Real time assessment (RTA) of UNICEF's ongoing response to COVID-19 in eastern and southern Africa

COVID-19 vaccine supply and rollout

Key insights from qualitative research in Ethiopia, Rwanda, South Africa and South Sudan

Photo credit: UNICEF Ethiopia

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Preface

The United Nations Children's Fund (UNICEF) Eastern and Southern Africa Regional Office (ESARO) commissioned Oxford Policy Management (OPM) to carry out a Real-Time Assessment (RTA) of UNICEF's response to COVID-19 in countries in the region.

Three reports were produced in this phase, Phase II, of the RTA. The reports covered three thematic areas: COVID-19 vaccine supply; COVID-19 vaccine demand promotion; and education, specifically the safe return to school. This report outlines the findings from the study on COVID-19 vaccine supply. Drawing on the qualitative data gathered during the course of 30 interviews with key informants in the four focal countries (Ethiopia, Rwanda, South Africa, and South Sudan) and from UNICEF ESARO, the report presents key findings, emerging themes, and lessons to be learned.

The RTA team includes the following members: Jayne Webster (Team Leader), Emma Jones (Project Manager), Bilal Hakeem (RTA Coordinator), Kandi Shejavali (Monitoring and Evaluation (M&E) Expert), Lauren Mueenuddin (M&E Expert), Kate Gooding (health sector specialist), Sourovi De (education specialist), Elizabeth Harrop (Adviser – Gender and C4D specialist), Vimal Kumar (cold chain specialist) and Nicola Wiafe (Research Analyst). Kate Gooding and Nicola Wiafe conducted the interviews and drafted this report in collaboration with Jayne Webster and Vimal Kumar, which was then quality assured by Emma Jones.

Executive summary

This real time assessment (RTA) is a case study of the UNICEF support to COVID-19 vaccine supply in the eastern and southern Africa region (ESAR), based on qualitative research in four countries: Ethiopia, Rwanda, South Africa and South Sudan. This study is phase II of a wider real time analysis (RTA) of UNICEF's COVID-19 response in eastern and southern Africa. The aim is to support UNICEF's reflection and learning in its ongoing support to COVID-19 vaccine supply, especially success factors, challenges and lessons learned.

The assessment is based on a review of documents, and interviews with 30 respondents across the four focal countries: UNICEF country office staff (9), partners (11) and frontline workers (10). No direct beneficiaries were interviewed. The interviews were conducted from July to September 2021. The assessment is based on a review of documents, and interviews with 30 respondents across the four focal countries: UNICEF country office staff (9), partners (11) and frontline workers (10). No direct beneficiaries were interviewed. The interviews were conducted from July to September 2021. The study addressed questions related to UNICEF's support and lessons learned regarding COVID-19 vaccine supply and rollout; the procurement of COVID-19 vaccines and other relevant supplies; and UNICEF partnerships.

Key Findings

The key findings summarised below were common to all four countries unless otherwise specified. However, we identify where an issue was emphasised more in specific countries. It should be noted that the research did not reach saturation point, so an issue not being reported in a country does not necessarily mean that it was not resonant.

Support for vaccine supply and rollout

Support for the cold chain, supply and logistics has been a key area of UNICEF focus, including assessing or procuring cold chain equipment (CCE), effective vaccine management (EVM), international supply, and distribution within country. Although varied between countries, across the four countries as a whole, there was UNICEF engagement in all ten areas of the Vaccine Introduction Readiness Assessment Tool (VIRAT). Previous experience with, and investment in cold chain together with experience in logistics and procurement and existing networks and partnerships was a strong and valuable UNICEF contribution. UNICEF was also seen as playing an important role in areas such as provision of staff to increase capacity for new vaccine rollout and address existing human resource shortages; attention to equity in planning for vaccine targeting; support for service delivery, planning and coordination; funding; advocacy; promotion of vaccine demand and support for addressing misinformation and rumours management, and support for continuity of essential health services including routine immunisation even while conducting COVID-19 vaccine rollout. In addition, some partners described UNICEF's role in COVID-19 vaccine rollout as wide-ranging and comprehensive.

In terms of strategy for COVID-19 vaccine rollout, planning was generally led by government, with the WHO as the lead partner where partners were involved. However, UNICEF country offices (COs) in Ethiopia, Rwanda and South Sudan were key participants in planning discussions and contributed to development of National Deployment and Vaccine Plans (NDVPs). Targeting strategies and identification of priority groups were largely based on international SAGE guidance and led by government, with support from technical partners

particularly in Ethiopia and South Sudan. In Ethiopia, UNICEF made a specific contribution to targeting through raising attention to inclusion of internally displaced persons (IDPs) and refugees as at-risk groups

Partners and UNICEF staff identified areas where UNICEF support could be strengthened, including some areas of existing UNICEF work. Needs here included earlier action to support COVID-19 vaccine readiness and rollout, additional support in areas such as CCE and technical assistance (TA), and further focus on the continuity of essential services. A range of risks to efficient roll out were anticipated, particularly related to gaps in CCE and EVM, but also vaccine uptake and in South Sudan and Ethiopia, insecurity. UNICEF staffing and budgets have been stretched, with small teams, higher workloads, and lack of budget to expand support as requested. Additional TA consultants have been hired in some countries, although hiring processes were indicated as sometimes delayed.

Funding for vaccine rollout and availability of vaccines

Adequacy of funding for vaccine rollout (covering activities such as training, CCE, and monitoring) varied between countries and was a more significant constraint in Ethiopia and South Sudan. In both countries, funding gaps resulted partly from a delay in development partner support, often due to slow and complex processes. **UNICEF's role in addressing funding constraints involved TA to support resource mobilisation, in-kind support and direct funding** from internal resources, and acting as a channel for funds from other donors. Some partners suggested **areas for improvement in UNICEF's support on funding, particularly in South Sudan, including faster response to funding requests and more streamlined systems, clarity on processes for distributing funding** from other partners, and areas where additional funding was needed**.**

Shortages of vaccine doses were mentioned by some stakeholders in all countries, but more consistently in Ethiopia and Rwanda, with some concerns in South Africa and South Sudan. Gaps in supply meant the target population could not be covered. **Gaps in supply have also hindered sub-national planning and distribution**. As well as quantities, the nature of supply also brought challenges, including short expiry dates (creating pressured timelines for distribution) and reliance on multiple vaccines with different operational requirements.

Stakeholders in all countries recognised that the shortage of vaccines through COVAX and other channels was a global issue beyond UNICEF's control. However, UNICEF has been working to support the supply of vaccines, including supporting development of national COVAX proposals, liaising with the UNICEF Supply Division, organising supporting documents and import requirements, and making arrangements for vaccine arrival, and this role was recognised and appreciated.

Suggestions for improvement in UNICEF's support for international supply of vaccines included support beyond vaccines provided through COVAX and Gavi (for example, considering funding), active support to plan and procure devices for unbundled vaccines, and careful messaging on vaccine arrival timelines.

Coordination and partnerships

UNICEF has been an active participant in coordination fora in all four countries, including overall coordination bodies and participation in thematic working groups. UNICEF has also played a role in organising and supporting specific coordination structures, particularly national working groups on logistics. UNICEF or its TA consultants have engaged with subnational coordination fora and worked to strengthen subnational coordination. **There were positive**

perceptions about UNICEF's approach to collaboration and partnership in all four countries, including descriptions of UNICEF as responsive, collegial and professional. Coordination between UNICEF teams was largely seen as working well.

Suggestions or concerns regarding UNICEF's approach to coordination included ensuring communication to partners is clear and timely, with adequate information sharing; working collaboratively with all partners; closer working with subnational government to jointly plan and agree areas of support; and more support for subnational coordination and engagement. There were also some concerns regarding international coordination, applicable to UNICEF and other partners, in particular, uncoordinated reporting requirements.

Conclusions: summary of key recommendations

This section first summarises the key issues emerging from interviews in the focal countries, and then the prioritised action points developed by ESARO and CO teams.

1. UNICEF and global partners support for COVID-19 vaccine rollout

These areas may be applicable for UNICEF ESARO or headquarters, or advocacy with partners.

- **Funding for rollout and delivery is critical** and requires international attention alongside advocacy for vaccine supply. As supply of vaccines increases, more funding will be needed to scale up rollout, particularly in ensuring vaccines get into arms. Funding should consider the range of activities required for safe and effective vaccine distribution, including the full procurement and supply cycle up to last mile distribution, access and uptake, and system areas such as adequate staffing, training, information, monitoring, supervision and CCE.

- **Slow and complex funding processes for international partners delay funding:** Streamlined systems, including standardised proposal and budget formats and faster approval and disbursement processes, could help to meet urgent needs.

- **Short expiry dates, uncertain timelines and deployment of multiple vaccines make roll out more difficult**, for example hindering advance planning, bringing urgent needs for expanded capacity, and adding to operational preparations (e.g., training on different vaccine requirements). Long delays between international supplies also extend the wait for second doses and create difficulties for public communication to balance supply and demand and maintain trust. More predictable and regular supply could smooth capacity needs.

- **Limited international coordination among partners:** More effective international coordination among partners, including in reporting systems could minimise reporting burdens for country-level stakeholders.

- **A need for more efficient timely communication and collaboration among UNICEF offices:** building on existing collaboration between UNICEF offices to ensure effective communication between all levels could support COs, particularly clear communication from COVAX and the UNICEF Supply Division to national government and UNICEF COs regarding updates and responsibility for delays can help COs in their relationships with partners and enable COs to provide effective support.

2. Country level support to COVID-19 vaccine rollout

- **As vaccine quantities increase, target populations change or expand, or the mix of vaccine types changes, capacity requirements – and gaps - for distribution may**

grow or change. This suggests a need for continued review of national and subnational needs in relation to expected vaccine supplies, to determine support needs such as additional TA, vaccinators, CCE and funding, with timely investment to ensure capacity is in place before supplies arrive. With vaccine coverage still well below target levels (particularly in South Sudan and Ethiopia), substantial further investment may be needed. As part of planning for new vaccine supplies, it will be important to identify and address any requirements for additional supplies (such as syringes).

- **Distribution strategies affect access and equitable access may require additional capacity and activities.** For example, outreach may be needed for populations who are further from vaccine centres (while ensuring sufficient support for safety), and additional investment in CCE and EVM at lower-level facilities may be needed for more decentralised distribution. These needs could be assessed and addressed as part of planning for future rollout.

- **Microplanning and efficient distribution require availability and use of data, including detailed local data on target groups.** Two particular areas to consider are data for equitable targeting and distribution, including supporting availability of data on groups at risk or who are missing out, and effective use of data to determine vaccine needs per location, in order to support efficient distribution and reduce backhauling

- **A focus on COVID-19 has potential consequences for continuity of routine vaccination and other essential health services**: Investments for COVID-19 have the potential to benefit routine services, for example through stronger CCE and EVM skills that apply more widely. However, COVID-19 has taken the time of government (and UNICEF) staff away from other programmes, and in some cases CCE has been reallocated from EPI to COVID-19. Impacts on routine EPI and other services could be considered as part of identifying further support needs (including additional CCE), alongside continued work to promote and invest in activities for COVID-19 rollout that can benefit wider systems (see below).

- **In relation to government coordination, subnational government engagement and coordination are an important accompaniment to national engagement.** Activities here could include early engagement with subnational government to jointly agree on local needs and areas for support, and support to strengthen subnational coordination structures where these are sub-optimal.

- **Clear and effective information sharing can support coordination, collaboration and confidence among government and partners**. This includes sharing information on activities with other development partners to align support (which may require additional effort in countries without effective partner coordination fora); clear information on what is needed from other partners; sharing information on vaccine arrivals with all stakeholders; and careful communication around uncertainties to avoid 'broken promises'.

- **Where funding is channelled through UNICEF, clear and efficient processes are needed to ensure trust and allow timely support.** Key steps here include early clarity and transparency for all partners on the systems that will be used to allocate and disburse funding, to ensure confidence, and streamlined disbursement systems and early preparation for requests and approvals, to ensure funding is provided when needed.

- **Building on existing teamwork within UNICEF offices to ensure regular communication between COs and UNICEF TA consultants** who are supporting vaccine rollout could provide support for consultants and assist their work.

3. Longer term health systems support

- **Experience from the four countries reemphasises the importance of strong underlying health systems and structures in place before crises hit** (a well-documented and recognised issue from previous health system shocks), as well as strong public health emergency capacity. Examples include effective coordination structures that could be adapted for emergency planning and coordination; adequate numbers of staff, with sufficient remuneration and capacity to cover routine as well as emergency-related needs; strong information systems; robust cold chains and EVM, including at PHC level; routine stocks and storage for additional supplies; and adequate infrastructure, including roads and electronic communication networks. The experience with COVID-19 including vaccination provides further impetus for government and partners to invest in strong basic health systems and in making health systems more resilient.

- **Some systems developed for COVID-19 have potential to support the health system more widely**, particularly routine EPI (for example, new monitoring systems and training). There may be opportunities to document and build on the learning from these approaches, and to think strategically about how investments made for COVID-19 can be used for wider health system strengthening. Some support provided for COVID-19 is already building wider systems, for example through contributions of TA consultants whose remits support continuity and strengthening of routine immunization as well as COVID-19 vaccine rollout. Given the significant costs of investment in ultra cold chain capacity for the Pfizer vaccine, one aspect of considering ways to leverage COVID-19 investment for wider health system support may be examining options for future use.

Prioritised action points

These action points were developed by ESARO and COs through a workshop to discuss the RTA findings.

Funding for vaccine rollout and running costs.
- Support for adequate funding should consider ways to enhance efficiencies within the system, rather than focusing only on securing additional resources. Strategies to enhance efficiency include using existing structures for COVID-19 vaccine rollout (rather than parallel systems), ensuring efficiencies in areas such as customs to avoid delays, and ensuring vaccines can be used as soon as they arrive to reduce storage costs.

- Linked with use of existing systems, support should focus on planning for integration of COVID-19 vaccines in routine systems, including government responsibility for vaccination, so moving beyond an emergency campaign mode to a more sustainable approach.

- Some vaccines are donated without the required additional supplies, and without funding for vaccine rollout. Advocacy should address the need for associated costs to be supported and for required supplies to be provided alongside vaccine doses.

- There is scope for UNICEF to enhance mobilisation of resources.

Review and invest to address changing capacity needs as vaccine quantities increase, target populations change or expand, or the mix of vaccines changes
- Capacity needs are affected by vaccine supply, including surges of supply with short expiry dates, and donations of multiple vaccine types. Supply is affected by international political considerations, but there is a role for advocacy around vaccine donation timing (e.g. with

sufficient time for distribution before expiry) and staggering supply to fit capacity, and for advocacy on the types of vaccines supplied to minimise additional country capacity requirements. This may include punctual contribution to discussions on allocation of vaccines through the COVAX Support Work to Advance Teams.

- UNICEF could support national governments in requesting vaccines from COVAX that are the same as previously received, to enhance efficiency and reduce the need for additional capacity.

- Coordinate information on cold chain needs in-country, inform GAVI about gaps and required support through international discussions, and work with other partners to coordinate cold chain support.

- Capacity can also be supported through effective stock management in-country.

- To address UNICEF CO capacity needs, more use could be made of remote options for support from global or regional offices, as well as more country visits when travel restrictions allow. Strategies also need to consider options for addressing staffing needs in-country for activities such as on the ground monitoring.

Distribution strategies affect access, and equitable access may need additional capacity and activities

- Clear advocacy to governments, jointly with WHO, on who to prioritise and on vaccination strategies that reach marginalised groups.

- In relation to supporting national governments to request specific vaccine types from COVAX, UNICEF can support governments to request vaccines that are most acceptable to the population and the same as first doses provided, to reduce hesitancy and enhance uptake and vaccine use.

Microplanning and efficient distribution require availability and use of data, including detailed local data on target groups.

- UNICEF supports routine health information and monitoring systems, including DHIS2. Where not already contributing, UNICEF COs could engage with these systems to enhance routine data quality.

- UNICEF can also support stronger end user monitoring, using government systems.

- To support equity, specific analysis on groups who are missing out on vaccines could be conducted and used as a basis for advocacy.

- Ensure effective use of available data, including existing monitoring systems, to plan distribution. As the rollout strategy has matured and demand and absorption capacity have become more predictable, efficiency can be enhanced with more certainty on subnational needs to inform distribution.

COVID-19 vaccine investments could benefit routine services, but COVID-19 has taken government and UNICEF staff time from other programmes and negatively affected routine vaccination.

- Identify situations where CCE shortages and reallocation of CCE to COVID-19 vaccination are affecting routine immunisation, and include associated capacity needs as part of CCE assessments and coordination in-country, as well as in discussions with Gavi.

