics and pandemics emerge". Despite the specific case of the SARS-CoV-2 pandemic with its global nature, the equitable access policy contributes to clarify the developing countries focus of CEPI's mission of "accelerate the development of vaccines against emerging infectious diseases and enable equitable access to these vaccines for people during outbreaks".

The COVID-19 Response Review (CRR) was completed at the end of August 2020 and amended to include some events that occurred in September.

Since the completion of the review a number of important events have taken place that are important to provide a comprehensive perspective on CEPI's progress and response to a fast-changing environment.

- Three COVID-19 vaccines (BioNtech/Pfizer, University of Oxford/Astra Zeneca, and Moderna) have shown high efficacy against COVID-19 after less than 12 months from start of the development efforts. BioNtech-Pfizer has already obtained an emergency use license and it is anticipated that all three will be awarded a marketing authorization license in 2021. Of these frontrunner wave 1 COVID-19 vaccines, University of Oxford and Moderna received early catalytic R&D funding from CEPI, with the Uni Ox-AZ vaccine also receiving tech transfer and manufacturing funding.
- 190 countries and economies (corresponding to more than 90% of the world population) have joined the COVAX facility to ensure effective and equitable global access to COVID-19 vaccines.

Conclusions

As a relatively young organisation, CEPI has made impressive technical progress in advancing vaccines against EIDs. CEPI had delivered positively on the majority of its performance indicators and evolved quickly in response to a changing environment. It has established sufficiently rigorous and clear processes and structures for launching and making awards in response to CFPs, in controlling the development progress of its awardees and in managing toward its stated targets. In addition, internally facing policies, risk identification and mitigation, and financial controls have been established to serve the whole of CEPI's operations. There is widespread goodwill and positive sentiments on the importance of CEPI, but clarity is still sought on its role beyond vaccine development funding.

Not surprisingly, in view of the very young age of the organisation, three areas for improvement emerged as priority from the MTR process. First, the partnership and policy framework to support CEPI's relationships with organisations and countries engaged in preparedness and response to EIDs needs to be further strengthened. Second, CEPI's commitment to equitable access has exclusively taken the perspective on how it leverages its funding of awardees but does not specify its obligations to the countries or individuals who receive the benefits of this funding. Lastly, the documentation of decisions and their rationale is not always immediately intelligible, as is the role of specific governance and advisory bodies, even among many participants internal to the process. Improvements in these areas can further strengthen CEPI's role in relation to its broader stakeholder group.

The impact of SARS-CoV-2 significantly altered the vaccine development and delivery ecosystem and impacted heavily on CEPI. Such impact will continue to be profound and CEPI's success in balancing the high expectations of its response to SARS-CoV-2 — while sustaining its "old" portfolio — will shape the organisation's future. Stakeholders were acutely aware of the potential effects of SARS-CoV-2 on CEPI, as evidenced by the number of times it was mentioned in both survey and interview comments.

Across all dimensions of the research, a general consensus emerged on the timeliness and quality of CEPI's response to SARS-CoV-2, in particular when considering the exceptional circumstances under which the organisation has operated. Notably, CEPI's ability to respond in a swift and focused manner has been praised. Furthermore, stakeholders acknowledge and appreciate CEPI's progress in evolving its mission and strategy, adapting its governance and operations, and strengthening its partnerships.

CEPI is seen as acting swiftly to tackle the COVID-19 emerging challenges. Stakeholders believe that the path forward lies in partnership and that CEPI should build on its distinctive competencies of support to vaccine early clinical development and complement partner organisations with aligned missions, such as Gavi and the WHO. In doing this, the organization will need to transition from its current emergency footing and highly technical focus to an operating model that places greater emphasis on comprehensive policies, greater transparency and clarity in roles and responsibility in the global health ecosystem with focus on strong interfaces and sustainability.

Looking beyond the SARS-CoV-2 response and to CEPI's future, stakeholders indicated that CEPI should answer three key strategic questions regarding its role in the global health architecture. First, it should critically review its contributions to the broader pandemic preparedness effort in view of its current and future distinctive advantage. An in-depth reflection is needed on the inclusion of manufacturing and, to a lesser extent, Phase 3 clinical development in CEPI's strategy. Second, CEPI should strengthen its internal processes and governance (JCG and SAC in particular) to ensure they are adequate to support CEPI's progression toward its goals. This includes processes for investment decision-making, portfolio management and partner engagement. Finally, CEPI should clarify its advocacy and resource mobilisation goals and strategy in view of the additional resources needed for its investments and for a well-functioning Secretariat, as well as to ensure adequate recognition of CEPI's significant efforts and progresses.

