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Desk-Based Vaccine Capability and Gap Analysis

Pacific Island Countries

24 November 2020

Strategic input on health to the Australian Government

Specialist Health Service

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Executive Summary

This is a desk-based analysis of vaccine delivery capability and gaps in selected Pacific island countries. The analysis includes a regional and country level overview of vaccine delivery systems, identifying existing strengths and gaps for potential further support. The purpose of the analysis was to collate publicly-available data to inform the early consultations of the Australian Department of Foreign Affairs and Trade (DFAT) with Pacific island countries, following Australia's AUD 500 million commitment to the Pacific and Southeast Asia over the period 2020–2021 to 2022–2023.[1]

Pacific island countries included in this analysis are:

1. Fiji
2. Kiribati
3. Nauru
4. Papua New Guinea
5. Samoa
6. Solomon Islands
7. Tonga
8. Tuvalu
9. Vanuatu.

DFAT engaged two experienced consultants to undertake this work, through the Specialist Health Service.

This analysis was completed between October and November 2020. It involved reviewing publicly-available documents only, to avoid duplication of country consultations already underway to complete the COVID-19 Vaccine Introduction Readiness Assessment Tool (VIRAT/VRAF 2.0), led by WHO, UNICEF, and the World Bank.

Data for areas of assessment were collated from public sources at a point in time, noting that the vaccine landscape is rapidly progressing, and an independent analysis was made by the consultants, where publicly-available data were available.

Findings from the desk-based capability and gap analysis are presented in the document below.

[1] The views and recommendations expressed in the publication are those of the authors and do not necessarily reflect the views of the Australian Government.

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Abbreviations and Acronyms

ADB	Asian Development Bank
AEFI	Adverse event following immunisation
AMC	Advance Market Commitment
APO	Asia Pacific Observatory on Health Systems and Policies
ARIA	Australian Regional Immunisation Alliance
BCG	Bacillus Calmette-Guérin [vaccine]
CCE	Cold chain equipment
CDC	Centers for Disease Control and Prevention [United States]
CHW	Community health worker
cMYP	Comprehensive multi-year plan
COVAX	COVID-19 Vaccines Global Access [initiative]
DFAT	Department of Foreign Affairs and Trade [Australia]
DHIS2	District Health Information Software 2
DHO	District Health Office
DPS	Division of Pacific Technical Support
DTP	Diphtheria and tetanus toxoids, and whole-cell pertussis
DTP-Hep B-Hib	Diphtheria, tetanus, pertussis, hepatitis B, and *Haemophilus influenzae* type B [vaccine]
DTwP	Diphtheria, tetanus, and whole cell pertussis [vaccine]
eHDF	Electronic health declaration form
EOC VPD	Emergency Operations Centre for Vaccine Preventable Diseases
EPI	Expanded program on immunisation
EVSM	Effective vaccine storage management
EVMSA	Effective vaccine management supply-chain assessment
FPBS	Fiji Pharmaceutical and Biomedical Services
Gavi	Gavi, The Vaccine Alliance
GDP	Gross domestic product
Global Fund	The Global Fund to Fight AIDS, Tuberculosis and Malaria [also GFATM]
GSK	GlaxoSmithKline
H1N1	Influenza A virus subtype H1N1
HCW	Healthcare workers
Hep B	Hepatitis B
HPV	Human papillomavirus [vaccine]
ICC	Interagency Coordination Committee
IDA	International Development Association
IEC	Information, education, and communication
ILO	International Labour Organization
IMT	Incident Management Team
IPC	Infection prevention and control
IPV	Inactivated polio vaccine
LMIC	Lower-middle-income country
MCV	Measles containing vaccine
MDA	Mass drug administration