- Where monitoring or surveillance systems for COVID-19 vaccination are established, identify ways these can build on and strengthen existing systems, or designs that support future routine monitoring and surveillance.[1]

- Examine ways to use COVID-19 vaccination to support comprehensive primary health care, for example by using community contact for COVID-19 vaccinations to build trust and support provision of other vaccines or other services (such as health checks), and establishing patient registries.[2]

- Advocacy for continued support for routine health systems with international partners and government; and ensuring continued UNICEF support for routine services. This includes considering adequate support for the health workforce, considering capacity for providing COVID-19 vaccines alongside routine services.

Streamlining of work between the Regional Office and global level

- To clarify roles between global and regional levels, there may be value in a similar approach to the annual compact developed between the RO and COs.

- Ensure CO clarity in division of responsibility between UNICEF regional and global offices.

Fast-track processes to provide TA are needed for UNICEF to remain a reliable partner

- There are existing processes to fast-track TA and process contracts rapidly. Ensuring rapid response may require ensuring awareness of existing processes and collaboration with operations teams for effective implementation.

Focus on areas of expertise while looking at opportunities to build on other areas

- UNICEF contributes to the COVID-19 response alongside other partners. Not all roles will be best served by UNICEF, and it is important to recognise where other partners have expertise.

- There may be opportunities to develop new skills (such as with new technologies) that can enhance UNICEF's support to both COVID-19 vaccine rollout and in other programme areas. COVID-19 has in some cases also indicated additional areas for future UNICEF support within UNICEF's existing expertise (for example, through highlighting new needs for cold chain support), and these could be incorporated in future country strategies.

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[1] PHCPI (2021) Strengthening primary health care through Covid-19 vaccination efforts & investments. PHCPI, 2021 https://improvingphc.org/phc-and-covid-19-vaccination
[2] PHCPI (2021) Strengthening primary health care through Covid-19 vaccination efforts & investments. PHCPI, 2021 https://improvingphc.org/phc-and-covid-19-vaccination

List of abbreviations

C4D	Communication for Development
CCE	Cold Chain Equipment
CCEOP	Cold Chain Equipment Optimization Platform
CEPI	Coalition for Epidemic Preparedness Innovations
CO	Country Office
CRD	Country Readiness and Delivery workstream
EPI	Expanded Programme on Immunisation
EPP	Emergency Preparedness Platform
ESAR	Eastern and Southern Africa Region
ESARO	Eastern and Southern Africa Regional Office (of UNICEF)
EVDS	Electronic Vaccination Data System
EVM	Effective Vaccine Management
FCDO	Foreign and Commonwealth Development Office
FMoH	Federal Ministry of Health
GBV	Gender-Based Violence
GFATM	Global Fund to fight AIDS, TB and Malaria
ICC	Interagency Coordination Committee
IDPs	Internally displaced persons
IPC	Infection Prevention and Control
KII	Key Informant Interview
LMICs	Low and Middle Income Contries
M&E	Monitoring and Evaluation
MICS	Multiple Indicator Cluster Survey
MoH	Ministry of Health
NDVP	National Deployment and Vaccine Plan
NITAG	National Immunization Advisory Group
OPM	Oxford Policy Management
PHC	primary health care
PPE	Personal Protective Equipment
RCCE	Risk Communication and Community Engagement
RTA	Real-Time Assessment
SAGE	Strategic Advisory Group of Experts on immunisation
SOP	Standard Operating Procedures
TA	Technical assistance
TWGs	Technical Working Groups
UNHAS	United Nations Humanitarian Air Service
WHO	World Health Organization

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1   Introduction

As of September 2021, over 4.6 million people globally have died from COVID-19.[3] The pandemic has upended people's lives across the globe, and the effects on economies, livelihoods and service provision are exacerbating poverty,[4] vulnerability and inequity (Robertson et al 2020).

This real time assessment (RTA) was commissioned by the UNICEF Eastern and Southern Africa Regional Office (ESARO). The **objective is to support UNICEF reflection on its COVID-19 response to date, including success factors, challenges and lessons learned**. The RTA has been implemented in two phases:

Phase I (research undertaken from October to December 2020) had a broad multi-sectoral basis. It included a light-touch regional analysis and deep dives in six countries (South Africa, Somalia, Uganda, Kenya, Madagascar and Namibia).

Phase II (research undertaken from June to September 2021) has a more discrete focus on three thematic areas and four focal countries (Rwanda, South Africa, South Sudan and Ethiopia)*.* This responded to UNICEF staff reflections on Phase 1, which highlighted preference for more in-depth analysis. Phase II assesses UNICEF's response to COVID-19 in three thematic areas, encompassing the work of four UNICEF programmes:

- COVID-19 vaccine supply and rollout (UNICEF Supply and Health/Immunisation teams) – **the focus of this report**
- COVID-19 vaccine demand promotion (C4D)
- Education - specifically the safe return to school

The thematic focus for Phase II was defined by the RTA Steering Committee. As described in the RTA Phase II inception report, the focus and questions for each thematic study were agreed through a series of engagements with the focal ESAR programme teams (regional and country offices), with support from the ESARO Evaluations Team. The focal countries were also identified in collaboration with the regional programme teams and the UNICEF Deputy Regional Director. The focal countries were a 'best fit' of the four programme team preferences, based on factors such as progress with programme roll out, country contexts (e.g. conflict, economic development, and effective vaccine management (EVM) rating), and UNICEF's role in country coordination structures.

1.1   Background to the study

The Access to COVID-19 Tools (ACT) accelerator collaboration was established in 2020 to accelerate development, production and equitable access to COVID-19 tests, treatments and vaccines. COVAX is the vaccines pillar of ACT, and is co-led by Gavi, the Coalition for Epidemic Preparedness Innovations (CEPI) and the World Health Organization (WHO). It aims to accelerate development and manufacture of COVID-19 vaccines and to guarantee fair and equitable access for every country in the world. COVAX acts as a platform to support research, development and manufacturing of COVID-19 vaccine candidates, and to negotiate their pricing. Self-financing countries that participate in COVAX are guaranteed sufficient doses to protect a certain proportion of their population, depending upon their funding. Eligible low and lower-middle income economies receive doses for free, with all countries first receiving doses

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[3] WHO COVID-19 Dashboard: https://covid19.who.int/ [Accessed 21st September 2021].
[4] World Bank (2021) Poverty: https://www.worldbank.org/en/topic/poverty/overview

in proportion to their population until 20% of the total population are vaccinated.[5] Ethiopia, Rwanda and South Sudan are funded members of COVAX, while South Africa is self-funding.

UNICEF response to COVID-19 vaccine supply and rollout

UNICEF is playing a role in COVID-19 vaccine supply and rollout globally, regionally and at country level. Globally, UNICEF has a key role in COVAX organised through its global Supply Division in Copenhagen. UNICEF is working with manufacturers and partners on vaccine procurement, freight, logistics and storage, and leading procurement and delivery for the 92 low- and lower middle-income countries that receive vaccine donations through COVAX. UNICEF also supports procurement for many upper middle-income and high-income nations, and procures and transports immunization supplies such as syringes, safety boxes, and cold chain equipment (CCE)[6].

At regional level, the ESARO Health and Expanded Programme on Immunisation (EPI) team supported vaccine supply and rollout through activities that included providing guidance (e.g., input to global guidance through participation in workstreams under the ACT Accelerator); contributing to global and regional coordination and resource mobilisation; working with other agencies to organise capacity building webinars and reviews of national plans; and providing day-to-day support for UNICEF country offices (COs).

The ESARO supply team have supported upstream procurement and shipping.

This report focuses on UNICEF's work at country level, and the CO work on vaccine supply is described in the findings section of this report. UNICEF has provided support across areas indicated in the Vaccine Introduction Readiness Assessment Tool (VIRAT) which was developed by the COVAX Country Readiness and Delivery (CRD) workstream (led by WHO and UNICEF, and including Gavi, the World Bank and the Bill & Melinda Gates Foundation). The VIRAT considers readiness in ten areas:

  A. Planning and coordination,
  B. Budgeting,
  C. Regulatory,
  D. Prioritization, Targeting, and COVID-19 Surveillance,
  E. Service Delivery,
  F. Training and Supervision,
  G. Monitoring and Evaluation,
  H. Vaccine, Cold Chain, Logistics, and Infrastructure
  I. Safety Surveillance
  J. Demand Generation and Communication.

1.2   Intervention contexts: situating the four focal countries

In ESAR, since the beginning of the pandemic at the time RTA data collection finished in September 2021, there had been 4,740,722 confirmed COVID-19 cases and 124,191 deaths. There is considerable country variation, however.[7] Of the four focal countries, South Africa had reported the highest number of cases (2,882,630) by a substantial margin, followed by Ethiopia (332,961), Rwanda (95,257), and South Sudan (11,814). Figure 1 shows the cumulative

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[5] Berkley (2020) COVAX explained, GAVI https://www.gavi.org/vaccineswork/covax-explained; WHO (2020) COVAX https://www.who.int/initiatives/act-accelerator/covax; Loft, P (2021) Covax and global access to Covid-19 vaccines. House of Commons Library https://commonslibrary.parliament.uk/research-briefings/cbp-9240/
[6] UNICEF 2021 COVAX: ensuring global equitable access to COVID-19 vaccines https://www.unicef.org/supply/covax-ensuring-global-equitable-access-covid-19-vaccines
[7] WHO COVID-19 Dashboard: https://covid19.who.int/ [Accessed 21st September 2021].

number of COVID-19 cases per 100,000 population reported in the four focus countries compared to the wider east and southern Africa region.

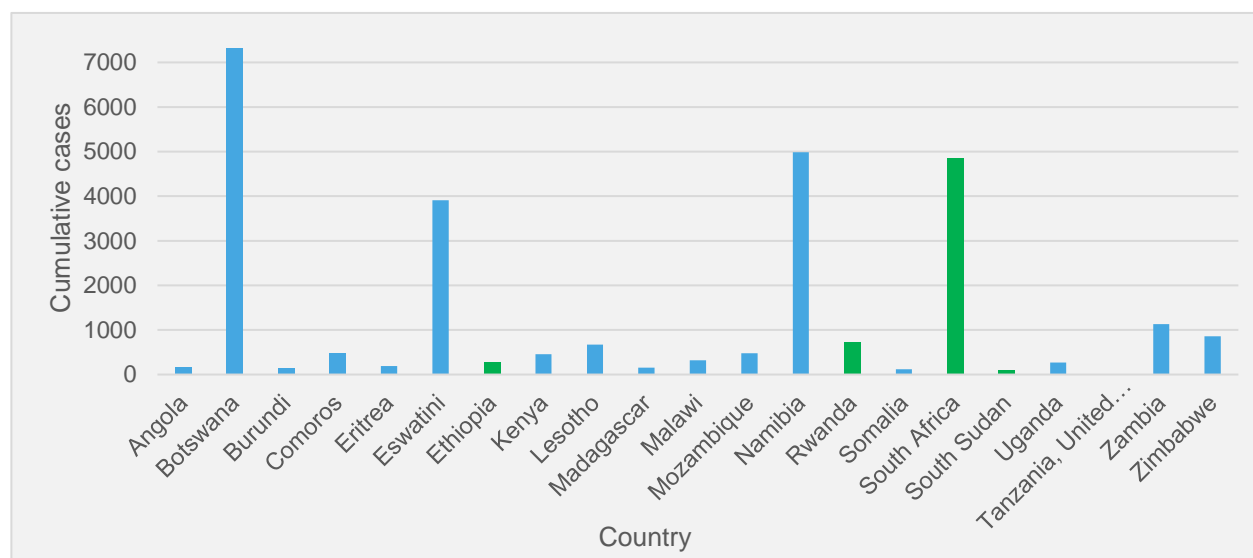**Figure 1 Cumulative number of COVID-19 cases per 100,000 population[7]**

Figure 1 shows that, among the four focal countries, South Africa has also reported the highest cumulative number of cases per 100,000, although bordering nations (Botswana and Namibia) have reported higher case rates. Rwanda has reported more cases per 100,000 population than Ethiopia, while South Sudan has reported the fewest. The reported number of deaths per 100,000 population in the four countries follows the same pattern.[7]

Table 1 Comparison of country characteristics[1]

	Population[8]	Land area (sq. km)	Income classification[9]	Poverty headcount ratio at $1.90 a day (2011 PP) (% of population)	Fragile and conflict affected context?[10]	Number of languages spoken[11]	DTP3 coverage (2019) (%)[12]	Country status in terms of EVM
Ethiopia	114,963,583	1,129,300	Low income	30.8	Yes	93	68	Mid performing
Rwanda	12,952,210	24,670	Low income	56.5	No	6	98	High performing
South Africa	59,309,690	1,213,090	Upper-middle income	18.7	No	52	85	High performing
South Sudan	11,194,730	631,928	Low income	76.4	Yes	74	49	Mid performing

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[8] World Bank (2021). https://data.worldbank.org/ [Accessed: 21st September 2021]

[9] World Bank (2021). World Bank Country and Lending Groups. https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups

[10] The World Bank. 2021. Classification of Fragile and Conflict-Affected Situations. https://www.worldbank.org/en/topic/fragilityconflictviolence/brief/harmonized-list-of-fragile-situations [Accessed: 21st September 2021]

[11] Eberhard, David M., Gary F. Simons, and Charles D. Fennig (eds.). 2021. *Ethnologue: Languages of the World.* Twenty-fourth edition. Dallas, Texas: SIL International. Online version: http://www.ethnologue.com. [Date accessed: 21st September 2021]

[12] UNICEF (2021), Immunization coverage by antigen (country, regional, and global trends). https://data.unicef.org/topic/child-health/immunization/; [accessed: 21st September 2021]

Other aspects of the national context also vary between the case study countries (see Table 1) In Ethiopia and South Sudan, both classified as fragile and conflict-affected states, the COVID-19 pandemic further complicates complex humanitarian situations. In both countries, civil conflict has led to a lack of basic services and infrastructure, population displacement, insecurity, and restricted movement. The maturity of the existing vaccination system also varies, with South Sudan and Ethiopia classified as lower performing in terms of effective vaccine management than Rwanda and South Africa and having lower routine immunisation coverage. Ethiopia, Rwanda and South Sudan all receive support from Gavi, while South Africa contributes funding to Gavi; this status affects international support for cold chain systems for routine EPI as well as support related to COVID-19 vaccination.

Vaccine sourcing and coverage in each country context

COVID-19 vaccine supply and coverage has varied between the four countries. As of September 2021, the proportion of people fully vaccinated ranged from 14% in South Africa and 12% in Rwanda, to 0.66% in Ethiopia and 0.26% in South Sudan (see Table 2).

Table 2 Proportion of people vaccinated against COVID-19, Sep 28, 2021[13]

Country	Proportion of people fully vaccinated (single-dose vaccine or both doses of a 2-dose vaccine)	Proportion of people only partially vaccinated (one dose of a 2-dose vaccine protocol)
Ethiopia	0.66%	1.71%
Rwanda	12.45%	3.4%
South Africa	14.16%	6.27%
South Sudan	0.26%	0.39%
Africa	4.29%	2.32%

Coverage of COVID-19 vaccination varies within countries: in South Africa, 40% of adults are fully vaccinated in the Western Cape, compared to 25% in Mpumalanga.[14]

Target populations across the countries have largely followed global WHO Strategic Advisory Group of Experts on Immunization (SAGE) guidelines[15], focusing initially on health workers, older adults and adults with comorbidities, but with some additional groups identified (such as prison inmates and refugees in Rwanda).

Vaccine sourcing and supply strategies have varied. Ethiopia, Rwanda and South Sudan have all received SII-Covidshield and Vaxzevria (AstraZeneca) doses through COVAX, with Ethiopia and South Sudan additionally receiving Janssen doses via COVAX, and Rwanda receiving Pfizer doses. Ethiopia and Rwanda have also received Janssen doses through the African Union's African Vaccine Acquisition Trust (AVAT) initiative. Additional doses have been received through bilateral donations, for example from China (Sinopharm), and the USA (Pfizer and Janssen). Some governments have also mobilised domestic funding to purchase vaccines, especially noted for Rwanda and South Africa. South Africa has received Pfizer

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[13] Global Change Data Lab COVID-19 data explorer https://ourworldindata.org/explorers/coronavirus-data-explorer?facet=none&Metric=People+vaccinated&Interval=7-day+rolling+average&Relative+to+Population=true&Align+outbreaks=false&country=USA~AUS~ITA~CAN~DEU~GBR~FRA [accessed 28 September 2021]

[14] South Africa Department of Health COVID-19 public dashboard https://sacoronavirus.co.za/latest-vaccine-statistics/ [accessed 28 September 2021]

[15] WHO (2021) WHO SAGE Roadmap For Prioritizing Uses Of COVID-19 Vaccines In The Context Of Limited Supply https://www.who.int/publications/i/item/who-sage-roadmap-for-prioritizing-uses-of-covid-19-vaccines-in-the-context-of-limited-supply

doses via COVAX, but in contrast to the other three countries, South Africa pays for supplies via COVAX. Most doses in South Africa have been self-procured through government purchases, with primary focus on Pfizer and Janssen after the use of AstraZeneca vaccines was halted due to concerns regarding their efficacy against the beta variant of COVID-19. South Africa also expects some bilateral donations of Pfizer from the USA and has begun local manufacture of the Janssen vaccine.[16]

Capacity to use supplied vaccines has also varied. Donated doses have largely been used in Rwanda and Ethiopia. Yet in South Sudan, delivery strategies and systems were not sufficient to use initial doses supplied through COVAX before the expiry date. Of the doses received in March 2021, South Sudan returned 72,000 doses to COVAX for use elsewhere (in May 2021).[17] The limiting factors are discussed in the findings sections of this report. Since then, systems have been strengthened and remaining doses were delivered before they expired in July, with minimal wastage for recent supplies.