Methodological Annex

Mid-term Review

A mixed-methods approach was used to collect and analyse data, including a document review, literature review, a stakeholder survey, and interviews including with select Secretariat staff. This review was conducted consistent with the Development Assistance Committee Principles for the Evaluation of Development Assistance.

Evaluation Advisory Committee (EvAC)

An Evaluation Advisory Committee (EvAC) was established to provide oversight to the evaluation process and inform development of recommendations. EvAC members were selected based on specific areas of expertise, relevant experience, and diversity of gender, geographies and vaccine development and partnership perspective. The EvAC was composed of the following members:

- Ibrahim Abubakar, University College London
- Christopher (Edge) Egerton-Warburton, Lions Head Global Partners
- Nima Farzan, industry and CEPI Interim Board member
- Jorge Kalil, formerly Instituto Butantan
- Hind Khatib-Othman, formerly Gavi
- Marie-Paule Kieny, formerly WHO
- David Salisbury, formerly UK Department of Health

Document/Literature Review

The document and literature review included documents available on CEPI's website, confidential CEPI documents and a systematic literature review spanning 2012-2020. A sample of the CEPI documents reviewed are below and the full set is provided as a Bibliography. Documents are referenced throughout the detailed report, but not in the executive summary.

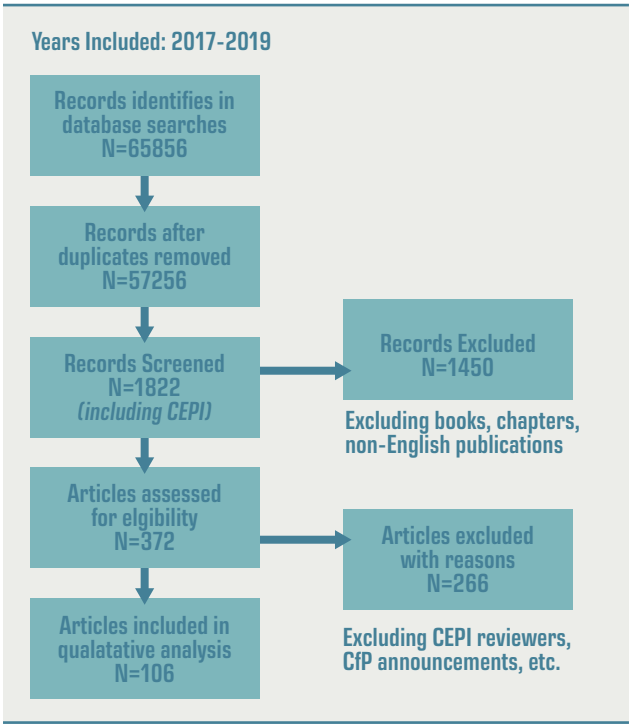
Document review

- Articles of Association
- Terms of Reference for Governance bodies including the Board, Scientific Advisory Committee (SAC) and Joint Coordinating Group (JCG), Investors Council (IC)
- Annual Members Meeting Minutes
- Board/SAC/JCG meeting summaries/notes
- CEPI policies
- Business plans
- Annual progress reports / 2019 Programme document
- CEPI Secretariat policies (internal)
- External audit and financial reports
- Board Effectiveness Review (December 2019)
- Reputation Management Review (December 2019)
- Annual Portfolio Review Meeting Report (November 2019)
- Secretariat Staff Job Descriptions
- Sample documentation from portfolio management activity

Literature review

MMGH conducted a systematic literature review using Google Scholar and PubMed covering the period 01 January 2017 through 31 December 2019 (with one exception: a single article from 2020 was included). The review was truncated at the end of 2019 in order to exclude the effects of SARS-CoV-2 and used the following search terms

Figure 22: Flow diagram of CEPI literature review



and variants: epidemic/outbreak preparedness; epidemic/outbreak response; Coalition for Epidemic Preparedness Innovations; CEPI; epidemic disease vaccine development; vaccine platform technologies; rapid vaccine manufacturing; vaccine manufacturing innovation; vaccine regulatory science; epidemic disease vaccine access; and specific pathogen vaccines either supported or under consideration by CEPI (e.g., Lassa fever, Chikungunya).