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MFAT	Ministry of Foreign Affairs and Trade [New Zealand]
MHMS	Ministry of Health and Medical Services
MICS	Multiple Indicator Cluster Survey
MOH	Ministry of Health
MMR	Measles, mumps, and rubella [vaccine]
MR	Measles and rubella [vaccine]
NAFH	National Adviser Family Health
NGO	Non-government organisation
NITAG	National Immunisation Technical Advisory Group
OCHA	Office for the Coordination of Humanitarian Affairs [United Nations]
OOP	Out-of-pocket
OPV	Oral poliovirus vaccine
PAM	Project Administration Manual
PCV	Pneumococcal conjugate vaccine
PNG	Papua New Guinea
PPE	Personal protective equipment
RISE	Regional Immunisation Support and Engagement
RMNCAH	Reproductive, maternal, newborn, child, and adolescent health
RRT	Rapid response team
RV	Rotavirus vaccine
SIA	Supplementary immunisation activity
SIDS	Sudden infant death syndrome
SPC	The Pacific Community
SRA	Stringent regulatory authority
Td	Tetanus toxoid and diphtheria [vaccine]
TGA	Therapeutics Goods Administration [Australia]
THE	Total health expenditure
TT	Tetanus toxoid [vaccine]
UK	United Kingdom
UMIC	Upper-middle-income country
UN	United Nations
UNICEF	United Nations Children's Fund
USA	United States of America
VII	Vaccine Independence Initiative
VPD	Vaccine-preventable diseases
WASH	Water, sanitation and hygiene
WHO	World Health Organization
WPRO	Western Pacific Regional Office
WPSAR	Western Pacific Surveillance and Response Journal

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Glossary

Term	Definition	Source
Administrative coverage	In most countries, 'administrative coverage data' are the number of doses administered to the target population. To estimate percentage immunisation coverage, this number is divided by the total estimated number of people in the target population. The target population groups vary from country to country and are dependent on the national immunisation schedule in place. The coverage estimates calculated using the administrative method can be biased due to inaccurate numerators or denominators. **Numerators may be:** • underestimated (due to incomplete reporting from reporting units or non-inclusion of other vaccinating sources; e.g. private sector, non-governmental organizations); or • Overestimated (due to over-reporting from reporting units; e.g. inclusion of other target groups). **Denominator inaccuracies may be due to issues such as:** • population movement; • inaccurate census estimations or projections; and/or • numerous sources of denominator data.	WHO
AEFI	An adverse event following immunisation is any untoward medical occurrence which follows immunisation, and which does not necessarily have a causal relationship with the usage of the vaccine. If not rapidly and effectively dealt with, it can undermine confidence in a vaccine and ultimately have dramatic consequences for immunisation coverage and disease incidence. Alternatively, vaccine-associated adverse events may affect healthy individuals and should be promptly identified to allow additional research and appropriate action to take place.	WHO
Bundled consumables	Vaccines procured through UNICEF Supply Division come with auto-disable syringes and safety boxes that meet the quantities of vaccines ordered.	
Burn and bury	Incineration of used syringes and needles prior to safe burial of waste. Syringes and needles can be burned via incineration, in metal drums or in open burn pits. Incineration can destroy syringes and needles. Fires burning at temperatures higher than 800˚C kill microorganisms and reduce the volume of waste to a minimum. Properly functioning incinerators ensure the most complete destruction of syringes and needles.	

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Cold chain	The 'cold chain' is a system of storing and transporting vaccines at recommended temperatures from the point of manufacture to the point of use. That is, the role of the cold chain is to maintain the potency of vaccines. There is also a concept called 'reverse cold chain', which is a system of storing and transporting samples at recommended temperatures from the point of collection to the laboratory.	WHO
EPI waste management	A system to safely manage the waste generated through Expanded Programs on Immunisation, including sharps and infectious non-sharps waste.	WHO
EVSM	Effective vaccine storage management is a system of equipment procurement, installation, operation, and maintenance to ensure that cold stores of vaccine are optimally functional, reducing waste and vaccine damage.	WHO
GAVI AMC IDA	Gavi Advance Market Commitment (AMC) and World Bank International Development Association (IDA)-eligible countries. In an AMC, donors commit funds to guarantee the price of medicines once they have been developed. The AMC provides an innovative financing mechanism for accelerating access to life-saving medicines in low-income countries and reduce the time gap between access to new vaccines in industrialised countries and low-income countries by incentivising pharmaceutical manufacturers to develop and manufacture medicines for diseases more prevalent in low-income countries.	Gavi
GAVI COVAX AMC	The Gavi COVAX AMC forms part of the COVAX Facility, a mechanism hosted by Gavi, designed to guarantee rapid, fair, and equitable access to COVID-19 vaccines for every country in the world, rich and poor.	Gavi
LMIC	Lower-middle-income country. Based on a country's Gross National Income (GNI) per capita (which can change with economic growth, inflation, exchange rates, and population), the World Bank classifies countries into low, lower-middle, upper-middle, and high income. Lower-middle-income countries have a GNI of between USD 1,026 and USD 3,995 per capita.	World Bank
Mass immunisation campaigns	Administration of vaccine doses to many people at one or more locations over a short period of time.	Grabenstein J.D., Nevin R.L. Mass immunization programs: principles and standards.