1.3   Study scope, approach and questions

Scope: The RTA provides a relatively light-touch assessment, based on review of available documentation and a limited number of key informant interviews in the four focal countries. This design recognises the need for real time learning and reflection in an unchartered and fluid context in which programme adaptations may be needed. As UNICEF support interventions are being rolled out in the evolving COVID-19 context, the RTA aims to inform what is working, challenges and possible adaptions, whilst recognising their non-static nature.

Respondent sample: The RTA of UNICEF's support to COVID-19 vaccine supply and rollout is based on interviews with 5-8 respondents in each of the four countries and discussion with 4 staff in ESARO (30 interviewees overall). The sample in each country focused on UNICEF health, EPI and supply staff, government and development partners, and subnational government and UNICEF consultants. The sample varied between countries depending on UNICEF's contacts and availability; **Annex C** provides a more detailed breakdown. The respondents were purposively sampled based on their involvement in COVID-19 vaccine rollout and familiarity with UNICEF's work. OPM selected interviewees from a longer list of provided by the relevant UNICEF CO.

Interviews and analysis: All respondents were sent a statement on research ethics ahead of the interview, and all provided informed consent. The interviews were undertaken from July to September 2021, using semi-structured interview guides (see **Annex D**). The interviews were recorded and documented. The interview data were analysed using a framework based on the study sub-themes, and successes and challenges within these.

The intended audience of the study are the ESAR health, EPI and supply teams at the regional and country-levels. The report identifies findings that were common across the four countries, and thus may be applicable to wider ESAR. It also identifies country-specific innovations, successes and challenges, which may be applicable to ESAR countries with similar contexts.

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[16] UNICEF COVID-19 Vaccine Market Dashboard https://www.unicef.org/supply/covid-19-vaccine-market-dashboard; COVID-19 vaccination in South Africa https://en.wikipedia.org/wiki/COVID-19_vaccination_in_South_Africa#Covax_Consignment; additional information from interviews.
[17] Government of South Sudan. South Sudan COVID-19 National Deployment and Vaccination Plan, Updated version 20th August 2021

Limitations

- As the RTA is relatively light touch and entailed a small number of KIIs, we have not captured a broad range of perspectives and the research did not reach saturation point. Additionally, it did not include interviews with final beneficiaries. These factors affect the depth of analysis.

- The report highlights the countries in which specific successes and challenges were mentioned by interviewees. However, **if the issue was not mentioned in a country, it does not mean that the issue was not resonant there**. As may be expected with a small sample, the issues raised by respondents varied even within countries.

- There are limitations to the transferability of the findings to other countries

- As the COVID-19 response work is ongoing, the assessment does not make judgements on the impact and coverage of the COVID-19 response.

Study questions

High level question: How is UNICEF working with partners to support government to prepare for and ultimately roll-out COVID-19 vaccines. What lessons have been learned and are there best practices that can be drawn across countries for the current and future pandemics?

Specific questions:
- **What has been UNICEF's role in supporting vaccine supply, readiness** and roll out and how effective has this support been, within the context of the adequacy of the existing supply chain systems? What was UNICEF's technical input to the strategy for COVID-19 vaccine rollout, and what value did UNICEF add? What risks were anticipated and what strategies were put in place to mitigate them, or what risks were avoided or transferred? What are the lessons learned?

- **How has the procurement of COVID-19 vaccines and other relevant supplies** (injection devices, safety boxes and PPE) been affected by funding and supply availability? To what extent have sourcing strategies changed? What has been UNICEF's role in mitigation of risks and advocacy, and what are the lessons learned?

- **How has UNICEF coordinated across programme areas and worked with partners in supporting government in planning and implementation of the COVAX roll-out**? How effective has this coordination and collaboration been (based on respondent feedback)? What have been the facilitating and limiting factors, and lessons learned?

The focus questions were developed in collaboration with the ESARO Health EPI and Supply teams; and were adapted during the research in each country to align with emerging findings. Some interpretations and adaptions are important to note here:

- We interpreted question 1 broadly, to consider UNICEF support across all areas outlined in the VIRAT, given the wide breadth of CO activity.

- The focus for question 2 was broadened to consider how funding and supply availability have affected COVID-19 vaccine introduction and rollout broadly, not just their effect on procurement. This responded to information from UNICEF ESARO and COs regarding limited CO roles in international procurement of vaccines: The CO role has largely focused on liaising with the UNICEF Supply Division in Copenhagen and ensuring required documentation is in place (for example, import permits). COs and other stakeholders

therefore had limited information on procurement. However, funding and supplies were raised as important issues for COVID-19 vaccine rollout more generally.

- The limited CO role in vaccine procurement also meant that questions on change in sourcing strategies were less relevant, and interview participants did not have information on this area.

Research Findings

Photo credit: UNICEF South Sudan/ Chol

2   Supply system readiness and support for rollout

2.1   UNICEF's role in supporting vaccine readiness and rollout

Across the four countries, support for the cold chain, supply and logistics has been a key area of UNICEF focus, including support on assessing or procuring CCE, EVM, international supply, and distribution within country. Other areas of focus vary between countries (see Annex B for details), but across the four countries as a whole, there has been some UNICEF engagement in all ten areas of the VIRAT. In addition to work on VIRAT component *H: Vaccine, cold chain, logistics and infrastructure*, other areas of UNICEF support are listed below.

- Planning, e.g. input to national deployment and vaccine plans (NDVPs) and strategies.
- Coordination, e.g. supporting and chairing technical working groups (TWGs).
- Budgeting, including resource mobilisation such as input to funding proposals, some direct funding, acting as a channel for funds.
- Regulation, for example technical support on import regulations and requirements.
- Prioritisation and targeting, such as advocacy and data around equity, subnational microplanning.
- Service delivery e.g. technical assistance (TA) and funding for subnational implementation through consultants or implementing partners.
- Trainings (including at subnational level) such as input to training materials development and supporting the cascading.
- Monitoring and evaluation, such as input on monitoring systems and tools, hands-on assistance to collect and compiling data.
- Surveillance, including technical input to tools through TWGs.
- Vaccine demand generation (this is covered in the RTA C4D report).

Support from UNICEF CO in the areas above has taken different forms, including financial support for meetings, CCE, supervision and other activities; in-kind support (for example, with vehicles or CCE); acting as a channel for funds from other donors and for procurement; technical advice and input to joint activities; and providing TA and staff support to undertake planning or implementation activities.

Regarding inputs to the strategy for COVID-19 vaccine rollout, planning has generally been led by government or WHO, but COs in Ethiopia, Rwanda and South Sudan contributed to planning discussions and development of NDVPs. This input included technical contributions, but also some financial support in each of these three countries. In Rwanda, UNICEF was a channel for Gavi funding for NDVP development meetings; in Ethiopia, UNICEF provided financial support for a meeting to review and revise the national distribution plan; and in South Sudan, UNICEF called a reflection meeting that would feed into future planning. Development partners saw this support as an important contribution, for example noting the **value of UNICEF support for reflection and learning in South Sudan**, and **the importance of partner support in Rwanda for timely NDVP submission**.

Targeting strategies and priority groups were largely based on international SAGE guidelines and, particularly in Rwanda and South Africa, prioritisation was undertaken by government. However, in Ethiopia, UNICEF made a specific contribution to targeting through raising

attention to inclusion of internally displaced persons (IDPs) and refugees as at-risk groups. Here, UNICEF initiated a joint letter with WHO to advocate for targeting of IDPs and refugees, and provided data to support their inclusion.

Beyond specific support to COVID-19 vaccine readiness, **UNICEF COs have also supported continued delivery of essential services**. For example, some TA consultants hired for COVID-19 vaccine support also supported routine EPI, and UNICEF provided input to guidelines for continued service delivery in South Africa.

2.1.1   Key areas of UNICEF's added value

Government and development partners in each country indicated areas where they saw UNICEF as making a particular contribution and having specific expertise or systems that contributed to planning or implementation. Support with the cold chain, vaccine management, supply and logistics were particularly highlighted, but there were several other areas where stakeholders saw UNICEF as playing an important role. In addition to areas described below, UNICEF was recognised for support with funding, international supply and coordination, which are discussed in sections 3 and 4.

Support for the cold chain and vaccine management

In each country, support for the cold chain and vaccine management was highlighted as a key area of UNICEF added value, and area of traditional UNICEF strength. UNICEF has dedicated staffing to support cold chain and vaccine management activities as part of routine EPI support, with significant funding from Gavi in some countries. Exact contributions on the cold chain and vaccine management for COVID-19 varied between countries, but have included assessment, procurement, and installation of CCE, allocation of UNICEF CCE to support COVID-19 vaccine rollout, development of guidelines and training on vaccine and cold chain management, support for supervision, and provision of national and sub-national TA.

UNICEF was particularly noted by national government respondents in Ethiopia and South Sudan for providing comprehensive and long-term support to the cold chain and vaccine management. In South Sudan, government reported that "*80-90% of work on vaccine management and the cold chain is by UNICEF*", both for routine EPI and COVID-19, because government systems are weak. In Ethiopia, UNICEF was seen as the only agency that has long-term involvement with the supply and cold chain, and as the only agency providing support on all aspects, including activities such as training on maintenance.

> "*80-90% of work on vaccine management and the cold chain is by UNICEF* (**Government partner, South Sudan**)

UNICEF's role in procuring additional CCE to support COVID-19 vaccine rollout was particularly noted in South Sudan and Rwanda. In South Sudan, UNICEF supported procurement of more sophisticated vaccine carriers with digital temperature recording, which was seen by a development partner as a "**big step forward and important work**" for South Sudan. In Rwanda, UNICEF support for the cold chain and logistics was seen as instrumental in ensuring that Rwanda was among the first countries in Africa to rollout the COVID-19 vaccine, and their specific support for ultra-cold chain development underpinned Rwanda being the first country in Africa to roll out the Pfizer vaccine.

> "*UNICEF's obvious infrastructure for doing these large procurements in the area of cold chain equipment is really helpful*" (**Development partner, Rwanda**)

UNICEF's subnational contribution to the cold chain during the COVID-19 pandemic was particularly highlighted in South Africa, where UNICEF has (on request from government) hired TA consultants as cold chain managers in five provinces. Their work has varied with needs and time available, but includes supporting government on stock management, cold chain gap analysis, development of toolkits and Standard Operating Procedures (SOPs), monitoring and supervision, and technical assistance to reduce wastage. The TA consultants interviewed reported important achievements, including increased awareness of the importance of high-quality cold chain management among government staff.

UNICEF's cold chain support for COVID-19 vaccines, and the ability of this support to overcome any gaps for COVID-19 vaccine rollout, was affected by existing cold chain capacities and prior support. In Ethiopia, Rwanda, and South Sudan, previous investment in the cold chain by UNICEF and other partners, prior to COVID-19, was identified as important for enabling use of the cold chain for COVID-19 vaccines and facilitating rollout, and the cold chain was not seen as a key constraint.

- **For example, in Ethiopia, Gavi funding and support by partners over previous years has strengthened the cold chain for routine EPI**, including UNICEF support for a gap analysis and procurement of solar fridges. Previous investment meant support to the cold chain through COVID-19 was seen by UNICEF as an 'extra boost' rather than addressing fundamental gaps.

- **In Rwanda, the existing supply and cold chain strength was seen as the 'bedrock' of efficient rollout**. Rwanda has received funding through Gavi's cold chain equipment optimisation platform (CCEOP) since 2019 to improve CCE availability, including delivery and installation (by UNICEF) of cold rooms in all health centres and in a new government warehouse. This previous work meant the Rwanda cold chain was largely prepared to receive the COVID-19 vaccine, and gaps were easily identified. UNICEF made additional recommendations to government regarding CCE requirements for COVID-19 vaccines, and existing supplier relationships created through the CCEOP arrangement enabled rapid procurement of additional equipment.

  'The CCEOP was very critical to the infrastructural preparedness for the COVID response" (**Development partner, Rwanda**)

Despite previous investment and new support during COVID-19, there have been gaps in the cold chain, and these have affected rollout. While these gaps are not necessarily related to UNICEF activities or primarily UNICEF's responsibility, they have potential implications for future support. In relation to CCE, for example, in South Sudan and Ethiopia there were reports of insufficient or broken refrigerators, and suggestions that UNICEF could do more to repair or provide new fridges, including solar (although UNICEF does not have primary responsibility for maintenance). Other gaps in Ethiopia included shortages of cold boxes and fridge tags, as well as other equipment needed for rollout such as safety boxes. In both countries, stakeholders reported being able to work around these limitations. This was helped by good knowledge of the system to enable planning around gaps, and by vaccine supply being limited in overall quantity and coming in tranches, which reduced the amount of storage and other CCE needed at any time. However, in both countries, CCE gaps have affected distribution strategies and created additional work. For example, in Ethiopia, repeat journeys were needed to distribute vaccines in order to manage the smaller quantities that could be stored in existing CCE. There are also concerns in both countries that additional CCE will be needed as vaccine quantities and targets increase.

Beyond equipment, vaccine management was also noted as an area with continued gaps, particularly in Ethiopia, where several stakeholders reported insufficient training in EVM (partly due to limited time for preparation), and insufficient monitoring. Lack of vaccine vial monitors for COVID-19 vaccines makes careful temperature monitoring critical, and this was hindered by insufficient fridge tags and supervision. While primary responsibility is not with UNICEF, government saw partner support as needed to strengthen the national and subnational monitoring system.

Insufficient CCE and vaccine management were particularly highlighted in South Africa. Compared to the other three countries, there had been less prior UNICEF support for cold chain strengthening in South Africa, and support for the cold chain and EVM has also been affected by South Africa's status as a country without GAVI support. Routine EPI is delivered through the primary health care system, but primary health care (PHC) cold chains do not meet COVID-19 vaccine requirements (in particular, PHC clinics often have domestic fridges, which also causes vaccine wastage for routine EPI). These CCE gaps reflect a history of insufficient investment: At least in some provinces, there had been previous cold chain and EVM assessments, but limited action or allocation of funding to address identified gaps. Longstanding weakness include gaps in CCE, skills (with insufficient training and mentoring), and procedures (e.g. clear policies on temperature monitoring). Reflecting these issues, routine EPI vaccine wastage is high in some provinces.

CCE gaps affected COVID-19 vaccination strategies in South Africa. In particular, due to insufficient PHC cold chain capacity, COVID-19 vaccines have been delivered through hospitals and vaccine centres. This approach brought additional capacity needs: creating a different cold chain to the routine EPI system necessitates training in cold chain and vaccine management for different staff; new vaccine sites have to be accredited (involving significant regulation); and additional CCE was needed, particularly higher quality (and more expensive) fridges for the hospital sites. The more centralised approach also affects uptake, as vaccines are delivered through more distant hospitals or specific vaccine centres rather than more familiar and easily accessible PHC facilities. The government plans to expand COVID-19 rollout to smaller clinics, but this needs additional cold chain capacity. CCE gaps have also affected routine EPI. For example, in one province it was reported that the EPI programmes donated their CCE to meet needs for COVID-19 vaccine rollout (e.g. temperature monitoring devices), which negatively affected routine EPI in a province where immunisation rates were already low (this was not reported in other countries). With growing awareness of the gaps, the South Africa CO sees comprehensive cold chain and EVM support as an important area for future work, building on the current support provided by subnational TA.

Supply and logistics

Support with supply and logistics was highlighted as a primary UNICEF contribution in Ethiopia, Rwanda and South Sudan. Here, UNICEF was seen as making a critical contribution due to unique and specialist expertise and systems, and in general as providing effective support. For example, in South Sudan, government and a development partner described UNICEF as a key partner for supply and logistics (and the associated cold chain), providing essential support. In South Africa, where the government is self-procuring, UNICEF has played less role in supply and logistics, but has supported local supply management, for example through work on stock management by the province TA consultants.

> *"UNICEF is the main partner for supply and logistics and the cold chain. No one else could do this."* (**Development partner, South Sudan**).