The initial search of both databases returned nearly 66,000 records, reduced to slightly more than 57,000 after duplicates were removed. Adding the search terms "Coalition for Epidemic Preparedness Innovations" and "CEPI" reduced the positive items to 1,822; of these, 1,450 were excluded to remove non-English language publications, books and chapters, narrowing the items assessed for eligibility to 372. Of those, 266 were excluded because they were CEPI CFPs, included CEPI staff as reviewers only, or CEPI was included only in a citation within the article, leaving a total of 106 articles included in this analysis. High-level findings are presented below; topic-specific findings are included in more detailed sections in later sections of this report.

- For each of the three years, 35 items were reviewed. A single article from 2020, explicating CEPI's revised Equitable Access Policy, was extraordinarily included.
- As might be expected, the majority of items from 2017 covered the launch of CEPI and were nearly all positive.
- In subsequent years, articles noted CEPI's focus and funding for specific pathogens in passing or, sometimes, more specifically: Chikungunya (1 article), Lassa (13), MERS (4), Nipah (3), Rift Valley Fever (1), Zika (2) and Disease X (1).
- Of the 106 items, CEPI authors contributed 14 (13%). 4 were published in 2017, 1 in 2018, 7 in 2019 and 1 in 2020. The majority, in 2019, were descriptive articles detailing CEPI's decision-making processes or the status of vaccine candidates. Although some were published in relatively obscure journals, several were in major publications (e.g., *British Medical Journal, The Lancet*).
- CEPI is held in high regard and there are sweeping aspirations for its success. A number of publications ascribe grand ambitions for a young organisation, hinting at CEPI's need to manage expectations, which can result in frustration if unmet. As one example stated, *"...[I]f CEPI is successful in the vaccine arena, it could in the future tackle the need to coordinate and cooperate on the development of new safe and effective therapeutics. It has the 'right DNA for the job,' and we are hopeful that it will quickly evolve and be willing to take on the broader role..."*[74]
- Predictably, a number of observers questioned CEPI's selection of priority pathogens and/or specific constructs/candidates for funding.
- Across the three years reviewed, language regarding CEPI's purpose, remit and focus regarding affordability and access varied, indicating a need for greater clarity regarding critical aspects. This includes whether CEPI is focused only on supporting candidates deterred by market failure (calling into question Zika and SARS-CoV-2) and its role in "assuring" affordability and equitable access.

Stakeholder Survey

An online survey was administered in English via the survey platform Qualtrics between 23 March 2020 and 22 April 2020, when data collection was interrupted. The survey was sent to a convenience sample of 161 valid e-mail addresses, representing the following categories of association to CEPI:

- members or observers of any interim or permanent governance committee since CEPI's inception, including current members of the Board, SAC, JCG and IC;
- primary contact of applicants and grantees;
- the most senior representatives of grantee organisations with knowledge of the CEPI partnership (e.g., CEO, CSO);
- individuals from countries where diseases currently in CEPI's priority list are endemic, including medical professionals, academics, civil society representatives and/or public health officials;
- individuals from organisations working on global health security and emergency response;
- individuals from regulatory bodies, including both stringent regulatory authorities and national regulatory authorities in affected countries;
- select academics not represented above.

Forty-four full responses and one partial response were received, representing a 28% response rate. Sixteen of the respondents (36%) were also

Table 6: Distribution of survey respondents by sub-group

Type	Survey	Survey Comments
Implementation partner	7	6
Awardee / Industry	9	8
Awardee	5	4
Industry	4	4
Board / Founder	7	5
Board	3	2
Founder	4	3
Country	1	1
Donor	9	6
Secretariat Staff	12	9
JCG/SAC	10	10
JCG	4	4
SAC	6	6
Other	2	1
Grand Total	57	46

respondents to CEPI's Reputation Management Review conducted during late 2019. Secretariat staff were omitted from the original survey list and thus were given the opportunity to respond in August 2020 when their responses were added to the analysis. Fifteen Secretariat staff identified by CEPI were sent the survey and 12 responses were received, for a response rate of 80%.

Respondents are categorized according to their most direct association with CEPI, as some stakeholders could fall into multiple categories. As an example, if an individual now holds an academic position and was also a founder of CEPI by serving on the Interim Board, that respondent is categorized as a "founder" in Table 7 below. Survey results in this report are presented based on these groupings.