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		Curr. Top. Microbiol. Immunol. 2006; 304:31-51. DOI: 10.1007/3-540-36583-4_3. PMID: 16989263.
mSupply	A logistics management information system (LMIS) for health supplies.	mSupply website
NITAG	National Immunisation Technical Advisory Groups (NITAGs) are multidisciplinary groups of national experts responsible for providing independent, evidence-informed advice to policy makers and program managers on policy issues related to immunisation and vaccines.	WHO
Passive AEFI	An AEFI is defined as any untoward medical occurrence which follows immunisation, and which does not necessarily have a causal relationship with the use of the vaccine. The adverse event may be any unfavourable or unintended sign, an abnormal laboratory finding, a symptom, or a disease. Passive surveillance systems theoretically allow anyone in a country to report and, due to their broad coverage, they can provide the first indication of an unexpected AEFI.	WHO
Regulatory pathways	A regulatory pathway is a mechanism which allows a product to be imported into a country when otherwise it would be unavailable. That could be because it has not been approved yet, has been withdrawn from market, is in shortage, or if a patient is unable to participate in a clinical trial.	WHO
Risk comms	Risk communication plans at country level to promote awareness of vaccine risks and benefits, understand perceptions of risk, and prepare for managing any adverse events and concerns about vaccine safety promptly. Communicating about vaccine safety is always important. It is essential in at least three situations, namely: • explaining properly the benefits and risks of a recommended vaccine; • addressing public concerns and upcoming or persistent rumours about vaccine safety; and • preparing to address vaccine safety crises if and when they occur.	WHO
Supplementary immunisation activities	Also known as mass immunisation days, supplementary immunisation activities (SIA) are one of the four pillars of eradication. They are intended to complement, not replace,	Global Polio Eradication Initiative (GEPI)

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	routine immunisation and are often conducted in response to an outbreak of a vaccine-preventable disease.	
Supply chain DHIS2	A logistics management information system for digital health commodities.	DHIS2 website
UMIC	Upper-middle-income country. Based on a country's GNI per capita (which can change with economic growth, inflation, exchange rates, and population), the World Bank classifies countries into low, lower-middle, upper-middle, and high income. Upper-middle-income countries have a GNI of between USD 3,996 and USD 12,375 per capita.	World Bank
UNICEF Supply Division	UNICEF's supply and logistics headquarters.	UNICEF
Vaccine enablers	People, policies, and strategies that increase availability and uptake of vaccines.	Paraphrased from WHO article: *Improving vaccination demand and addressing hesitancy*
Vaccine hesitancy	Delay in acceptance or refusal of vaccines despite availability of vaccination services.	WHO
Vaccine Independence Initiative	The Vaccine Independence Initiative (VII) was initiated by UNICEF to address procurement and financing challenges faced by national vaccine programs globally. It allows low-and-middle-income countries that can finance their vaccine programs to benefit from UNICEF procuring vaccines on their behalf. Before the VII, the experiences of these countries ordering independently, with small volume orders, coupled with their poor credit ratings, resulted in high prices and other challenges. The VII has been providing pooled procurement and bridge-financing support to PICs since 1995. Currently 13 PICs – Cook Islands, Fiji, Kiribati, Republic of the Marshall Islands, Federated States of Micronesia, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, and Vanuatu – obtain their vaccines through the VII procurement and financing mechanism for vaccines and immunisation devices (syringes).	UNICEF