Support for national distribution was particularly highlighted in South Sudan, perhaps reflecting demanding conditions. Distribution in South Sudan relies heavily on air transportation due to poor road networks, and UNICEF supports internal distribution through collaboration with the United Nations Humanitarian Air Service (UNHAS) as well as other contractors. Distribution, by road and air, was recognised as a demanding job. While there were suggestions for improvement (see below), development partners felt UNICEF had a good team for this work, with sufficient staffing, and **"they've done it well"** (development partner, South Sudan), including seeking to coordinate effectively and to ensure distribution was cost-efficient where possible.

Other key areas of UNICEF added value

Beyond support for the cold chain, vaccine management, supply and logistics, several other areas were identified by partners or staff as important UNICEF contributions.

Provision of staff to counter human resource shortages was identified as an important UNICEF contribution in all four countries, including allocation of TA consultants at national and subnational levels. This support has helped to address system weaknesses with insufficient EPI staff (for example, at subnational level in South Africa), and to provide specific COVID-19 expertise and focus. For example, in South Sudan, UNICEF provided a COVID-19 vaccine consultant who is responsible for all arrangements within government. A government partner saw this as a critical contribution as there were no Ministry of Health (MoH) staff with a dedicated focus on COVID-19 vaccines.

Other areas particularly highlighted as key UNICEF strengths included a **focus on equity**, particularly support for targeting IDPs and refugees (noted in Ethiopia); support for **service delivery, planning and coordination** (Ethiopia and South Sudan); **existing partnerships**, networks, and government coordination that facilitate rollout (Rwanda and South Sudan); **funding** (Ethiopia and South Sudan); **advocacy** (South Africa); and **support for routine EPI,** for example with TA consultants supporting both routine and COVID-19 vaccination (Ethiopia, South Sudan, South Africa).

Beyond specific areas of added value, **some partners described UNICEF's role in COVID-19 vaccine rollout as wide-ranging**, particularly in Ethiopia and South Sudan. In Ethiopia, development partners emphasised that UNICEF was contributing to all aspects of vaccine introduction and working at national and subnational levels, and they are seen as having **"many strengths"** (development partner, Ethiopia). In South Sudan, UNICEF is supporting vaccine service delivery in two states, and a subnational government representative described UNICEF as having **"the major role"** for COVID-19 vaccine rollout, working on almost all activities needed.

"From top to bottom, there is no area where UNICEF is not involved in vaccine rollout" (**Partner, Ethiopia)**

"UNICEF did a great job" (**Subnational government, South Sudan)**

Perceptions of areas for further support

Some partners identified few or no gaps in UNICEF's support. In Rwanda, there were limited suggestions for areas requiring strengthening. In Ethiopia, national government stated that they did not have any criticism of UNICEF support and said there was "nothing to improve". Here, difficulties with rollout were seen as wider challenges rather than weaknesses of UNICEF's work, and UNICEF was seen as helping to address many of these challenges (for example, by supporting planning, EVM, training and cold chain mapping).

However, while UNICEF contributions were widely highlighted, partners (and UNICEF staff) also identified areas where UNICEF support could be strengthened, including weaker areas of existing UNICEF work and areas where additional support is needed. It should be noted that suggestions from partners may in some cases reflect limited awareness of UNICEF activity.

Areas for improvement were identified by subnational partners in Ethiopia. In particular, they felt UNICEF (and other partners) were slow to determine their role in COVID-19 vaccine rollout and took time to replan activities, and so provided limited support for the first round of rollout. They felt UNICEF support had increased, and they anticipated more UNICEF focus on COVID-19 vaccine rollout going forwards. Areas for further UNICEF support were also emphasised. This included additional TA at regional, zonal and lower levels to expand capacity as more vaccines are received; and more support for resource mobilization, supervision, and CCE (particularly refrigerators). There were concerns that budget constraints may limit UNICEF support.

The need for a faster start and additional support were also reported in South Sudan, with suggestions that UNICEF needed to prepare earlier, and requests for further support with CCE (including additional fridges and a dedicated vehicle). Another area for improvement emphasised by one partner was more careful planning for national distribution, including improved use of data to determine vaccine needs per location and so reduce expensive and logistically demanding backhauling. It was perceived that planning had improved, however, and the partner felt while initial uncertainty could be expected, there were "no excuses" going forwards as information and experience are now in place.

In South Africa, suggestions related primarily to additional areas for support. A particular focus was advocacy, which was seen as a traditional UNICEF strength and area where UNICEF should do more in relation to COVID-19. A specific area for advocacy that was highlighted was continued delivery of essential health services, including EPI (where there has been some advocacy but more attention is needed). Additionally, advocacy to promote equity in access to COVID-19 vaccines, including moving beyond general discussion of 'leaving no one behind' to provide specific information and data on groups who are missing out. Finally, advocacy on the wider impacts of COVID-19 on children, including bereavement.

Practical support for continued delivery of essential health services was also emphasised in South Africa as an important area requiring additional work. As explained above, CCE has been reallocated from routine EPI to COVID-19 vaccines, and staff attention has also been taken away from routine services. One specific suggestion was providing additional CCE, to meet gaps at COVID-19 vaccine sites and to reduce the impact on routine EPI (while also noting the need for UNICEF to make clear the expectations on government to use and maintain CCE effectively, and to monitor this). Another suggestion was strengthening internet connectivity for rapid reporting, specifically providing equipment such as routers; currently, weak networks hinder use of electronic monitoring and reporting systems. **A continued focus on routine EPI was also suggested by a partner in Rwanda.**

2.1.2 Wider challenges for COVID-19 vaccine rollout

Beyond the limitations of UNICEF support, a range of issues were reported as affecting initial rollout, including specific issues related to COVID-19 preparations, and underlying system weaknesses, such as health worker shortages and infrastructure gaps. These challenges limit the ability of UNICEF and other partners to ensure effective COVID-19 vaccine distribution. The extent and range of challenges varied between countries. Beyond the gaps in CCE and EVM noted above, **key challenges included health system issues** such as gaps

in human resource capacity and data; **wider contextual issues** such as insecurity and inadequate communication networks; and **barriers to uptake**, such as access and hesitancy.

Inadequate human resources, including insufficient EPI staff, were noted as a challenge in all countries, but particularly emphasised in Ethiopia and South Sudan. Key issues discussed for Ethiopia included gaps in skills and numbers of government staff to support rollout, and insufficient partner TA to compensate for gaps, particularly given Ethiopia's size. The focus on adults for COVID-19 vaccination also requires new systems compared to routine EPI, so staff at all levels have to learn new approaches – which is a further capacity challenge.

In South Sudan, the main difficulty discussed by partners was around incentives for vaccinators, and a lack of funding for this. In the states where UNICEF supports service delivery, some health workers already received incentives through the UNICEF programme, but additional staff were needed for COVID-19 vaccination. Incentives were not initially available for these additional staff, but after discussion, UNICEF did cover this cost. However, incentives carry a significant cost, and there have been disagreements between government and international partners regarding the balance between providing incentives or expecting health workers to conduct COVID-19 vaccination as part of standard services.

Planning was also highlighted as a challenge, again primarily in Ethiopia and South Sudan. The different targets to routine EPI make microplanning harder, and this is made more difficult by lack of data and information on target groups and their locations, for example numbers of people with comorbidities in different areas. **In Ethiopia, data on IDPs and refugees has been limited**, partly due to barriers to access such as insecurity, as well as the need for negotiation with government administration to obtain data, and government departments themselves sometimes lacking accurate figures. **In South Sudan, migration and movement of IDPs** have sometimes meant the projected population figures used as a basis for county requests are inaccurate, with implications for efficient distribution. Gaps in data on target groups also create uncertainties for monitoring uptake and coverage. In Ethiopia, government and partners are now working with local leaders to obtain local data on target groups (such as people with comorbidities) – drawing on earlier experience.

Challenges related to infrastructure have been particularly apparent in Ethiopia and South Sudan. In South Sudan, the limited road network means that logistics for routine EPI and immunisation campaigns (including COVID-19) rely on air transport for some locations, which increases costs. The rainy season exacerbates the challenges. For example, runways are not covered with tarmac, limiting distribution by air, and the already limited road network is further affected by problems such as flooding. In Ethiopia, gaps in the road system and transport availability, compounded by insecurity, have constrained access to IDP, refugee and remote populations, and there is limited access to some locations for preparation and monitoring. Gaps in infrastructure are exacerbated by the size of South Sudan and Ethiopia. In contrast, Rwanda's smaller size was noted as an enabler for rollout, because the vaccine can be delivered anywhere in the country within three-six hours.

Weak or unstable communications networks have also affected rollout, in Ethiopia, South Sudan and South Africa. For example, unstable networks have hindered communication with subnational staff or government in Ethiopia and South Africa. In South Africa, power blackouts and poor internet in some facilities have hindered use of the new Electronic Vaccination Data System (EVDS) and electronic reporting. Pharmacists have been asked to provide updates manually, but this takes their time, there is less quality assurance, and data is not real time. Some partners are providing routers to support connectivity.

Access and equity in coverage were raised as challenges in South Sudan and South Africa, **in both cases related to relatively centralised vaccine centres**. As noted above,

gaps in PHC CCE have meant vaccines are distributed through hospitals or specific vaccine centres in South Africa, rather than more accessible PHC centres. In some cases, uptake has also been hindered by requirements for registration through the electronic data collection system. In South Sudan, government initially limited distribution to three hospitals in Juba, significantly constraining access. The strategy has since changed to distribution through subnational sites but use of fixed sites is thought to reduce uptake given transport difficulties and the limited number of facilities. A partner perceived that access challenges have contributed to a gender gap in coverage (only 26% of those vaccinated so far are female), as women's domestic burden and child care responsibilities make it harder for them to visit facilities. Outreach has been supported in some cases but was seen by some partners as requiring more focused and upfront planning.

Hesitancy was also discussed as a barrier in Ethiopia, South Sudan and South Africa, particularly initially. Issues around hesitancy are discussed in the RTA C4D report.

2.2 Risks anticipated and mitigation strategies

The range of risks that were anticipated and addressed varied between countries.

Aspects of the supply and cold chain, including equipment and vaccine management, were identified as risks in South Sudan, Ethiopia, and partially in South Africa. In Ethiopia, activities to address these risks included cold chain assessment, support for additional equipment, training and monitoring and supervision; although as explained above, some gaps remain. In South Sudan, risks related to storage constraints were addressed through finding alternative strategies during microplanning. In South Africa, risks related to vaccine management have been recognised at subnational level, including risks around fraud and wastage. Monitoring and assessments are being conducted to assess the risks, as well as development of SOPs and training to promote appropriate use and EVM, and action to address CCE gaps. Risks related to insufficient CCE were well-known by some stakeholders, including due to previous assessments, but there appeared to be less advance consideration of this risk by the CO.

In Rwanda, potential risks related to CCE were seen as avoided, first through installation of CCE the previous year as part of the CCEOP, and second due to the change in storage guidelines for Pfizer vaccines; the early limit of 5 days at 2–8 degrees would have required quick distribution and multiple trips to central stores.

Risks related to citizen uptake of the vaccine were also identified in South Sudan and in South Africa, where this was one aspect of a wider risk related to developing a system that could reach adults. In both countries, UNICEF or partners helped to address this risk through demand promotion work, for example working with state authorities in South Sudan to address misconceptions and hesitancy. In contrast, **UNICEF Ethiopia EPI staff saw low uptake of the vaccine as a key risk that was not considered in enough depth** at planning stage.

In South Sudan, a wide range of further risks were anticipated by UNICEF or subnational partners. These included insecurity (which was addressed by UNICEF's security team providing frequent guidance); a shortage of health workers including to continue routine services (addressed by raising the need for additional staff and supporting incentives) and funding (addressed through assistance from UNICEF HQ and ESARO). Another anticipated risk in South Sudan was limited participation of lower-level officials in subnational coordination meetings, due to long distances to the state headquarters, lack of road connections, and variable phone network. This was addressed by circulating meeting minutes in order to share information. Finally, flooding was an anticipated risk in South Sudan that was partially

addressed by using UNICEF boats and planning initial delivery during the dry season - although flooding remains a challenge. However, there were **unexpected risks in South Sudan, particularly a sudden change in government decisions on the delivery approach**, which is discussed further in the section on coordination.

There are also risks that COs have limited scope to address, particularly related to international vaccine supply (noted specifically as risks in Ethiopia and Rwanda, but also apparent in South Africa and South Sudan). Stakeholders in Rwanda noted that changes in expected supply mean that commitments on vaccination from government and partners are not met - creating **an ongoing risk of loss of trust**. A similar risk was noted in South Sudan, with arrival dates communicated by UNICEF being followed by repeated delays – which was again perceived as creating the risk of distrust and suspicion among the public (or others) that UNICEF is either 'lying' or lacks competence. While timelines are beyond CO control, a partner felt UNICEF should do more to manage this risk through more careful communication regarding uncertain arrival dates.

2.3   Key lessons for support to vaccine rollout

UNICEF and partners explicitly identified lessons learned regarding support to vaccine rollout, and other lessons are suggested by the reported strengths and challenges. Key lessons are summarised below. We have noted countries where lessons were particularly evident or emphasised, but the issues may have applied elsewhere in the sample. Note that the country reference may also reflect either positive or negative experience in relation to the lesson.

- **Good data are needed for microplanning** (Ethiopia and South Sudan)**:** Determining vaccine requirements and planning distribution require data on target groups at different sites. Engagement with local leaders can help with this. Data are also needed for equitable rollout, for example, on refugees or IDP numbers. Clear use of data to determine vaccine requirements also enables efficient distribution.

- **The value of previous investment in cold chains and need to continue addressing gaps** (all four countries)**:** Previous investment in the cold chain helped to provide a basis for COVID-19 vaccine rollout and to minimise additional investment needed before vaccine distribution could begin. Where there were gaps in investment (as seen in South Africa), this has affected distribution strategies for COVID-19 vaccines, and also negatively affected routine EPI. There are continued gaps in CCE and management, affecting distribution strategies and creating wastage risks - for example, an ongoing need for new or repaired fridges in some countries and locations.

- **Adequate support to health workers and vaccinators, and careful agreement on incentives** (South Sudan): Retention of adequate staff to cover both COVID-19 vaccination alongside essential services is essential for rollout, but policy around incentives needs careful discussion between government and partners to balance routine and campaign approaches and ensure appropriate costs.

- **Staggered vaccine supply facilitates distribution within existing system capacity** (Ethiopia and South Sudan)**:** With limited resources (staff, funding, CCE), waves of supply helped country teams work around gaps and balance distribution with resources. For example, vaccine supplies have been sufficiently small to fit within constrained storage capacity. Higher vaccine quantities will require more support, including more TA to help with activities such as increased microplanning, and additional CCE and funding.

- **Distribution strategies need to address equitable access, including through outreach** (South Sudan and South Africa)**:** Vaccine distribution through fixed sites or more centralised approaches can hinder access and limit uptake. Thus, distribution plans need to consider hard to reach areas and populations, for example through outreach. Insufficient CCE can also limit more decentralised distribution approaches, so support for CCE and EVM at lower levels could facilitate access. There are also specific groups who may miss out, and gender inequities are apparent in vaccine uptake in some locations. Thus, advocacy and systems to ensure equity in access and uptake are important.

- **The need to consider potential consequences of a focus on COVID-19 for routine vaccination and other essential services** (mentioned especially South Africa and Ethiopia but also Rwanda and South Sudan): Investments for COVID-19 have the potential to benefit routine services, for example through investment in CCE and management skills that apply more widely. However, COVID-19 has taken government and UNICEF managers time away from supporting other programmes, and in some cases CCE has been reallocated from EPI to COVID-19.

- **Previous experience, expertise and networks have helped the response** (all four countries): UNICEF's previous experience in cold chain, logistics and procurement has helped UNICEF to play an important role in supporting cold chains for COVID-19 vaccination. UNICEF's existing networks and partnerships have also played an important role. For example, existing implementing partners on the ground have supported vaccine rollout, and relationships with government staff have helped collaboration, access to information, problem solving, and trust in UNICEF's work.

- **CO teams reported several lessons regarding an approach to working that helped COVID-19 preparations** (Ethiopia, South Sudan and South Africa). Key aspects included:

  - Thinking ahead and considering possible scenarios, to identify potential strategies.

  - Working on multiple areas in parallel (e.g. applying for funding, preparing training) – ensuring all activities are moving so everything is in place when vaccines arrive.

  - Working around gaps, for example planning around known cold chain constraints.

  - Having an adaptive approach and quick response to any arising issues – whatever is planned, new issues will emerge, and teams need to find ways to work around these.

  - Positive relationships among UNICEF teams have boosted morale, including mutual support with heavy workloads.

- **The need for adequate UNICEF staffing and budgets** (noted in Ethiopia, South Sudan and South Africa): Several UNICEF country teams reported stretched capacity, given small teams and a much higher workload with COVID-19, including multiple meetings and late working. A lack of budget to expand support for COVID-19 vaccine rollout (and routine EPI) was also mentioned, particularly for South Africa but also by some partners in the other three countries. Ability to source external expertise also limited support and there were sometimes delays in finalising TA contracts (noted for hiring consultant TA in South Africa).