The survey collected demographic data, asked 35 thematic questions for all respondents primarily structured on a five-point Likert scale ranging from strongly agree to strongly disagree and an additional five questions for just the Secretariat staff. Each question also allowed participants to choose "I don't know" as an answer. Each section of thematic questions was followed by a free text area that encouraged respondents to provide written rationale for their answers. Forty-six respondents (81%) also provided text comments as part of the survey.

Stakeholder Interviews

At the initiation of the project, select Secretariat staff were interviewed by MMGH to assess their expectations for the MTR and key areas of interest, and to introduce MMGH to their functional areas of the organisation.

Structured viva voce interviews targeted 30 individuals at the senior management level within the "inner circle" of CEPI stakeholders, i.e., individuals with a sufficient familiarity and understanding of CEPI structure, strategy and functioning to understand the questions and to articulate thoughtful, constructive answers. This designated "highly knowledgeable" group included:

- individuals who served on interim or permanent governance committee since CEPI's inception through current members including the Board, SAC, JCG, IC;
- other investors in CEPI;
- individuals representing applicants or grantees;
- individuals working on global health security and emergency response;
- affected country public health agency representatives.

Interviews with 15 stakeholders were conducted between 28 March 2020 and 15 April 2020. All interviewees were invited to respond to the survey and four completed the survey. Seven of the interviewees (47%) were also respondents to CEPI's Reputation Management Review conducted during late 2019. The survey is available as Annex 2 in the accompanying Annex document.

Interviewees were categorized into the following groups:

Table 7: Categorisation of interviewees

Type	Number
SAC	1
JCG	3
Donors	2
Implementation partner	1
Awardee	1
Board	5
Founder	1
Other	1
Total	15

All interviews were conducted based on a standard script through telephone or video, and responses were recorded in a template by the interviewers

and anonymized for reporting. Interviews focused on the subjective aspects of the research questions, seeking to understand the underlying rationale for stakeholder perceptions and focused on the expertise of the interviewee. The interviews ranged in time from 30 to 90 minutes.

Thematic analysis

An independent thematic analysis was conducted using both the notes from stakeholder interviews and the free-text comments entered in the survey. Stakeholder remarks were coded inductively using the framework method[75] and themes generated using the MTR Review Indicators as an organising framework. Preliminary themes — including quantification and supporting quotes — were reviewed by the interviewers to ensure fidelity.

Since the stakeholder sample was not designed to be statistically representative of CEPI stakeholders, this report does not give quantitative results from the thematic analysis. Instead, it describes the overall direction and the diversity of responses relating to each indicator, and (where found) the degree of divergence among stakeholders.

COVID-19 Response Review

A mixed-methods approach was used to collect and analyse data, including a document review, literature review, a stakeholder survey, and stakeholder interviews. This review was conducted consistent with the Development Assistance Committee Principles for the Evaluation of Development Assistance.

Document/Literature Review

The document and literature review included documents available on CEPI's website, confidential CEPI documents and a literature review spanning January through August 2020. A sample of the CEPI documents reviewed are below. Redacted documents related board discussions were available for 48 hours for review. Documents are referenced throughout the detailed report, but not in the executive summary.

Document review

- Board/SAC/JCG meeting summaries/notes
- IC meeting materials and summaries
- PSMB meeting summaries
- Sample documentation from the stage gate review process

Literature review

MMGH conducted a systematic literature review using Google Scholar and PubMed covering the period 01 January 2020 through 20 August 2020. The review used the following search terms and variants: Coalition for Epidemic Preparedness Innovations; and CEPI. The initial search of both databases returned 100 records. Of those, 60 were excluded because they were duplicates or did not have content related to COVID, leaving a total of 40 articles included in this analysis. Of the 40 items, CEPI authors contributed 7 (18%) [10,53,59,65,76–78].

- Several articles were reviews of vaccines under development that make mention of CEPI's role [79–84].
- Two were reports of clinical results of CEPI funded vaccine candidates [85,86].
- Three represent relevant work in enabling science where CEPI contributed [87–90].
- Many mention CEPI in the overall context of vaccine development [82,91–100].

Survey and Thematic Analysis

Stakeholders. The CEPI Secretariat provided the list of stakeholders to be interviewed and/or surveyed by MMGH and identified most of them into the Stakeholder Types below. If a stakeholder could fall into more than one type, their primary and most recent relationship with CEPI was used.