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Methodology

Summary Methodology

- Areas of assessment were based on key components for routine EPI and mass vaccination campaign delivery.
- Data for areas of assessment were collated from public sources at the time of the assessment (October–November 2020).
- Population data:
  - Country population data were sourced from UN World Population Prospects 2019.
  - Data for Healthcare Workers (HCW) were sourced from WHO Global Health Workforce Statistics (Dec 2018).
  - Data for 'vulnerable population at high or increased risk' were sourced from the Lancet Global Health article (2020).
- Collated data were analysed for each area of assessment by country, to assess country-level capacity to deliver a COVID-19 mass vaccination campaign.

Detailed Methodology

Table Summary Data

To determine country readiness for delivering a COVID-19 mass vaccination campaign, data were aggregated on the country's capacity to deliver EPI services, including mass campaigns and surveillance for COVID-19. The areas considered necessary to deliver a successful COVID-19 vaccination campaign and therefore included in this review were: country and healthcare system background, including COVID-19 summary situation and EPI coverage; governance; vaccine access and procurement; infrastructure and systems for vaccine management; immunisation information systems; and risk communication. Internet searches and literature reviews were undertaken to source documents that contained reliable information on the identified areas for analysis. All information in the description column of the table was copied from existing documents, and source documents referenced. This information was then critically reviewed, with a brief capability assessment, as well as overall summary analysis provided for each country. Where data were not available in the public domain, capability assessment and analysis were limited.

Population Data

To estimate the number of healthcare workers in 2020, data on the number of HCW per population were downloaded from the WHO Global Health Observatory data repository (Source: WHO Global Health Workforce Statistics (Dec 2018)). Data were available for the following cadres of HCW; doctors and psychiatrists, nurses and midwives, dentists, pharmacists, laboratory personnel, physiotherapists, social workers in mental health, and biomedical engineers, as well as Environmental and Occupational Health and Hygiene Personnel. Community health workers were not included in this analysis, as the assumption is that they are not based in health facility settings. In addition, the available data was inadequate. Where data were missing for HCW cadre, the number was estimated using the Fijian rate for PICs and the rate in Myanmar for Southeast Asian countries, and applied to the relevant country's population. This had a minimal impact on total numbers of HCW, as most cadres and all countries have doctors and nurses who make up the majority of the cohort. Data were not available for all years, and some countries showed large

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variation in rates between years, which suggests variation in data collection methods. To adjust for this, the average rate of HCW was calculated for all available years from 2010 onwards. If no data were available for 2010 onwards, the most recent year of data were taken (environmental health data; Samoa only 2008, Vanuatu only 2007; Myanmar physiotherapists only 2004). To generate one final rate for all HCW in the country, the rates for each cadre were summed to generate the rate of HCW per population for each country. This rate was applied to the 2020 population from the UN population database to generate the number of HCW in 2021 by country.

To estimate the number of people vulnerable to COVID-19 per population, data were extracted from a study that calculated the number of people at high risk and increased risk (Source: Lancet Global Health article (2020)). The study estimated the number of individuals at increased risk of severe disease (defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines published by WHO and public health agencies in the UK and the USA), by age, sex, and country for 188 countries and mapping prevalence data for underlying conditions from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017 and UN population estimates for 2020. The number of individuals at high risk (defined as those who would require hospital admission if infected) were calculated using age-specific infection–hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed males were twice as likely as females to be at high risk.

Full detail of the methods used can be found by accessing the source document (Source: Lancet Global Health article (2020)). The Lancet publication did not present data on the number of people at high risk and increased risk for Nauru or Tuvalu. Therefore, this was calculated manually using the same methods as the Lancet article, with population data sourced from the Pacific Data Hub, The Pacific Community (SPC), and applying the rates of underlying conditions for the population of Fiji.