3 Funding for vaccine rollout and availability of vaccines

3.1 The effect of funding on COVID-19 vaccine rollout

Adequacy of funding varied between countries. In Rwanda, partners reported largely adequate funding for the costed NDVP, partly through World Bank support. In South Africa, funding has been primarily through government and was not discussed as a constraint at national level, although a partner noted information gaps regarding budgets. Yet here, funding gaps were noted at province level, including insufficient funding for routine EPI and health systems, which contributed to system weaknesses that affect COVID-19 vaccine rollout (e.g. CCE gaps).

Funding was seen as a more significant constraint in Ethiopia and South Sudan. In both countries, funding gaps resulted partly from a delay in development partner support. In Ethiopia, government and partners started applying for World Bank funding in November 2020, but approval processes took time and funds had not arrived when vaccine rollout started in March 2021. Some funding promised by Gavi (for cold rooms) had also not arrived by early August 2021. South Sudan also experienced delays in receiving World Bank funding, and USAID funding promised in April had not arrived in August. Partners reported that Foreign, Commonwealth and Development Office (FCDO), Global Fund to fight Aids, TB, and Malaria (GFATM) and other donors had been asked for funds but seemed reluctant to provide support.

While World Bank funding arrived too late for initial rollout in South Sudan and Ethiopia, the process was faster in Ethiopia (within 6-months) due to swift, high-level government action and previous experience with World Bank funding and proposals to multilaterals; as well as support from a strong Technical Working Group (TWG). In contrast, in South Sudan, national partners and the technical team struggled to complete complicated budgeting templates required for World Bank and WHO funding, and government decisions delayed and reduced donor support. For example, some potential Gavi bridge funding was lost because the Ministry of Health (MoH) maintained that funding was needed for $30/day incentives.

While some funds have now arrived, there is still a shortage in Ethiopia and South Sudan. For example, the government in Ethiopia reported that the revised NDVP indicates a gap of over $1m. Funding gaps affected ability to both procure vaccines and to effectively rollout and use vaccines that have been provided. In both Ethiopia and South Sudan, funding was needed for activities such as printing documents, monitoring, recruiting TA, providing training, coordination meetings, and health worker incentives. **Lack of funds reduced preparation and slowed rollout**. For example, in Ethiopia, not all lower-level staff could be trained, and both here and in South Sudan, insufficient funding reduced supervision and monitoring. In South Sudan, delayed funding contributed to a significant proportion of initial doses being returned to COVAX. A partner emphasised that while vaccine supply is important, more attention to funding is needed for delivery.

"The country is working to give to 20% of the population by the end Dec 2021 but till now only 3% of the populations received the vaccine. … had there been adequate funding we would do more than this and we are lagging behind." **(Subnational stakeholder, Ethiopia)**

"Having a vaccine be brought into a country that is really strapped for health budget is burdensome. And it's not just the scenario here in South Sudan, many countries have difficulties being able to incorporate this activity without any associated money." **(Development partner, South Sudan)**

In both Ethiopia and South Sudan, stakeholders have sought to manage rollout using existing resources. In Ethiopia, some government spending has taken place once World Bank approvals were in place, and government provided some financing, but this did not cover all costs. In South Sudan, a development partner described that rollout has so far been "done on a shoestring", and only been possible due to development partners being willing to provide support even without dedicated COVID-19 vaccine funds. As well as support from logistics partners, this includes support through existing service delivery programmes and partners on the ground with staff and systems that could be adapted for COVID-19 (including activities under the Health Pooled Fund in 10 states, and under UNICEF in two states).

3.2   UNICEF's role in ensuring adequate funding

UNICEF's role in addressing funding constraints has involved **TA to support resource mobilisation** (in Ethiopia, Rwanda and South Sudan), **in-kind support** and **direct funding** from UNICEF resources (primarily reported in Ethiopia and South Sudan) and acting as a **channel for funds from other donors** (primarily noted for Ethiopia and South Sudan). For example, in Ethiopia, UNICEF (with WHO and support from other partners) was a key member of the technical committee that prepared the World Bank funding application with government, and COs in Rwanda and South Sudan were also involved in proposal development. Direct UNICEF funding in Ethiopia and South Sudan was appreciated by partners, including funding for planning and review meetings, supervision, and other rollout activities in Ethiopia, and support for staff incentives, distribution, and subnational service delivery in South Sudan. In Ethiopia, UNICEF was a channel for some World Bank and Gavi funding for procurement (for CCE but also some TA), and in South Sudan, World Bank and Gavi bridge funding was managed and distributed by UNICEF.

3.2.1 Areas for improvement in UNICEF support for funding

Partners in Ethiopia and South Sudan pointed to areas where they thought UNICEF's support for adequate funding could be strengthened.

In Ethiopia, government and other partners perceived a need for additional UNICEF funds, if possible, given remaining funding gaps and the need for funds to support a larger rollout. This included more funding for subnational supportive supervision, and additional support for resource mobilisation in general. There was some criticism of UNICEF as insufficiently proactive in ensuring timely financial support for activities where UNICEF had taken responsibility, particularly for the vaccine demand promotion work (waiting for World Bank funds rather than identifying UNICEF resources).

Concerns regarding UNICEF's role in funding were more wide ranging in South Sudan. Similar, to Ethiopia, there were concerns that limited UNICEF budgets and financial support constrained some activities (e.g., the ability to hire additional staff who could support essential service delivery alongside vaccination; CCE procurement; and state-level government engagement). This was perceived to lead to reliance on other partners for some logistics costs. Stakeholders also suggested UNICEF should ensure **faster response to funding requests**. Other concerns related to UNICEF's role as a channel for World Bank and Gavi bridge funding, in particular the **need for more streamlined, faster, and clearer processes**. First, linked with concerns about timely response, respondents felt that the process of distributing funding to be straightforward and efficient as, currently, complex rules and regulations were seen as hindering timely disbursement and implementation. Timely disbursement also requires that UNICEF provide government with sufficient advance warning of activities to allow time for

government to make funding requests and for UNICEF approvals. Timely response was seen as particularly important since short expiry dates mean vaccines need to be used quickly when they arrive. Another concern related to uncertainty about why all funds have been channelled through UNICEF, when funding was applied for on behalf of all partners. There was also a feeling that the systems and processes for using funds held by UNICEF are unclear, and a concern that the system risks side-line a major service delivery partner. A partner recommended that UNICEF clarify approaches for using the funding and ensure involvement of key stakeholders. Some UNICEF staff also raised concerns about the channelling of funds, mainly related to the additional workload for the CO to ensure funding is spent as intended.

3.3   Lessons learned regarding funding

Key lessons from discussion of funding strengths and weaknesses were as follows.

- **Funding for rollout and running costs is critical** and needs international attention alongside advocacy for vaccine supply. This includes funding for items such as training and materials, monitoring and supervision, vaccinator incentives, and coordination meetings, as well as additional equipment. Without sufficient funding, receiving the vaccine places significant strain on under-resourced health systems (South Sudan and Ethiopia).

- **Slow and complex proposal processes for international partners delays funding**. More streamlined systems, including for proposal/budget formats and approval and disbursement processes, are needed to meet the urgency of vaccine rollout (South Sudan and Ethiopia).

- **Resource mobilisation is assisted by previous government experience with international donors, effective high-level government leadership**, and agreement on appropriate expenses among government and partners (South Sudan and Ethiopia).

- **Mobilising existing staff and partner systems can help to support rollout** in the absence of additional funding. For example, using programmes that are already on the ground to support COVID-19 vaccination (South Sudan and Ethiopia).

- **Where funding is channelled through UNICEF or other partners, this requires early clarity** and transparency on the part of all partners regarding systems that will be used. This is important to build trust and confidence (South Sudan).

- **Timely funding (including from UNICEF) requires streamlined systems for disbursement,** and advance warning of when funding will be needed so that government (and others) can prepare funding requests (South Sudan).

3.4   The effects of international supplies on rollout

Shortages of vaccine supplies were mentioned by some stakeholders in all four countries, but views varied between stakeholders. Shortages were particularly emphasised in Ethiopia, Rwanda and to some extent in South Africa and South Sudan.

In Rwanda and Ethiopia, doses through COVAX have been significantly lower than expected, resulting from a range of constraints such as manufacturers' production capacity, high global demand, large quantities of vaccines going to wealthier nations, and the COVID-19 crisis in India reducing availability of Covishield. In Rwanda, this meant that initial doses were used within two weeks, and there was no further supply until June. Both the Rwandan and Ethiopian government sought to secure additional doses through bilateral discussion and other channels, but supplies remained insufficient to cover the target populations.

In South Africa, vaccine supply was affected by issues such as a decision not to use AstraZeneca vaccines due to concerns about efficacy, concern about adverse events and then a manufacturing failure with Janssen and limited initial Pfizer supplies. UNICEF and a national partner felt that supply had become more adequate (as of August 2021), helped by provision of ultra CCE, relaxation of Pfizer storage requirements, and increased Pfizer supplies. However, continued gaps and delays were noted by some stakeholders, particularly at subnational level.

In South Sudan, difficulties related to funding, uptake and delivery strategy meant that initially some doses were not used. However, national stakeholders in particular thought that subsequently as delivery strategies had improved and demand has increased **supply had become insufficient**. However, some subnational stakeholders felt that supply remained adequate. Different views may reflect variation in supply between states, or different expectations regarding the volume of doses that could be used.

Gaps in supply have meant that the target population could not be covered, and regional planning and distribution was hindered. In Ethiopia, insufficient doses necessitated further prioritisation beyond the agreed targeting criteria; and in South Africa, districts requested higher volumes than some provinces could provide. In Ethiopia and South Sudan, it was noted that delays in international supply led to a long wait for second doses, beyond the expected 3 months.

The nature of supply also brought challenges, including short expiry dates. Limited time to use doses was a particular challenge in South Sudan (contributing to doses being returned to COVAX), but the tight timelines also added pressure and limited preparations more widely. For example, in Ethiopia, some partners said that the first vaccines arrived before the country was fully prepared. Here, stakeholders were conscious the vaccine had a short shelf life and was expensive, which led to rushed activity and a need to work around gaps in preparations (such as on-the-job training because the planned training was incomplete).

A need to use different vaccines (due to obtaining supplies and donations from different sources) also created additional work for rollout. This was particularly noted in Ethiopia, where use of AstraZeneca, Sinopharm and Janssen required different systems, guidelines and training to accommodate different contraindications or storage requirements.

Uncertain supply created difficulties in balancing supply with demand creation, to avoid disappointment (noted in Ethiopia) and distrust. In South Sudan, several respondents noted that an abrupt end to supplies, and vaccines not arriving when expected, created rumours and distrust at community level which required careful messaging.

Other supplies (such as syringes) were generally reported as adequate. For example, in Ethiopia and South Sudan, stakeholders reported that these supplies were bundled with the vaccine for COVAX supplies. While some of this additional equipment came by sea to save transport costs, routine EPI supplies were used and then replaced when new supplies arrived. There have, however, been some concerns about delays in additional supplies in Rwanda (see below), perhaps reflecting greater reliance on direct purchases of the unbundled Pfizer vaccine (vaccines provided separately from syringes).

3.5   UNICEF role in international supplies

Stakeholders in all four countries recognised that the shortage of vaccines through COVAX and other channels was a global issue, beyond UNICEF's control.

UNICEF is supporting the availability of vaccines in Ethiopia, Rwanda and South Sudan, and this role was recognised and appreciated (in South Africa, as previously explained, the government is organising vaccine supply). UNICEF's role has included supporting development of national COVAX proposals for vaccine supply, liaising with the UNICEF Supply Division in Copenhagen, organising supporting documents and import requirements (such as tax exemption), and making arrangements for vaccine arrival at the airport. This role in international import has been helped by early notification and support from Copenhagen (noted by UNICEF in South Sudan), and by effective government leadership (noted as enabling quick authorisation for import in Ethiopia). Early engagement with government to understand requirements was a lesson in South Sudan, to ensure all required approvals were known. UNICEF support for international supply was recognised and praised by partners. In Ethiopia, for example, UNICEF was recognised as having a major role in procurement, shipment, and clearance, and their support was seen as efficient, timely and as making international supply smoother and faster.

UNICEF supported availability of supplies from other sources. This was particularly evident in Rwanda. In particular, the CO facilitated dose repositioning, including promptly assessing the viability of vaccines from a warehouse in the Democratic Republic of Congo that could not be used following the volcanic eruption. UNICEF also supported the availability of Pfizer vaccines in Rwanda, including reassuring Pfizer regarding Rwanda's capacity to use the vaccines, and supporting development of the ultra cold chain. UNICEF also used their procurement expertise and systems to manage rapid procurement of the Moderna vaccine. More generally, UNICEF worked with the government to communicate delays of COVAX supplies and to encourage consideration of other sources.

UNICEF's global role in vaccine availability was recognised in Rwanda, where UNICEF was seen as engaging with vaccine manufacturers as a founding member of the COVAX arrangement, and as advocating with bilateral organisations to allocate vaccines to LMICs. However, there was **uncertainty about UNICEF's global role among some stakeholders**. For example, a partner in Ethiopia indicated that they lacked information on UNICEF's role in international decision making on vaccine allocation. This partner asked whether UNICEF could "*be more than the messenger*" such as taking a greater role in advocating for adequate supplies and contributing to decisions on allocation.

> *"UNICEF are the ones who are already procuring routine vaccines with the Supply Division in Copenhagen, so they have the expertise that other agencies might not have. It is good to work with agencies who are already specialized and the expert in their domain. This helps us to avoid risks related to the procurement, distribution of vaccines or their availability."* **(Partner, Rwanda)**

Beyond vaccines, UNICEF has also provided support with other supplies, including the use of routine stocks. This support was particularly noted by a government partner in Ethiopia, who saw UNICEF as supporting supply of PPE, syringes and other equipment, when required by the Ministry of Health and health facilities for COVID-19 and EPI more widely.

3.5.1 Perceived areas for improvement in UNICEF support for international supplies

Area for improvement in UNICEF's support for international supplies were particularly suggested in Rwanda and related to both vaccines and other supplies

- With regard to vaccines, Rwandan respondents suggested that UNICEF (and WHO) should not limit their support to vaccines provided through COVAX and Gavi, and instead consider how they can work with the government and provide funds directly, to improve

availability. There was also a suggestion that UNICEF could use its leverage to advocate for moving vaccine manufacture closer to developing countries. This was forwarded as a route to making the vaccines more affordable and reducing disruptions created by the global supply chain. There were also suggestions that UNICEF might advocate against the kind of export restrictions seen with AstraZeneca supplies in India.

- In regard to other supplies, Rwandan partners felt that UNICEF should be more proactive in supporting government on planning and procuring devices for unbundled vaccines obtained outside of COVAX. This includes use of UNICEF's supply mechanisms to support device procurement; and considering agile systems that respond to changing needs (such as blanket agreements with manufacturers). It was also suggested that UNICEF keep informed about device requirements in relation to dose donations: In one situation, UNICEF was perceived as '*not aware*' that its assistance was needed to procure syringes for the Pfizer vaccine. Finally, partners suggested that the turnaround time for sending vaccines and devices (e.g. syringes) should be faster: a one-week lag time between syringes being provided to a shipper and arrival in the country was seen as too long and is affecting rollout.

A further area for improvement was noted in South Sudan, related to more careful messaging on vaccine arrival timelines. A partner felt that unclear and changing messages about when vaccines will arrive (with information that the vaccine will come in July, then August, and now perhaps September) could be interpreted by the public or others as UNICEF either lying or lacking competence. Thus, it was suggested, careful communication is needed to address uncertain timelines and avoid creating distrust.

3.6 Lessons learned regarding vaccine supply

- Early information and support for required documentation from the UNICEF supply Division in Copenhagen allowed for preparation and smooth import (South Sudan).

- Messaging on vaccine availability and timelines requires care to balance demand and supply and avoid creating distrust (Ethiopia and South Sudan).

- Short expiry dates, uncertain timelines and reliance on different vaccines made vaccine distribution and use more difficult, for example requiring training in different vaccines and more complicated planning (Ethiopia and South Sudan).

- As some vaccines were supplied without associated devices, UNICEF (and others) needed to ensure that any requirements for additional supplies are known well in advance and addressed (Rwanda).

- Availability of routine stocks that could be used to support rollout helped to address slower shipping of related supplies (Ethiopia and South Sudan).

- Understanding of UNICEF's international role in COVAX varied. There were suggestions that UNICEF could play a stronger role in global advocacy (Ethiopia and Rwanda).

- The Pfizer vaccine required additional ultra CCE. This required additional support through COVAX, or direct support and advice on procurement for national governments (Rwanda).

- Strong government leadership and early engagement with government to understand and meet import and regulatory requirements facilitated approvals and supported efficient vaccine import (Ethiopia and South Sudan).