- **Board** – A current board member or former board or interim board member
- **Founder** – Someone engaged in the start-up of CEPI but no longer affiliated
- **Donor** – A donor, including current or former members of the IC
- **Secretariat** – A Secretariat employee or consultant
- **Joint Coordinating Group (JCG)** – A current or former member of the JCG
- **Scientific Advisory Committee (SAC)** – A current or former member of the SAC
- **Awardee** – Represents an organisation that has received funding from CEPI

- **Industry** – A current or former employee of a company, not otherwise affiliated with CEPI
- **Implementation Partner** – Representing an organisation that is considered a partner of (but not funded by) CEPI (e.g., Gavi) and not falling into other types
- **Country** – Representing the perspective of a recipient country
- **Other** – Anyone not fitting into one of the other types

Surveys. Two surveys were developed by the MMGH team with input from the CEPI Secretariat. (Surveys are given in the annexes to this report.) The CRR Survey contained 27 five-point Likert scale questions, with responses ranging from "strongly agree" to "strongly disagree." Questions addressed CEPI's response to the COVID-19 pandemic and were grouped by performance area. Each group was followed by a free text box asking the respondent for their rationale for their answers. The Secretariat Survey was structured in the same way. In addition to the questions included in the CRR Survey, the Secretariat Survey contained questions from the MTR survey and five questions directed only to the Secretariat. Surveys were administered in English using the Qualtrics survey platform. Reminders were sent on a weekly basis to stakeholders who had not completed their survey.

Structured interviews. An interview script was developed by the MMGH team with input and approval from CEPI. The script contained eight questions exploring stakeholder perceptions of CEPI's response to the COVID-19 pandemic. Questions were shared in advance with interviewees, and the interviews were conducted by MMGH staff in English, German or Italian. Interviews ranged in duration from 30 to 90 minutes. Responses were captured in a template by the interviewers and anonymised for reporting. Secretariat staff were not included among the interviewees.

Thematic analysis. An independent thematic analysis was conducted using both the notes from stakeholder interviews and the free text comments entered in the surveys. Stakeholder remarks were coded inductively using the framework method75 and themes generated using the Performance Areas as an organising framework. Preliminary findings, including supporting quotes, were reviewed by the interviewers to ensure fidelity.

Because the stakeholder sample was not designed to be statistically representative of CEPI stakeholders, this report does not give quantitative results from the thematic analysis. Instead, it describes the overall direction and the diversity of responses relating to each indicator, and where found, the degree of divergence among stakeholders.

Stakeholder Analysis

In total, 88 individuals provided their views in interviews or surveys. Of them, 10 participated in the interviews as well as the CRR Survey (Table 8). As anticipated given its timing and brief duration, the CRR Survey had a moderate response rate. Response rates for the interviews and Secretariat Survey were good.