Details on the characteristics of the most likely COVID-19 vaccine candidate were not available at the time of writing this report; therefore, the target population could not be generated based on this. For example, the age group for paediatric COVID-19 vaccine was not available. Once a vaccine candidate is clearer, the target populations and pricing should be updated accordingly.

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Vaccine Capability and Gap Analysis by Country

1. FIJI

Country and Healthcare System Background

Geography

- The Republic of Fiji consists of 322 islands, of which 110 are inhabited, with a total land area of 18,274 square kilometres.
- Fiji lies within the South Pacific Ocean.

Service Delivery

- The expanded program on immunisation (EPI) sits under the public health section at the Ministry of Health and Medical Services (MHMS).
- Health care delivery is predominantly public, with a small private service offered in the larger cities.
- Fiji has a far-reaching health service, with basic health care being provided through a hierarchy of community health workers (CHW), nursing stations, health centres, sub-divisional hospitals, and divisional and specialist hospitals.
- Fiji has a largely decentralised health service, with divisional hospitals providing tertiary care, and sub-divisional hospitals providing primary health care and limited secondary health care services.
- Routine immunisations are given in maternity and paediatric wards in the clinical setting, and at health centres and nursing stations in the community. Fiji has 40 healthcare workers (HCW)/10,000 population.

Health Financing

- Fiji is classified as an upper-middle-income country.
- The major sources of income in Fiji are tourism, sugar, mining, fishing, and remittances.
- The health care system in Fiji is mainly financed through general taxation.
- Other finance comes from out-of-pocket payments, mostly in the private health sector, and funding from donor organisations.

COVID-19 Situation Summary

- Fiji has reported a total of 35 COVID-19 cases and two deaths (as at November 2020).

Source: WHO Global Health Workforce Statistics (Dec 2018); WHO COVID-19 Situation Report Western Pacific Region #30 (25 Nov 2020); World Bank Fiji Country Engagement Note FY2015–2017; RNZ Fiji Declares Dengue and Leptospirosis Outbreak (19 Aug 2020).

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Population Data

- Total population in 2020 is 896,444.
- From this total, 57% of the population live in urban areas and 43% live in rural areas.
- The population at high risk is 63,283 – which equates to 7% of the total population.
- The population at increased risk of severe COVID-19 is 277,280 – which equates to 31% of the total population.
- Populations at risk of severe COVID-19 are distributed across age groups, with the majority aged between 35–69 years, as shown in Figures 1 and 2.