4   Coordination and partnerships

4.1   UNICEF's role in coordination

In each country, there were a range of existing coordination structures, such as National Immunization Technical Advisory Groups (NITAG), interagency coordination committees (ICC), EPI working groups, and advisory bodies or working groups established for COVID-19.

UNICEF has been an active participant in coordination fora in all four countries, including overall coordination bodies (such as the national COVID-19 TWG in South Sudan), and thematic working groups. For example, in Ethiopia, UNICEF is a member of the COVID-19 ICC, the highest coordination body, and participated in all five TWGs under the ICC.

UNICEF has also played a role in organising and supporting specific coordination structures, particularly national working groups on logistics. UNICEF was co-chair in Rwanda, secretariat in Ethiopia, and in South Sudan UNICEF has deployed TA to facilitate the working group and support revision of the terms of reference and workplan. A further role has been advocacy to strengthen TWGs that require more government input. This was noted in Ethiopia where it done in coordination with the WHO.

UNICEF (or its TA consultants) have also participated in subnational coordination fora involved with vaccine rollout (reported in Ethiopia, South Sudan and South Africa), **and has worked to strengthen subnational coordination** (particularly noted in South Africa and South Sudan). In South Africa, UNICEF subnational consultants have sought to strengthen links within government. For example, one UNICEF TA has encouraged collaboration between pharmacy and EPI departments to strengthen EPI stock management and supplies. The TA have also supported coordination among development partners, including making links to relevant partner programmes. In South Sudan, UNICEF's implementing partner has contributed to information sharing and coordination with lower-level leaders, and existing programme structures have supported subnational coordination. For example in Jonglei, a monthly coordination meeting for county government and partners was previously established using UNICEF funding under the World Bank programme, and this forum was adopted for COVID-19 and then began to meet more often.

UNICEF has also played an international coordination role. ESARO is within the global and regional coordination structures, including ACT-A workstreams and a regional partners forum coordinated by WHO to supported vaccine deployment.

4.2   Partner views on coordination and collaboration with UNICEF

There were positive comments regarding UNICEF's approach to collaboration and partnership in all four countries.

- In Ethiopia, national government described coordination with UNICEF as smooth and friendly, with support aligned to country needs, a fast response when needed, and good communication. Here, UNICEF were described as '*part of us*', working as a team with the national immunisation '*family*'. A development partner also described '*close and collegial coordination with UNICEF*' from the start.

- In South Sudan, development partners commented on there being a good team at UNICEF, with '*a high level of professionalism*' and generally good working relationships. Subnational government also reported that UNICEF, implementing partners, other

agencies and government work as a team and agree on actions together. A subnational implementing partner also felt working with UNICEF had *'been smooth since the start'* with a high and welcome level of UNICEF engagement in COVID-19 activities.

- In Rwanda, partners saw UNICEF staff as responsive, helpful, showing initiative, flexible in their support, and working collaboratively with other organisations, and described working with UNICEF as '*a very positive experience'.*

'It's all super complex. I mean you just need people to be responsive and helpful, right? And I think that UNICEF certainly met that mark' **(Development partner, Rwanda)**

- Similarly, in South Africa, a development partner reported that UNICEF had taken a collaborative approach to activities and engaged actively in coordination discussions, and they welcomed what they saw as UNICEF's approach of *'focusing on a few areas of comparative advantage and doing these well'* (particularly work on the cold chain).

4.2.1   Areas for improvement in UNICEF's coordination

There were some concerns about UNICEF's approach to coordination, and suggestions for areas where UNICEF could play a stronger role, particularly in South Sudan but to some extent in Ethiopia, South Africa and Rwanda. Concerns varied between countries**. In South Sudan, some partners felt that the early communication from UNICEF had been uncertain, unclear or too late,** particularly for initial meetings. Here, it was perceived that a lack of clear and accurate information on vaccine arrival timelines, distribution needs and rollout requirements had hindered planning and support from other partners. **Information and communication were seen as improved in South Sudan now**, however, with the CO now providing clearer information, discussion of challenges and good leadership. There were also concerns in South Sudan that competition for resources affected collaboration, and that UNICEF needed to work collaboratively with all partners.

In Ethiopia, national stakeholders did not report concerns regarding UNICEF's approach, but a subnational partner felt UNICEF should work more closely with government to jointly plan and agree areas of support. Here, partner activities (including UNICEF's) were seen as decided at international or national levels, rather than through assessment of local needs. There were also concerns about partners acting without consultation, and insufficient clarity and alignment of partner roles. The **need for more partner coordination, alignment and clarity on roles was also raised in South Africa and Rwanda**. In Rwanda, some stakeholders also felt there were gaps in information sharing. In particular, other partners involved in a dose donation shipment sometimes lacked access to information held by UNICEF and this was seen as partly reflecting insufficient global coordination, while some partners felt that information sharing has been adequate.

There were also requests for additional support from UNICEF for subnational coordination in both South Sudan and Ethiopia. This included providing budgets for workshops that were seen as important to generate closer government engagement in South Sudan; and for strengthening sub-national structures in Ethiopia.

There were some concerns regarding international coordination, applicable to UNICEF and other partners; in particular, **uncoordinated reporting requirements** from different agencies' international or regional headquarters create significant workload for country staff.

4.3   Effectiveness of coordination and facilitating factors

Beyond UNICEF's role, the effectiveness of coordination varied between countries.

Coordination was seen as particularly effective in Ethiopia and Rwanda, where all stakeholders thought national coordination was working well, with joint planning and alignment of roles. In South Sudan, views on the effectiveness of coordination were more mixed, but partners perceived that roles were largely clear in regard to the distribution of tasks.

In South Africa, in contrast, inadequate coordination was reported at national and subnational levels, particularly among partners. Here, many partners are working on COVID-19, creating a potential duplication in roles, and missed opportunities for greater impact through coordinated resources. Some partners also reported that fragmentation has increased time pressures on government staff, due to multiple meetings with individual partners, leading to confusion on tools for vaccine rollout - as each partner brought their own system (e.g. for monitoring and reporting). UNICEF CO staff saw coordination challenges as routine in South Africa, and both the CO and subnational staff felt there were ways to work around these difficulties.

Across the four countries, a range of factors helped or hindered coordination, among partners and with government. Five key enablers were suggested, including in countries where the issue was a challenge and potential approaches to address it were discussed in the interviews.

1.   Structures for regular meetings and engagement

Fora for partners and government to come together and meet regularly were essential for effective rollout in Ethiopia, Rwanda and South Sudan. Regular meetings helped to move activities forward, share information, ensure that partners knew each other and avoided duplication, and provided a forum for partner input to government plans. In South Africa, there was not a clear forum for partner coordination. This partly reflected longstanding coordination gaps (including a lack of an immunisation ICC), but also limited development of fora for joint partner and government discussion of COVID-19 vaccine operations. Instead, in South Africa discussions were bilateral, between a partner and government, or between two partners.

2.   Strength through existing coordination structures and relationships

Use of existing coordination structures to support COVID-19 vaccine rollout enabled coordination, provided established structures, and built on existing relationships and ways of working (noted in Ethiopia and South Sudan). For example, in Ethiopia, several committees and working groups used for COVID-19 coordination were part of existing EPI structures, including NITAG and TWGs on supply and logistics and communications. The same organisations and individuals were involved for COVID-19 vaccines, so using existing structures was more efficient, and these structures '*retained their existing strength*' (development partner, Ethiopia). Some TWGs newly created for COVID-19 have been weaker, with less frequent meetings, partly due to insufficient government engagement.

Established structures for routine EPI also supported clarity on roles for COVID-19 in Ethiopia. Here, partners and government established focus areas for routine EPI, and transferred these roles to COVID-19 vaccine rollout, so roles were clear from the start (at least nationally). In contrast, in South Africa, the existing NITAG (known as NAGI in South Africa) had a less clear role in COVID-19 given a new COVID-19 Ministerial Advisory Committee. However, some individuals are in both groups, which is supporting coordination.

Existing relationships facilitated coordination, **even in the absence of clear communication structures** (noted in all countries). For example, in South Africa, existing

networks between regional TA and other national and province health sector stakeholders provided a channel to resolve difficulties, including around potential duplication in roles. In South Sudan, UNICEF's existing government networks was reported as helping to resolve difficulties faced by implementing partners.

3. Collaborative approach balanced with formal coordination systems

Coordination was helped by a collaborative approach among partners (particularly emphasised in Ethiopia and Rwanda). In Ethiopia, development partners were reported as working together effectively, without '*unhealthy competition*' (UNICEF CO). Linked with clarity on roles, Ethiopia respondents described that different agencies had their own established areas of work, but agencies shared information, worked together, and knew what others were doing. In Rwanda, partners were also reported as '*working together as colleagues*' in a professional manner, despite chaotic, high stakes moments and heavy workloads. However, there was a **feeling that coordination had relied partly on good will, and more formal clarity on role division and information sharing is needed**, particularly as more dose donations added complexity.

> *"'I think we've gone really far on people's overall willingness, personal relationships, general collaboration, and the idea that we all want to get it done. …We need to get to that level of coordination because the volumes are going to significantly increase and the stakes are going to get higher"* **(Development partner, Rwanda)**

Partner competition was a concern in some countries. In South Sudan, UNICEF reported strong collaboration among partners, but as mentioned above, there were some concerns from partners about competition which was seen to sometimes reduce collaboration among certain organisations. In South Africa, there were also concerns about partners competing rather than collaborating and focusing on their areas of comparative advantage.

4. Strong government leadership balanced with technical input and coordination

In both Ethiopia and Rwanda, coordination was assisted by strong government leadership. In Rwanda, government led coordination, and asked for support in specific areas, and partners respected this arrangement. In Ethiopia, senior government leadership was balanced by collaboration with wider structures and partners: initial coordination was managed largely by the MOH, but government then recognised the value of technical input from wider, existing EPI structures.

A more difficult experience in South Sudan showed the importance of effective government leadership and stakeholder involvement. In particular, the government changed the planned distribution strategy just before NDVP submission and without partner agreement. This change brought substantial re-planning, causing delays and reduced access and uptake – which contributed to doses being returned to COVAX. The situation was resolved with a change in government roles, more partner collaboration, a revised NDVP and a new distribution strategy.

5. Capacities for subnational coordination and government engagement

A range of capacities and approaches affected subnational coordination, including staffing, leadership, regular communication, reliable communication networks, and budgets for engagement. In Ethiopia, some regional and zonal working groups were not fully functional; this reduced capacity to coordinate with national structures, delayed information sharing, and hindered rollout in some regions. Here, weak sub-national structures were caused partly by long-standing EPI system issues, particularly shortages of government and EPI staff that meant limited time or capacity to participate in coordination, and a lack of partner support

in some locations. Limited government time, in part due to numerous meetings, also affected government availability to coordinate with partners in South Sudan and South Africa.

Stronger subnational structures supported rollout. In one region in Ethiopia, coordination was reported as largely effective, with a functional task force at all levels and regular communication between different levels of sub-national and national government: districts (*woreda*), zones, regional government and the Federal Ministry of Health (FMoH). Here, **regular communication across levels** has also supported effective subnational government leadership and management. There were daily zoom meetings where zones presented to the FMoH; and in one region, a weekly zoom meeting was held between zones and the regional health bureau, with follow up by senior regional health bureau managers. This helped to address weak leadership at some health facilities and districts, by sharing lessons and identifying required action. In South Africa, expectations of provincial government daily and weekly reporting (through national presentations) also promoted subnational accountability and action.

4.4   Coordination within UNICEF

Coordination between UNICEF teams was largely seen as working well. Key links were between the supply and health / EPI teams, while links among other key teams were also highlighted by different COs (including C4D in Ethiopia and Rwanda, and operational teams in South Sudan). Roles were perceived as generally clear and integrated, with effective information sharing. There was also frequent communication and collaboration among regional teams working on vaccine demand promotion, health emergencies, supply and health/EPI.

Relationships between COs and regional or headquarters offices were also generally reported positively. For example, information and support from ESARO was appreciated, and support from the international Supply Division was welcomed, including early notification about arrival times, support with required documents and effective information flow. Regional UNICEF meetings were initially perceived as too frequent but became manageable.

However, there were suggestions for improved coordination from one country, particularly related to communication from the UNICEF Supply Division. First, there were requests for COVAX and the Supply Division to communicate clearly when procurement and supply difficulties were due to COVAX/Supply Division issues, so that COs would not be blamed. Second, when the Supply Division was acting as an intermediary between the government and a manufacturer, they should communicate updates to the CO, so that COs are fully informed for discussions with government and well-prepared to provide support.

There was also a request for more CO communication to TA consultants in one country, including a regular, structured system to discuss activities and any issues encountered.

4.5   Lessons learned on effective coordination

Government roles and capacity in coordination:

- **High level government leadership** supported coordination, when there was effective government decision making and when this was balanced with technical input from and collaboration with partners (all four countries).

- **Early engagement with government and joint discussion on local priorities** and areas for support (including at subnational level) helped to build trust, collaboration, and effective partnership (Ethiopia, South Africa and South Sudan).

- **Effective communication and coordination required adequate government capacity**

to engage, which was limited by systemic staff shortages, a high volume of meetings, and unreliable communication networks (Ethiopia, South Africa and South Sudan).

- **Coordination structures were needed at all levels of government.** Subnational fora and government engagement needed support, including funding (Ethiopia and South Sudan).

- **Regular communication and reporting** across levels promoted effective subnational government leadership, management and accountability (Ethiopia and South Africa).

Functional coordination structures and relationships:

- **Functional coordination structures** that brought together relevant partners provided a forum to share information, align roles and avoid fragmentation (all four countries).

- **Using existing coordination fora supported coordination** through established structures, roles, relationships and ways of working. New structures generally required additional support (Ethiopia, South Africa and South Sudan).

- **Collaborative relationships and teamwork** helped to move activities forward, including where formal roles were unclear, with effective working helped by partners focusing on their comparative advantage and avoiding competition (all four countries).

- **Existing bilateral and individual networks supported trust and coordination**, facilitating alignment and implementation (Ethiopia, South Africa and South Sudan).

- **Effective information sharing, among partners and with government, supported coordination and helped partners to align and optimise their support** (South Sudan, South Africa and Rwanda). This included clear information on both what was known and uncertainties, to avoid perceptions of confusion and enable efficient use of partner time.

International reporting:

- **More effective international coordination among partners, including in reporting systems**, could minimise reporting burdens for country-level stakeholders.

Coordination within UNICEF:

- **Clear communication from the Supply Division** regarding updates and responsibility for delays was needed to help COs provide support, and **regular communication between COs and UNICEF TA consultants** would assist consultants' work.

5   Conclusions and recommendations

This section summarises key issues that may be relevant for future UNICEF support. The areas below focus on experiences of effective practice and success in some of the focal countries that could be considered elsewhere, or challenges and areas where additional or different approaches were suggested. Some aspects are more specific for support with the COVID-19 vaccine rollout, while others could also apply for support for other emergencies, or for wider health systems strengthening. We focus on key areas most likely to be actionable by UNICEF, including aspects for consideration by COs, and areas for discussion with global and regional partners. A range of other lessons were reported in earlier sections, some of which may be more directly actionable by government (such as the value of using existing coordination structures).

1.   Global partners and headquarters support for COVID-19 vaccine rollout

These areas may be applicable for UNICEF RO or headquarters practice, or advocacy with other partners.

- **Funding for rollout and running costs is critical** and needs international attention alongside advocacy for vaccine supply. As supply of vaccines increases, more funding will be needed to scale up rollout and distribution. Funding should consider the range of activities required for safe and effective vaccine distribution, including the full procurement and supply cycle up to last mile distribution, and system areas such as adequate staffing, training, information, monitoring and supervision as well as CCE. Funding constraints were noted in relation to items such as monitoring, supervision, training and staff incentives, but gaps are likely to vary between countries, and an assessment of key funding gaps could be a tool to support advocacy.

- **Slow and complex funding processes for international partners delay funding**. Streamlined systems, including standardised proposal and budget formats and faster approval and disbursement processes, could help to meet urgent needs.

- **Short expiry dates, uncertain timelines and reliance on different vaccines types make distribution and use of vaccines more difficult**, for example hindering advance planning, bringing urgent needs for expanded capacity, and adding to operational preparations (such as training on different vaccine requirements). Long delays between international supplies also extend the wait for second doses; and create difficulties for public communication to balance supply and demand and maintain trust. More predictable and regular supply could smooth capacity needs.

- **More effective international coordination among partners, including in reporting systems,** could minimise reporting burdens for country-level stakeholders.

- **Building on existing collaboration between UNICEF offices to ensure effective communication between all levels could support COs in their work:** in particular, clear communication from COVAX and the UNICEF Supply Division to national government and UNICEF COs regarding updates and responsibility for delays can help COs in their relationships with partners and enable COs to provide effective support.