Table 8: Response Rates

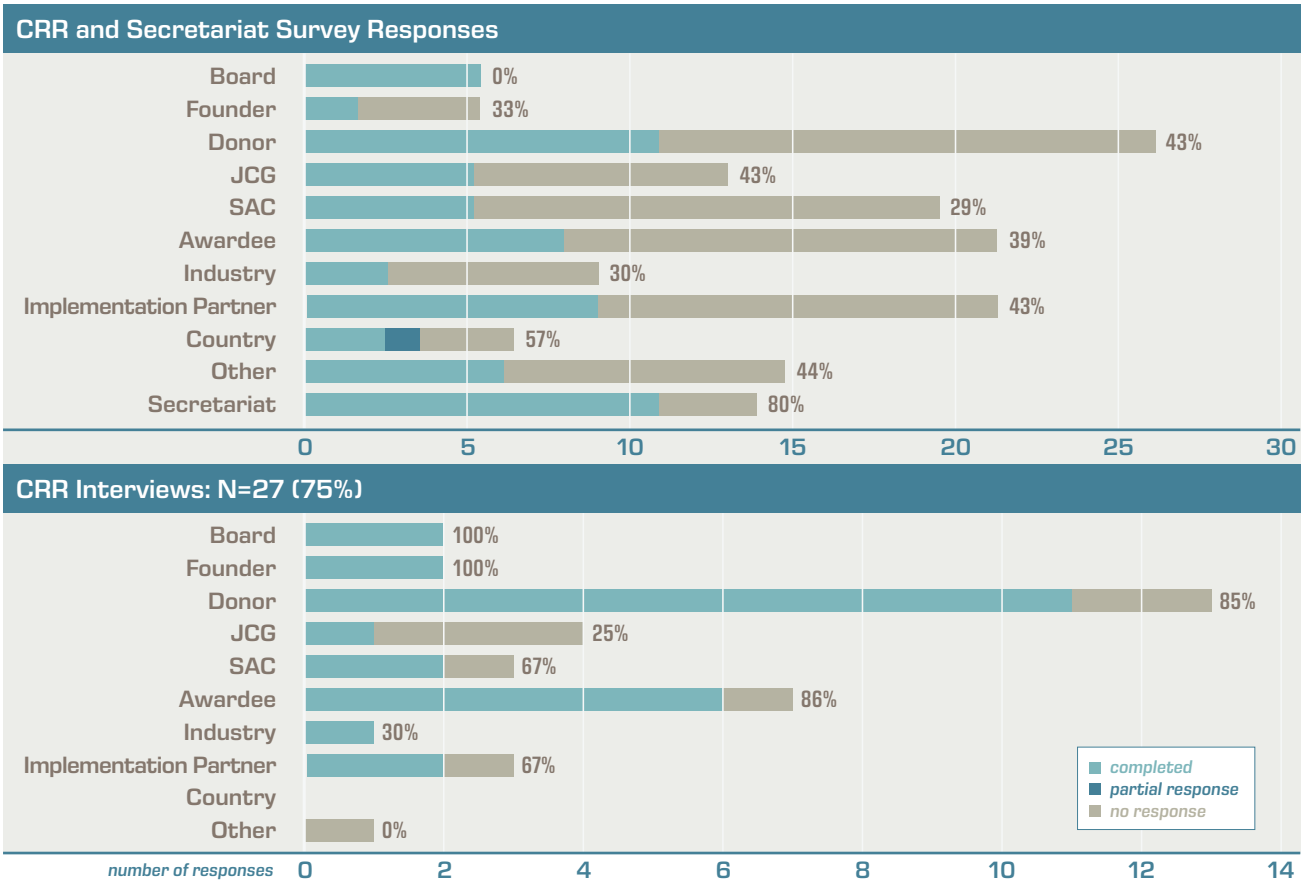
Survey	Period	Responses/ Target	Response Rate
CRR Survey	21 July – 23 August 2020	59/154	38%
Interviews	21 July – 20 August 2020	27/36	75%
Secretariat Survey	5 August – 23 August 2020	12/15	80%

The distribution of stakeholder types is shown in Figure 24. No Board members responded to the CRR Survey. They were added to the survey only on 13 August and so had limited time to respond. There were no other striking differences in response rates to the CRR Survey across stakeholder types. Among the CRR Interviews, response rates were lowest for the JCG members.

Please note that because of the differentiation in stakeholder types, the broad perspectives of industry and country representation may also be captured in awardee or other stakeholder types because individual responders may have a more specific relationship with CEPI.

There is overlap in the stakeholders contributing to the CRR, in particular with those that contributed to the MTR, and to some extent with those that participated in the CEPI Reputation Management Review. Of the 27 stakeholders interviewed, six (22%) were also interviewed for the MTR and four (15%) also participated in the CEPI Reputation Management Review. Of the 59 stakeholders who responded to the survey, 30 (50%) also responded in the MTR Survey and seven (12%) participated in the Reputation Management Review. Eight individuals have contributed to all three reviews.

Figure 23: Response Rates for CRR Survey and Interviews



Performance Annex

Progress Update 2021 – KPI Reporting

Portfolio composition

CEPI's current R&D portfolio consists of 20 vaccine candidates for priority pathogens ("core" portfolio; including 2 MERS and Lassa pilot pathogen candidates from rapid response platform projects), nine vaccine candidates for COVID-19 and three rapid response platforms (figure 1), along with a range of pathogen-specific and cross cutting enabling sciences activities that support vaccine development and funding activities for Finishing Ebola. A total of 18 vaccine candidates in CEPI's vaccine candidate portfolio are now in clinical trials.