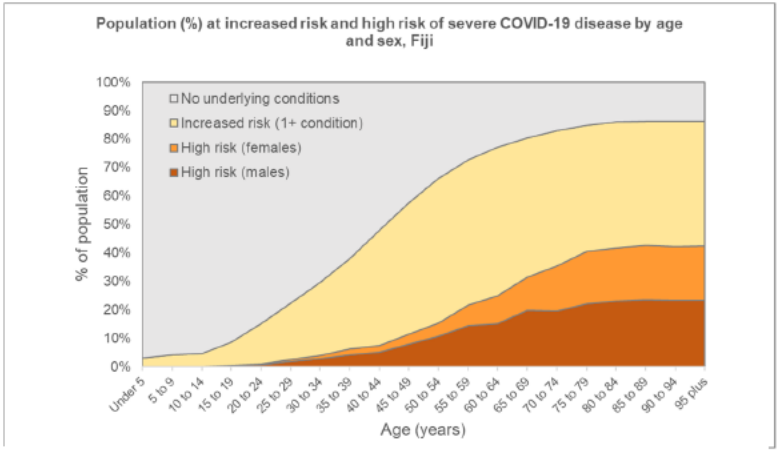


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

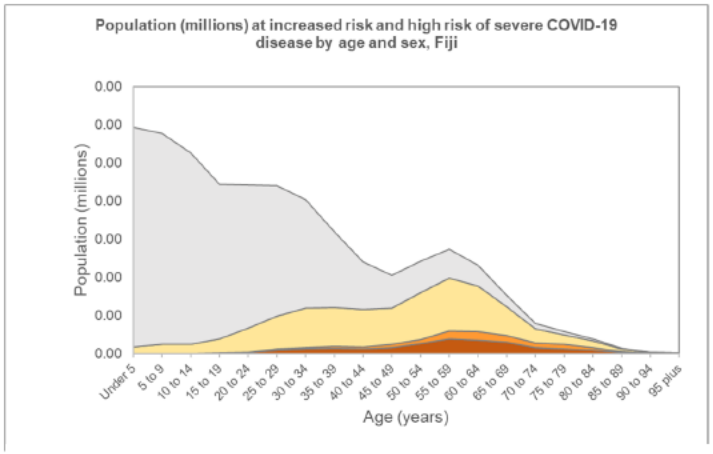


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Vaccine cost in USD for two doses at $5/dose	Vaccine cost in USD for two doses at $10/dose
Healthcare workers (assumed to be 18–59 years)[2]	**100%**	3,571	7,142	35,709	71,418
Comorbidities in the total population of all ages at high risk[3], excluding HCW	**3%**	1,791	3,583	17,914	35,827
	20%	11,942	23,885	119,424	238,847
	40%	23,885	47,769	238,847	477,694
	60%	35,827	71,654	358,271	716,542
	80%	47,769	95,539	477,694	955,389
	100%	59,712	119,424	597,118	1,194,236
Comorbidities in the total population of all ages at increased risk[4], excluding HCW and those at high risk	**3%**	6,313	12,626	63,128	126,256
	20%	42,085	84,171	420,853	841,705
	40%	84,171	168,341	841,705	1,683,411
	60%	126,256	252,512	1,262,558	2,525,116
	80%	168,341	336,682	1,683,411	3,366,822
	100%	210,426	420,853	2,104,264	4,208,527
Adults ≥60 years, excluding those with increased or high risk	**3%**	510	1,020	5,102	10,205
	20%	3,402	6,803	34,016	68,031
	40%	6,803	13,606	68,031	136,063
	60%	10,205	20,409	102,047	204,094
	80%	13,606	27,213	136,063	272,126
	100%	17,008	34,016	170,079	340,157
Adults 18–59 years, excluding HCW and those at increased or high risk	**3%**	9,220	18,441	92,204	184,407
	20%	61,469	122,938	614,690	1,229,380
	40%	122,938	245,876	1,229,380	2,458,760
	60%	184,407	368,814	1,844,070	3,688,141
	80%	245,876	491,752	2,458,760	4,917,521
	100%	307,345	614,690	3,073,451	6,146,901

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Vaccine cost in USD for two doses at $5/dose	Vaccine cost in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	8,737	17,474	87,372	174,744
	20%	58,248	116,496	582,481	1,164,961
	40%	116,496	232,992	1,164,961	2,329,922
	60%	174,744	349,488	1,747,442	3,494,883
	80%	232,992	465,984	2,329,922	4,659,844
	100%	291,240	582,481	2,912,403	5,824,805
Total population	**3%**	26,893	53,787	268,933	537,866
	20%	179,289	358,578	1,792,888	3,585,776
	40%	358,578	717,155	3,585,776	7,171,552
	60%	537,866	1,075,733	5,378,664	10,757,328
	80%	717,155	1,434,310	7,171,552	14,343,104
	100%	896,444	1,792,888	8,964,440	17,928,880