2.   Country level support to COVID-19 vaccine rollout

- **As vaccine quantities increase, target populations change or expand, or the mix of vaccines types changes, capacity requirements – and gaps - for distribution may**

grow or change. This suggests a need for continued review of national and subnational needs in relation to expected vaccine supplies, to determine support needs (such as additional TA, vaccinators, CCE and funding), with timely investment to ensure capacity is in place before supplies arrive. With vaccine coverage still well below target levels (particularly in South Sudan and Ethiopia), substantial further investment may be needed. As part of planning for new vaccine supplies, it will be important to identify and address any requirements for additional supplies such as syringes. When reviewing future country needs, it may be important to consider any implications for UNICEF staffing and expertise, accommodating continuity of EPI alongside the COVID-19 response.

- **Distribution strategies affect access and equitable access may require additional capacity and activities.** For example, outreach may be needed for populations who are further from vaccine centres (while ensuring sufficient support for safety), and additional investment in CCE and EVM at lower-level facilities may be needed for more decentralised distribution. These needs could be assessed and addressed as part of planning for future rollout. As part of country discussions, strategies for equitable COVID-19 rollout could consider options to draw from or integrate with activities designed to enhance access for routine EPI, such as outreach. Support for cold chain strengthening will need to consider ways that UNICEF can support progress in non-GAVI countries with less development partner funding (for example, focusing more on technical advice, or advocacy where funding is needed).

- **Microplanning and efficient distribution require availability and use of data, including detailed local data on target groups.** Two particular areas to consider are data for equitable targeting and distribution, including supporting availability of data on groups at risk or who are missing out, and effective use of data to determine vaccine needs per location, in order to support efficient distribution and reduce backhauling. While the target population largely differs from that of routine EPI (adults rather than children), there may be scope to leverage existing analyses on who is missing out and to adapt existing microplanning processes.

- **A focus on COVID-19 has potential consequences for routine vaccination and other essential services**: Investments for COVID-19 have the potential to benefit routine services, for example through stronger CCE and EVM skills that apply more widely. However, COVID-19 has taken government and UNICEF staff time away from other programmes, and in some cases CCE has been reallocated from EPI to COVID-19. Impacts on routine EPI (and other services) could be considered as part of identifying further support needs (including additional CCE), alongside continued work to promote and invest in activities for COVID-19 rollout that can benefit wider systems (see below). Supporting service continuity alongside the COVID-19 response may have implications for UNICEF staffing needs.

- **Fora for partners and government to come together and meet regularly have been essential to share information and avoid fragmentation in activities**. Where existing coordination structures were used for COVID-19, this built on established relationships and ways of working. Where new structures were created, these have in some cases been less functional or inclusive. Where structures are lacking, government time may be spent on multiple bilateral meetings, reducing efficiency. Where effective structures are lacking, roles for UNICEF might include advocacy regarding existing fora/groups that can contribute to COVID-19 decision making, strengthening less functional coordination structures, or building links among partners and coordinating partner communication with government. Where agencies have conflicting agendas or there is fragmentation, COs

could indicate the need for support from the UNICEF ESARO or headquarters for higher-level liaison with other agencies.

- **In relation to government coordination, subnational government engagement and coordination are an important accompaniment to national engagement.** Activities here could include early engagement with subnational government to jointly agree on local needs and areas for support, and support to strengthen subnational coordination structures where these are sub-optimal.

- **Clear and effective information sharing can support coordination, collaboration and confidence among government and partners.** This includes sharing information on activities with other development partners to align support (which may require additional effort in countries without effective partner coordination fora); clear information on what is needed from other partners; sharing information on vaccine arrivals with all stakeholders; and careful communication around uncertainties to avoid 'broken promises', as well as addressing any misperceptions regarding UNICEF's ability to control timing and availability of information.

- **Where funding is channelled through UNICEF, clear and efficient processes are needed to ensure trust and allow timely support.** Key steps here include early clarity and transparency for all partners on the systems that will be used to allocate and disburse funding, to ensure confidence; and streamlined disbursement systems and early preparation for requests and approvals, to ensure funding is provided when needed.

- **Building on existing teamwork within UNICEF offices to ensure regular communication between COs and UNICEF TA consultants** who are supporting vaccine rollout could support consultants and assist their work.

3.   Longer term health systems support

- **Experience from the four countries reemphasises the importance of strong underlying health systems and structures in place before crises hit** (a well-documented and recognised issue from previous health system shocks), as well as strong public health emergency capacity. Examples include effective coordination structures that could be adapted for emergency planning and coordination; adequate numbers of staff, with sufficient remuneration and capacity to cover routine as well as emergency-related needs; strong information systems; robust cold chains and EVM, including at PHC level; routine stocks and storage for additional supplies; and adequate infrastructure, including roads and electronic communication networks. The experience with COVID-19 vaccines provides further impetus for government and partners to invest in strong basic health systems and health systems resilience.

- **Some systems developed for COVID-19 have potential to support the health system more widely, particularly routine EPI** (for example, new monitoring systems and training). There may be opportunities to document and build on the learning from these approaches, and to think strategically about how investments made for COVID-19 can be used for wider health system strengthening. Some support provided for COVID-19 is already building wider systems, for example through contributions of TA consultants whose remits support continuity and strengthening of routine vaccination as well as COVID-19 vaccine rollout. Given the significant costs of investment in ultra cold chain capacity for the Pfizer vaccine, one aspect of leveraging COVID-19 investment for wider health system support may be examining options for future use.

Prioritised action points

Areas for consideration were prioritised by UNICEF ESARO health and supply colleagues, and discussed at a workshop with health and supply staff from ESARO and COs. Through this discussion, additional specific recommendations were proposed for the following areas:

Funding for vaccine rollout and running costs.
- Support for adequate funding should consider ways to enhance efficiencies within the system, rather than focusing only on securing additional resources. Strategies to enhance efficiency include using existing structures for COVID-19 vaccine rollout (rather than parallel systems), ensuring efficiencies in areas such as customs to avoid delays, and ensuring vaccines can be used as soon as they arrive to reduce storage costs.

- Linked with use of existing systems, support should focus on planning for integration of COVID-19 vaccines in routine systems, including government responsibility for vaccination, so moving beyond an emergency campaign mode to a more sustainable approach.

- Some vaccines are donated without the required additional supplies, and without funding for vaccine rollout. Advocacy should address the need for associated costs to be supported and for required supplies to be provided alongside vaccine doses.

- There is scope for UNICEF to enhance mobilisation of resources.

Review and invest to address changing capacity needs as vaccine quantities increase, target populations change or expand, or the mix of vaccines changes
- Capacity needs are affected by vaccine supply, including surges of supply with short expiry dates, and donations of multiple vaccine types. Supply is affected by international political considerations, but there is a role for advocacy around vaccine donation timing (e.g. with sufficient time for distribution before expiry) and staggering supply to fit capacity, and for advocacy on the types of vaccines supplied to minimise additional country capacity requirements. This may include punctual contribution to discussions on allocation of vaccines through the COVAX Support Work to Advance Teams.

- UNICEF could support national governments in requesting vaccines from COVAX that are the same as previously received, to enhance efficiency and reduce the need for additional capacity.

- Coordinate information on cold chain needs in-country, inform GAVI about gaps and required support through international discussions, and work with other partners to coordinate cold chain support.

- Capacity can also be supported through effective stock management in-country.

- To address UNICEF CO capacity needs, more use could be made of remote options for support from global or regional offices, as well as more country visits when travel restrictions allow. Strategies also need to consider options for addressing staffing needs in-country for activities such as on the ground monitoring.

Distribution strategies affect access, and equitable access may need additional capacity and activities
- Clear advocacy to governments, jointly with WHO, on who to prioritise and on vaccination strategies that reach marginalised groups.

- In relation to supporting national governments to request specific vaccine types from COVAX, UNICEF can support governments to request vaccines that are most acceptable to the population and the same as first doses provided, to reduce hesitancy and enhance uptake and vaccine use.

Microplanning and efficient distribution require availability and use of data, including detailed local data on target groups.

- UNICEF supports routine health information and monitoring systems, including DHIS2. Where not already contributing, UNICEF COs could engage with these systems to enhance routine data quality.

- UNICEF can also support stronger end user monitoring, using government systems.

- To support equity, specific analysis on groups who are missing out on vaccines could be conducted and used as a basis for advocacy.

- Ensure effective use of available data, including existing monitoring systems, to plan distribution. As the rollout strategy has matured and demand and absorption capacity have become more predictable, efficiency can be enhanced with more certainty on subnational needs to inform distribution.

COVID-19 vaccine investments could benefit routine services, but COVID-19 has taken government and UNICEF staff time from other programmes and negatively affected routine vaccination.

- Identify situations where CCE shortages and reallocation of CCE to COVID-19 vaccination are affecting routine immunisation, and include associated capacity needs as part of CCE assessments and coordination in-country, as well as in discussions with Gavi.

- Where monitoring or surveillance systems for COVID-19 vaccination are established, identify ways these can build on and strengthen existing systems, or designs that support future routine monitoring and surveillance.[18]

- Examine ways to use COVID-19 vaccination to support comprehensive primary health care, for example by using community contact for COVID-19 vaccinations to build trust and support provision of other vaccines or other services (such as health checks), and establishing patient registries.[19]

- Advocacy for continued support for routine health systems with international partners and government, and ensuring continued UNICEF support for routine services. This includes considering adequate support for the health workforce, considering capacity for providing COVID-19 vaccines alongside routine services.

Streamlining of work between the Regional Office and global level

- To clarify roles between global and regional levels, there may be value in a similar approach to the annual compact developed between the RO and COs.

- Ensure clarity for COs in division of responsibility between UNICEF regional and global offices.

Fast-track processes to provide TA are needed for UNICEF to remain a reliable partner

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[18] PHCPI (2021) Strengthening primary health care through Covid-19 vaccination efforts & investments. PHCPI, 2021 https://improvingphc.org/phc-and-covid-19-vaccination
[19] PHCPI (2021) Strengthening primary health care through Covid-19 vaccination efforts & investments. PHCPI, 2021 https://improvingphc.org/phc-and-covid-19-vaccination

- There are existing processes to fast-track TA and process contracts rapidly. Ensuring rapid response may require ensuring awareness of existing processes and collaboration with operations teams for effective implementation.

Focus on areas of expertise while looking at opportunities to build on other areas

- UNICEF contributes to the COVID-19 response alongside other partners. Not all roles will be best served by UNICEF, and it is important to recognise where other partners have expertise.

- There may be opportunities to develop new skills (such as with new technologies) that can enhance UNICEF's support to both COVID-19 vaccine rollout and in other programme areas. COVID-19 has in some cases also indicated additional areas for future UNICEF support within UNICEF's existing expertise (for example, through highlighting new needs for cold chain support), and these could be incorporated in future country strategies.

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Annex B   UNICEF CO support to COVID-19 vaccine rollout

This table shows the key activities which were indicated in documents and interviews. They may not be exhaustive. Information on VIRAT component J (demand generation & communication) is covered in the C4D report.

Table 3 Areas of UNICEF CO support to COVID-19 vaccine rollout

Area of support (based on VIRAT)	Ethiopia	Rwanda	South Africa	South Sudan
A. **Planning & coordination-** Establish committees and develop plans	**National planning:** UNICEF part of all planning discussions from the start, with regular ongoing technical input: • UNICEF central staff and consultants are part of the Planning, M&E and service delivery TWG (this TWG leads planning and is led by FMOH with WHO as Secretary) • Closely involved in development of NDVP and related plans e.g. TA to government on proposals for COVAX and Gavi. COVAX submission required around 20 documents, and 4-5 of these were prepared solely/primarily by UNICEF. • Part of virtual update meetings every other day with FMOH, RHBs, and partners **Financial support for planning:** providing funding to cover meeting costs for recent revision of NDVP and for performance review of national progress and activities on COVID-19, which fed into revised plans. **Subnational planning:** Regional TA support planning and microplanning e.g. assisting zone microplanning in the 14 zones where UNICEF works, reviewing and compiling sub-regional plans for submission to FMOH, TA for regional supply and logistics plan. **National coordination**: • Part of ICC and national task force for COVID-19	**National planning:** Gavi funding through UNICEF to convene meetings for NDVP development Participated in NDVP development **National coordination**: Member of multiple national coordination fora e.g. Scientific advisory group, ICC, cold chain equipment plan programme management group, TWGs. Supported development of National Logistics Working Group (developing ToR, organising initiation workshops)and acts as co-chair	**National coordination**: Member of supply TWG initially, and now TWGs on training, surveillance and communications. **Subnational coordination:** Province TA consultants contribute to COVID-19 working groups and have supported links between partners and government departments **Subnational planning** Some subnational input to implementation planning at province level through working groups	**National planning:** National planning (including development of NDVP) was led by WHO but undertaken as a team with government, UNICEF and other partners, and UNICEF played a key role due to their EPI expertise. **National coordination**: Member of the National COVID-19 Technical Working Group Support for the vaccine, cold chain & logistics and also demand generation & communication subgroups, with additional TA input to all subgroups. Support for the national logistics working group includes allocating TA to facilitate the group. revising TOR and developing the workplan. **Subnational planning:** Support to vaccine delivery in 2 states includes support to microplanning e.g. in Jonglei, UNICEF's implementing partner (LiveWell) has been developing microplans with the county

	vaccination and all TWGs under this. • Secretariat for Supply and Logistics and Communication and Demand Generation TWGs **Subnational coordination:** Subnational TA are part of working groups/task forces and participate in regional/sub-regional coordination meetings e.g. SNNPR TA is part of regional task forces on Planning, M&E and service delivery/implementation, and sometimes takes part in the logistics and supply chain taskforce.			government as well as UNICEF, other partners. **Subnational coordination:** A monthly coordination meeting for county government and partners was already conducted using UNICEF funding under a World Bank project. This forum has been used for COVID-19, and became weekly meeting and now twice weekly. UNICEF implementing partners participate in subnational logistics working group.
B. Budgeting – include costs in plans and budgets, ensure allocation in cash planning	Input to budgeting and costing as part of national planning and proposal development Support for resource mobilisation e.g. World Bank proposals Some provision of direct funding			Input to budgeting Support for resource mobilisation e.g. input to proposals Acting as a channel for funds for implementation provided by other donors (e.g. World Bank and Gavi) Some direct funding
C. Regulatory – confirm regulatory pathways, ensure documents are in place for import and that vaccines can be released	**Regulation:** WHO lead but UNICEF are part of TWG **Import regulations:** Key role - TA to government on import authorisation, ensuring all permits and requirements needed by UNICEF and Gavi are in place for import; TA for government/Ethiopian Pharmaceuticals Supply Agency (EPSA) on customs clearance,		**Subnational support:** Province TA consultants – some support on ensuring compliance with regulations (especially Section 21 permits, used as the vaccine is not yet registered)	**Import regulations:** Organising documents and authorisation for import, including liaising with government for tax exemption and other approvals.
D. Prioritization, targeting & COVID-19 surveillance –	**Targeting:** Input to planning included input to identification of target groups – especially advocating for inclusion	**Prioritisation and targeting** Supported equity assessment, report, and coverage and		

identify target groups and numbers, coordinate with COVID-19 surveillance to inform targeting	of IDPs and refugees through a joint letter with WHO and providing data related to IDPs and refugees to support targeting	equity improvement plan (develop TORs, hiring consultant, workshops, report dissemination) - report includes recommendations and improvements on all aspects of vaccination, not just COVID-19.		
E. Service delivery – define IPC and PPE measures, plan service delivery strategies e.g. vaccine centres, planning for logistics	**Subnational service delivery** TA, funding and procurement support for regional implementation: **TA:** Deployed 5 consultants to support regional rollout – TA to plan, coordinate and oversee vaccine delivery, including logistics, EVM, reporting, monitoring, supervision. UNICEF TA at zonal level also provide support (e.g. in SNNPR, TA in the 3 zones with the largest populations). **Funding** for regional implementation e.g. supervision and monitoring in SNNPR. **Procuring additional support:** FMoH is hiring approximately 90 TA to support vaccine rollout, and UNICEF is responsible for their recruitment.			**Subnational service delivery**: support for vaccine implementation in 2 states with large populations (Jonglei and Upper Nile, with about 25% total population), and work in some areas of remaining 8 states. Service delivery is supported through agreement with programme partners (NGOs) who had been working with UNICEF in these states since 2019 on a wider World Bank project on health service delivery. Activities supported within states and by these partners include microplanning; facilitating training for the state and other levels; managing the cold chain; TA on EVM; distribution; supporting vaccinators at facility level (e.g. helping with screening); and supporting a mobile team for outreach to areas not covered by the usual vaccination centres. UNICEF is also funding incentives for vaccinators in these states.
F. Training & supervision – development of training plan,	Supported development of training materials Subnational TA attended national training and supported cascade training to staff and health workers HCW at zonal and woreda level.	Develop guidelines and training materials for health workers in regard to COVID vaccine	Technical input to development of training materials on vaccination and a COVID-19	Training led by JSI but UNICEF provided input, including facilitating sessions on cold chain and vaccine management, and facilitating

materials, conduct training		Training for vaccinators in electronic stock management using DHIS2 – including modifying existing training to cover COVID-19	vaccination field guide, in collaboration with WHO and CHAI Helped to facilitate training for health workers on COVID-19 vaccination – virtual training for all provinces using MoH training platform (the 'knowledge hub)'	subnational training in states where UNICEF supports service delivery (direct and with implementing partners). Also provided funding for some training for health workers.
G. Monitoring & evaluation – develop framework for monitoring and surveillance (e.g. indicators on coverage, disease surveillance); design system and tools (electronic/paper), distribute tools and train users; systems for data protection and grievances/feedback	**M&E:** Supported development of M&E plan and printing of tools **Reporting** Subnational TA support operational reporting e.g. collecting reports on numbers vaccinated and any difficulties by phone, Telegram or other channels, then compiling these reports and sending them to national level, and reporting daily performance to central outbreak response teams.	Implementation of immunization e-tracker: assessment to examine current guidelines		**Monitoring and Evaluation** Participation in M&E Subgroup and support to development of data tools, including dashboard for monitoring that provides real time information on vaccine use and numbers covered (to assess daily performance and wastage). Support for training health workers and cold chain focal persons in vaccine accountability tools. Field teams supported supervision and monitoring. **Reporting** UNICEF staff helped to collect data for reporting e.g. for locations without good internet/mobile network, health workers took pictures of tally sheets and sent them to UNICEF to enter information for reporting.
H. Vaccine, cold chain, logistics & infrastructure: • Ensure strong logistics TWG and clear roles & responsibilities	UNICEF is lead development partner for supply and logistics, and secretariat for the TWG **Procurement of cold chain and other equipment:** • Support to CC assessment • Vaccine, supplies, PPE, CCE and other medical	**Cold chain equipment** Pre-COVID-19 work on CCE assessment and inventory, delivery and installation of CCE, supported by TA.	**Cold chain equipment, vaccine management and supply** Recruited TA consultants to support supply, cold chain and vaccine management in 5	Key partner for cold chain, logistics and supply. **Cold chain and other equipment** Together with WHO, supported MoH to map and assess cold chain