Notable portfolio developments related to CEPI's vaccine candidate portfolio in 2020 include:

- On top of its investments in priority pathogens, CEPI has invested in a diverse and advanced Covid-19 vaccine candidate portfolio, among which 8 have progressed to clinical development, including 5 in pivotal trials and 2 having received Emergency Use Authorization. In order to rapidly develop Covid-19 vaccines, CEPI enabled 6 vaccine and platform awardees to redirect efforts to Covid-19 vaccine projects.
- Based upon successful Stage Gate Reviews, PSMB endorsed recommendations to progress 5 priority pathogen vaccine candidates to the next stage of clinical development. A total of 11 priority pathogen vaccine candidates (including 3 Covid-19 rapid response platform projects) are now in clinical trials.
- Progress in late-stage development of CEPI's Chikungunya portfolio: Valneva initiated a pivotal Phase III study in the US (self-funded) and finalised a partnership agreement to enable technology transfer to Butantan (signed in January 2021); CEPI signed a new partnership agreement with IVI-Bharat for a third vaccine candidate for Chikungunya.
- Continued commitment to Finishing Ebola in response to the 2019 outbreak, with the licensure of a second Ebola vaccine (Janssen) as a major achievement to which CEPI has contributed and progress within the cross-cutting Enabling Sciences portfolio including the initiation of the multi-country Lassa epidemiology study.

Anticipated developments for 2021 include:

- Continued rapid progress of CEPI's Covid-19 portfolio, including completion of pivotal trials, authorization for emergency use and contribute to COVAX' objective of delivering 2 billion doses by the end of 2021.
- CEPI anticipates significant progress in its priority pathogen portfolio including 8 stage-gate reviews and the initiation of up to 13 clinical trials.
- Continued investment and progress in enabling science activities and Ebola clinical trial follow-up studies.

Portfolio investment

To date, CEPI has entered partnership agreements with total investment requirements of up to $725M to support its "core" (non-COVID-19) R&D portfolio - excluding contingency funding. Most of these investments are longer term, multi-phase investments, not all of which are expected to be committed, as these will be contingent on key milestones that candidates will have to meet as they transition between phases of development. Accounting for this phase-to-phase attrition, CEPI is expected to spend $577M to achieve strategic portfolio objectives for vaccine development against priority pathogens, Disease X as well as to complete Finishing Ebola. CEPI has redirected a substantial amount of funding to Covid-19 projects. Part of these funds have been permanently reallocated to CEPI's Covid-19 portfolio while additional funding reallocation is under study. A significant funding gap for progressing CEPI's priority pathogen portfolio of $357M has materialized and will require backfilling through CEPI 2.0 replenishment. The continuation of CEPI's rapid response platform call (CFP2R) and future funding of the advanced development of Chikungunya and Rift Valley Fever is uncertain.

Portfolio performance

CEPI is ahead of its overall portfolio targets for 2020 per development phase (see Table below) and in particular of its objective of delivering 4 phase 3 ready vaccine candidates against 2 or more priority pathogens. As far as CEPI's "core" portfolio (excluding Covid-19) is concerned, CEPI is slightly off target, especially in terms progress from preclinical studies to early-stage clinical development. This set-back is due to the Covid-19 pandemic having delayed overall progress in CEPI's "core" vaccine candidate portfolio. To limit those impacts, CEPI has developed and implemented mitigation strategies and reinforced portfolio monitoring and review efforts. Based on an initial impact assessment that provided an understanding of the nature and scale of Covid-19 impacts, as well as a recently completed scientific and technical review, CEPI is currently undertaking a systematic strategic review of its "core" vaccine candidate portfolio that will enable CEPI to reinforce portfolio oversight and to anticipate portfolio prioritization and transition towards CEPI 2.0 throughout 2021.

Despite the challenges encountered, CEPI has continued to support and advance its "core" vaccine candidate portfolio and the pipeline is broadly progressing as expected. While they could affect CEPI's ability to deliver on disease-area portfolio targets by the end of its first business cycle, the grass-roots changes in the vaccine development landscape as well as the clinical validation of vaccine platforms in CEPI's portfolio represent major upside opportunities.

Summary table showing progress within CEPI's vaccine candidate portfolio

KPI	Pathogen	Phase	Target 2020	Actual 2020 (+additional successful stage-gate reviews*)	Comment
Number of vaccine candidates advanced	"Core" Priority pathogens	Pre-clinical	14	17	The pipeline is progressing broadly as expected but experiencing delays due to the impact of Covid-19.
		P1	8	5 (+4)	
		P2	1	1 (+2)	
		P3/Licensure	1	1	
	Covid-19	Pre-clinical	NA	1	CEPI has an additional 9 Covid-19 vaccine candidates, 8 of which are in clinical development. Some of these projects have upside effects on CEPI's "core" priority pathogen pipeline.
		P1	NA	3	
		P2	NA	0	
		P3/Licensure	NA	5	
	Total	Pre-clinical	14	18	Taking into account "core" priority pathogen projects and Covid-19 projects, CEPI is ahead of its 2020 targets.
		P1	8	8 (+4)	
		P2	1	1 (+2)	
		P3/Licensure	1	6	

* There are some vaccine candidate projects that have successfully passed the stage gate to enter the next development phase but have not yet initiated the next phase in terms of dosing study subjects. For a complete overview, these numbers are added as (+SG) in the table above.

Glossary

Term	Definitions used in this report
Awardee	Sometimes used instead of development partner
Coalition	Any person or organisation having an official association to CEPI, including the Secretariat
COVAX	The vaccines pillar of the ACT Accelerator for COVID-19
Development partner	An organisation being funded under contract by CEPI to perform vaccine development activities
Donor	Investor
Implementation partner	An organisation expected to partner with CEPI to accomplish its targets but is not funded by CEPI and is not performing vaccine development activities
Observer	Authors included in the literature review not currently affiliated with CEPI
Secretariat	Any employee or consultant working on behalf of CEPI
Stakeholder	Any person associated with and having some level of vested interest in or employed by CEPI
Stakeholder Types	Stakeholders were categorised by their primary relationship with CEPI into these types for survey data analysis: • **Board** – A current board member, or former board or interim board member • **Founder** – Someone engaged in the start-up of CEPI but no longer affiliated • **Donor** – A donor, including current or former members of the Investors Council • **Secretariat** – A Secretariat employee or consultant • **Joint Coordinating Group (JCG)** – A current or former member of the JCG • **Scientific Advisory Committee (SAC)** – A current or former member of the SAC • **Awardee** – Represents an organisation that has received funding from CEPI • **Industry** – A current or former employee of a company, not otherwise affiliated with CEPI • **Implementation Partner** – Representing an organisation that is considered a partner of (but not funded by) CEPI (e.g., Gavi) and not falling into other types • **Country** – Representing the perspective of a recipient country • **Other** – Anyone not fitting into one of the other types

Acronyms

APR	Annual Progress Reports
ARC	Audit and Risk Committee
BARDA	United States Biomedical Advanced Research and Development Authority
BMGF	Bill and Melinda Gates Foundation
Bn	Billion
CEO	Chief Executive Officer
CDC	Centers for Disease Control and Prevention
CEPI	Coalition for Epidemic Preparedness Innovations
CFP	Call for Proposals
CHIKV	Chikungunya virus
CRR	COVID-19 Response Review
CSO	Civil Society Organisations
DNA	Deoxyribonucleic acid
EAC	Equitable Access Committee
EC	European Commission
EIC	Executive and Investment Committee
EID	Emerging Infectious Disease
EMA	European Medicines Agency
EUA	Emergency Use Authorization
EUAL	Emergency Use Assessment and Listing Procedure
EvAC	Evaluation Advisory Committee
FDA	United States Food and Drug Administration
Gavi	Gavi, The Vaccine Alliance
IC	Investors Council
IFFIm	International Financing Facility for Immunisation
IP	Intellectual Property
IPDP	Integrated product development plan
JCG	Joint Coordinating Group
LMIC	Low and Middle-Income Countries
MERS	Middle East Respiratory Syndrome
m	million
MMGH	MM Global Health Consulting
MNC	Multi-National Corporations
MTR	Mid-Term Review
MUSD	Million US Dollars
NEJM	New England Journal of Medicine
NGO	Non-Governmental Organisations
ODA	Official Development Assistance
OECD	Organisation for Economic Cooperation and Development
RFP	Request for Proposal
RI	Review Indicators
RNA	Ribonucleic acid
RVF	Rift Valley fever
SAC	Scientific Advisory Committee
SGR	Stage-gate review
TOC	Theory of Change
UNICEF	United Nations Children's Fund
USD	US Dollar
WEF	World Economic Forum
WHO	World Health Organization

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