• Plan distribution strategy • Plan for infrastructure needs e.g. IT/network, electricity, water • Assess CC and dry storage capacity • SOPs for medical waste • Systems for monitoring stock management and distribution • Disseminate protocols and ensure monitoring	supplies for wider COVID-19 response are funded by other partners and FMoH, but UNICEF coordinates procurement of all supplies and undertakes procurement of behalf of government. • Liaison between government and UNICEF HQ (Copenhagen) for vaccine procurement. • Supply chain TA consultant allocated to FMOH, and CO procurement team provide TA on procurement. **Cold chain and vaccine management:** • Deployed 6 immunisation logistics/vaccine management and cold chain consultants (5 regional, one national), who support cold chain management and monitoring as well as vaccine distribution; • Supported training in cold chain and EVM Funding for supportive supervision, which included monitoring cold chain, vaccine management and logistics **Distribution and logistics** • Work with EPSA to provide information on vaccine arrival and shipping, and TA for EPSA on supply and distribution. • Support with vehicles to distribute vaccine to more remote locations. • Facilitated distribution within regions as per the micro plan	Support on CCE continuous inventory and stock management. TA developing CCE application under COVAX Advocated for procurement of Ultra-cold chain equipment, followed by installation, training and related activities **Cold chain and vaccine management:** Pre-COVID-19 work on EVM and vaccine stock management, COVID-19 vaccine stock management added to this work. Provided SOPs/guidelines for collection and disposal of medical waste Updated vaccine stock management tools and operating procedures to cover COVID-19 vaccines Three staff working daily at central vaccine store to prepare for Pfizer vaccine. Supported vaccine guideline development Supported supervision of some vaccine sites **Distribution and logistics** Support on logistics management and distribution of vaccine to different sites Supporting implementation of the immunisation supply chain system redesign (continuing from 2019, includes costed implementation plan & full implementation)	provinces – TA support includes activities such as developing SOPs/guidelines, training staff, stock management, monitoring cold chain and vaccine management, identifying CCE gaps, and advising on CCE.	capacity and needs, to support CCE application to Gavi/COVAX. Contributed use of existing UNICEF equipment e.g. storage fridges. Procurement and import of additional CCE e.g. new vaccine carriers **Cold chain and vaccine management:** Development of EVM SOPs and training Subnational implementing partners support cold chain management e.g. temperature monitoring. **Distribution and logistics** Support to National Logistics Working Group e.g. facilitated revision of NLWG TOR and workplan, Developed distribution plan with NLWG Arrangements for vaccine arrival at airport and distribution to subnational locations, through partnership with UNHAS and other contractors, and organisation of logistics for backhauling when needed. Subnational distribution supported by UNICEF and implementing partners, including assistance with cars to transport vaccine from UNICEF storage areas to facilities.

		Procurement and supply Support in procurement of COVID-19 vaccines and other supplies Developed vaccine request to COVAX, which included MRNA vaccines		
I. **Safety surveillance** – guidelines, training and systems for pharmacovigilance and surveillance including to monitor adverse events, coordination and compensation schemes	**Surveillance and pharmacovigilance:** WHO lead but UNICEF are part of TWGs on Vaccine Safety, licensure pharmacovigilance, and Infection prevention, Surveillance & Research and Development		Part of surveillance TWG, technical input through this TWG on development of an electronic reporting system to capture adverse events following COVID-19 vaccination, and on training subnational staff in the system and monitoring its implementation.	
Additional activity to support **continuity of essential health services** around COVID-19	National and regional TA also support routine EPI e.g. TA allocated to EPSA also supports supply for routine immunisation supply; regional and zonal TA support EPI (e.g. mOPV2 campaign activities in Oromia); funding for some EPI campaigns.		Advocacy on continued essential services and support for children during COVID-19, and technical input on guidelines for services such as child health and EPI. Subnational TA consultants support supply, cold chain and vaccine management for EPI, not just COVID-19 vaccination.	

Annex C   Interview sample

Interviewees by organisational category	
UNICEF staff	**13**
Country office staff	9
Regional office staff	4
Partners	**11**
National government staff	4
Bilateral (foreign government) or other UN agency	7
Private sector	-
Frontline workers	**6**
Subnational government staff	2
UNICEF TA consultant	3
NGO/INGO	1
TOTAL	**30**

COVID-19 Vaccine supply: Interviewees per country	
Ethiopia	8
South Africa	6
South Sudan	7
Rwanda	5
Regional (UNICEF)	4
TOTAL	**30**

Annex D   Data collection tools

Note that all question guides were tailored to country contexts and used flexibly.

Question guide for UNICEF staff

1.   UNICEF role

1.1.   Was UNICEF's role as expected in country COVAX/COVID-19 vaccine rollout plans?
- Probe: technical inputs to immunization strategy
- Probe: support to the supply chain and vaccination roll-out readiness planning
- Probe: UNICEF's added value

Document review was used to understand areas of planned support and activities conducted in the country. The KII focused on any updates and changes; and questions will build on document review

1.2.   What UNICEF activities to support the supply chain and vaccination roll-out readiness have worked particularly well?
- Probe: What has helped progress?

1.3.   Are there areas where progress has not been as fast as expected?
- Probe: What has hindered progress?
- Probe: What could have been done differently? (e.g. change in strategy, different or additional activities)
- Did corrective actions take place? If so, what was done? If not, why?

These questions built on document review e.g. asking about challenges indicated in documents to understand whether they were anticipated, the effects, and what has been done in response).

1.4.   How did existing international or national vaccine supply chains affect activities and progress for COVAX/COVID-19 vaccine rollout?
- Probe: What aspects of the supply chain did UNICEF anticipate needed support to deliver COVID-19 vaccines?
- Probe: Were there any activities to provide this support? To what extent were these effective?
- Probe: Were there unexpected challenges related to the existing supply chain?

1.5.   What risks were anticipated at planning stage?
- Probe: Were there strategies to mitigate these risks?
- Probe: Were these strategies sufficient?
- Probe: Were there unexpected gaps and difficulties?
- Probe: Could anything have been done to identify these risks in advance?
- Probe: Are there ongoing risks, where additional support or different strategies are needed?

2. Procurement, funding and supplies

2.1.   Has procurement for COVAX/COVID-19 vaccine rollout proceeded as anticipated, considering vaccines and other supplies?
- Probe: If not, what have the difficulties been?
- Probe: Have funding constraints affected procurement, and if so how? (e.g. types of items procured, quantities, timing)
- Probe: Have constraints in the supply of vaccines or other materials affected procurement, and if so how?

2.2.   Was anything done by UNICEF to prevent or address gaps in funding? (building on document review, including direct provision and advocacy for further funding)
- Probe: If so, which of these activities were more effective?
- Probe: Were there any difficulties or areas where progress has been more limited?
- Probe: What helped, or limited progress?

2.3.   Was anything done by UNICEF to prevent or address gaps in supplies? (building on document review, including direct provision and advocacy for further supplies)
- Probe: If so, which of these activities were more effective?
- Probe: Were there any difficulties or areas where progress has been more limited?

- Probe: What helped, or limited progress?

2.4. **How useful were existing country or UNICEF vaccine sourcing strategies for COVID-19 (i.e. strategies used for other vaccines)?**
- Probe: Were new sourcing strategies needed?
- Probe: Have sourcing strategies changed since the start of COVID-19 vaccine planning? If so, why and how?
- Probe: Were there any changes to strategies due to gaps in funding or supplies? If so, have these strategies been effective?

2.5. **What lessons were learned about effective procurement?**
- Probe: What changes were made to procurement approaches in light of new/emerging gaps?

3. Coordination

3.1. **What is UNICEF's role in coordination structures for COVAX/COVID-19 vaccine rollout planning and implementation?**
Questions built on information about UNICEF's role from document review.

- **Are there aspects of coordination with partners or government that have worked particularly well?** Probe: If so, what enabled this? What was UNICEF role in this?

3.2. **Are there any gaps or challenges in coordination and alignment** to support planning and implementation of COVAX/COVID-19 vaccine roll out, with government or among partners, or areas that could be strengthened?
- Probe: If so, what have the difficulties been?
- Probe: What hindered effective coordination and collaboration?
- Probe: What could be done differently?
- Probe: there any partners or sectors who were missing from coordination activities, and who should be included?
- Probe: what was UNICEF role in addressing these gaps/challenges?

3.3. **What lessons were learned about effective coordination approaches?**
- Probe: Have there been changes to the coordination approach in light of emerging gaps?

3.4. **How has UNICEF worked with different programme areas internally,** within the CO or RO, for COVAX/COVID-19 vaccine rollout planning and implementation?
- Probe: Are there areas where this has worked well? What has helped?
- Probe: Have there been any challenges around internal coordination? What led to these?
- Probe: Were these coordination challenges addressed? If so, how? If not, why?

3.5. **Which partners did UNICEF work with to support planning and implementation** for COVAX/COVID-19 rollout? (i.e. contracted implementing partners)?
- Probe: Have these partnerships been effective in supporting rollout? (considering partner selection and partnering approach)
- Probe: Have there been any difficulties with partners or the partnership approach? What led to these?
- Probe: Is there anything that could have been done differently?

4. CLOSING

Are there any other lessons regarding effective approaches to supporting COVID-19 vaccine rollout that you would like to share?

Question guide for Partners (development partners)

1. UNICEF Role

1.1. Could you please tell me about your role in supporting supply chain and COVID-19 vaccination roll-out readiness, and what links you have had with UNICEF for this work?

1.2. Can you tell me about your experience of working with UNICEF on COVAX/COVID-19 vaccine rollout – any positives and negatives?

1.3. What do you see as UNICEF's areas of expertise and added value in relation to COVAX/COVID-19 vaccine rollout?
- Probe: How did UNICEF technical expertise contribute to the COVID-19 immunization strategy?
- Probe: How did this expertise and support contribute to rollout?
- Probe: What areas of UNICEF support do you see as most important?

1.4. What aspects of UNICEF support have worked well?

1.5. Are there areas of UNICEF input for COVAX/COVID-19 vaccine rollout that have worked less well, or where there have been challenges?
- Probe: What have the difficulties been?
- Probe: Are there any aspects of UNICEF support that could have been done differently?
- Probe: Are there any gaps where UNICEF could play a stronger role?

2. Procurement, funding and supplies

2.1. Did UNICEF play any role in helping to address gaps in funding for COVAX/COVID-19 vaccine rollout? If so, what was this role?
- Probe How effective was UNICEF's contribution to addressing funding gaps?

2.2. Did UNICEF play any role in helping to address gaps in supplies for COVAX/COVID-19 vaccine rollout? If so, what was this role?
- Probe: How effective was UNICEF's contribution to addressing gaps in supplies?

3. Coordination and collaboration

3.1. What systems are in place for partner and government coordination around COVAX/COVID-19 vaccine rollout?
- Probe: How well have these systems been working?
- Probe: Are there aspects of these systems that have worked particularly well? If so, what enabled this?
- Probe: Are there any gaps or challenges in coordination and alignment, with government or among partners, or areas that could be strengthened?
- Probe: If so, what have the difficulties been? What hindered effective coordination and collaboration?
- Probe: What should be done differently?

3.2. What role has UNICEF played in supporting coordination and collaboration among partners for COVAX/COVID-19 vaccine rollout?
- Probe: How has this support affected planning and implementation for rollout?
- Probe: To what extent has UNICEF's role aligned with other partners?
- Probe: Are there aspects of collaboration with UNICEF that you see as strengths?
- Probe: Have there been any areas where UNICEF's approach to coordination and collaboration, with government or partners, could be strengthened and more effective?

Specifically for implementing partners (i.e. contracted organisations)
3.3. Can you tell me about you experience of working with UNICEF on COVAX/COVID-19 vaccine rollout – any positives and negatives?

4. CLOSING

Are there any lessons or advice you would give to UNICEF to strengthen their future role in relation to COVID-19 vaccine deployment?

Question guide for Partners (government)

1. UNICEF Role

1.1. What has been your role in supporting supply chain and COVID-19 vaccine roll-out readiness, and what links you have had with UNICEF for this work?

1.2. Can you tell me about you experience of working with UNICEF on COVAX/COVID-19 vaccine rollout – any positives and negatives?

1.3. What do you see as UNICEF's areas of expertise and added value in relation to COVAX/COVID-19 vaccine rollout?
- Probe: How did UNICEF technical expertise contribute to the COVID-19 immunization strategy?
- Probe: How did this expertise and support contribute to rollout?
- Probe: What areas of UNICEF support do you see as most important?

1.4. What aspects of UNICEF support for COVAX/COVID-19 vaccine rollout have worked well?

1.5. Are there areas of UNICEF input for COVAX/COVID-19 vaccine rollout that have worked less well, or where there have been challenges?
- Probe: What have the difficulties been?
- Probe: Are there any aspects of UNICEF support that could have been done differently?
- Probe: Are there any gaps where UNICEF could play a stronger role?

1.6. How did the experience of working with UNICEF on COVID-19 vaccine roll-out compare to experience of working with UNICEF in other areas?

2. Procurement, funding and supplies

2.1. Did UNICEF play any role in helping to address gaps in funding for COVAX/COVID-19 vaccine rollout? If so, what was this role? Probe: How effective was UNICEF's contribution to addressing funding gaps?

2.2. Did UNICEF play a role in helping to address gaps in supplies for COVAX/COVID-19 vaccine rollout? If so, what was this role? Probe: How effective was UNICEF's contribution to addressing supply gaps?

3. Coordination

3.1. What systems are in place for government and partner coordination around COVID-19 vaccine rollout?

3.2. How well have these systems been working?
- Probe: Are there aspects of these systems that have worked particularly well? If so, what enabled this?
- Probe: Are there any gaps or challenges in coordination and alignment, with government or among partners, or areas that could be strengthened? If so, what have the difficulties been?
- Probe: What hindered effective coordination and collaboration?
- Probe: What should be done differently?

3.3. Has UNICEF played any role in supporting coordination among partners for COVID-19 vaccine rollout?
- Probe: If so, what has this role been?
- Probe: How has this support affected planning and implementation for rollout?
- Probe: Are there any areas where UNICEF's support for coordination could be strengthened?

3.4. How do you see UNICEF's approach to coordination and collaboration with government for COVAX/COVID-19 vaccine rollout?
- Probe: To what extent has UNICEF's role aligned with government priorities?
- Probe: Are there aspects of collaboration with UNICEF that you see as strengths?
- Probe: Have there been any areas where UNICEF's approach to coordination and collaboration with government could be strengthened and more effective?

4. CLOSING

Are there any lessons or advice you would give to UNICEF to strengthen their future role in relation to COVID-19 vaccine deployment?