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th rowspan="2">Area of Analysis</th><th rowspan="2">Description</th><th colspan="2">Capability Assessment</th></tr>
<tr><th>Qualitative Assessment</th><th>Traffic Light</th></tr>
<tr><td colspan="4">EPI Coverage and Mass Campaigns</td></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines[1]</th></tr>
<tr><th>Official country estimates</th><th>WHO–UNICEF estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td>97%</td><td>99%</td></tr>
<tr><td>6 weeks</td><td>DTP-Hep B-Hib, OPV, PCV, RV</td><td>92%</td><td>99%</td></tr>
<tr><td>10 weeks</td><td>DTP-Hep B-Hib, OPV, PCV</td><td>-</td><td>-</td></tr>
<tr><td>14 weeks</td><td>DTP-Hep B-Hib, IPV, PCV, RV</td><td>91%</td><td>99%</td></tr>
<tr><td>12 months</td><td>MMR (replaced MR in 2020) Vitamin A</td><td>83%</td><td>96%</td></tr>
<tr><td>18 months</td><td>MMR (replaced MR in 2020), OPV</td><td>82%</td><td>94%</td></tr>
<tr><td>School entry</td><td>Td</td><td>-</td><td>-</td></tr>
<tr><td>Class 8</td><td>HPV (2 doses)</td><td>-</td><td>-</td></tr>
<tr><td>Pregnant women</td><td>Td (up to 5 doses)</td><td>-</td><td>-</td></tr>
</table>
[1] Key coverage indicators used in EPI are DTP1, DTP3, MCV1, and MCV2. Other antigen coverage is not displayed.

Fiji has high reported routine EPI coverage.
Fiji introduced PCV, Rotavirus, and HPV vaccines in 2012.

Source: WHO VPD Monitoring: 2020 Global Summary: Fiji; FHSSP Annual Work Plan 2015 (11 Nov 2014).
</td><td>Fiji has consistently high coverage for the key indicator vaccines.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough information to rate.</td><td></td></tr>
</table>

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Experience with Mass Campaigns	• 2006 MR campaign targeting children aged 6 months to 5 years, with 98% coverage reported. • 2010 Typhim Vi (typhoid vaccine) mass campaign to targeted areas impacted by a tropical cyclone, targeting people aged 2 years to 70 years. • 2010 H1N1 Influenza campaign targeting those with pre-existing conditions and healthcare workers (HCW). • 2017 MR Campaign for children aged 1 year to 10 years. • 2018 Meningococcal C vaccine campaign for children and young people aged 1 year to 19 years. • 2019 MR campaign (targeting HCW, travellers, tourism, children aged 6 months to 5 years, and adults born between 1980 and 2000). Source: CDC Fiji Measles Outbreak and Response May 2006; PLOS: A Cross-Sectional Seroepidemiological Survey of Typhoid Fever in Fiji (20 Jul 17); WHO H1N1 Vaccine Deployment and Update; WPRO Measles-Rubella Supplementary Immunization Activity (6 Sep 2017); MHMS Meningococcal Disease; WHO/UNICEF Measles Outbreak in the Pacific – Situation Report No. 8 (23 Dec 2019).	Fiji has run multiple large mass campaigns in response to outbreaks of diseases in recent years, which were successful in stopping disease transmission.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough information to rate.	
Adult Vaccination Campaigns	• The target population coverage for H1N1 vaccine coverage was ~95% and H1N1 vaccine coverage for the entire population was 10% in 2010; no other data were available. • MR mass campaigns. Source: WHO H1N1 Vaccine Deployment and Update.			
Governance				
Leadership and Governance	• COVID-19 Incident Management Team (IMT) reports directly to the Permanent Secretary of Health, currently meeting weekly. Responsibilities include: o Command and coordination. o Surveillance, risk assessment, and response. o Laboratory.	Strong leadership and governance involving multiple	Governance capacity for COVID-19 vaccine:	

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	○ Clinical (case) management and infection prevention and control. ○ Public health intervention, including points of entry measures. ○ Risk communication. ○ Logistics, procurement, and supply management. ○ No dedicated Vaccine Pillar yet, but discussions about COVID-19 vaccine planning underway with the Division of Pacific Technical Support (DPS) and Public Health team, with population data currently being collated. Source: Fiji COVID-19 Preparedness and Response Plan 2020.	government agencies, no vaccine pillar yet.	Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
COVID-19 Vaccine National Policy	• No information publicly available.	No information available.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough information to rate.	Not enough info to rate.
National Immunisation Technical Advisory Group (NITAG)	• No information publicly available.	No information available.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet	Not enough info to rate.

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			established; White = not enough information to rate.	
Healthcare Workforce (vaccine providers)	• Fiji has 25 nurses per 10,000 population, which is slightly lower than the average for UMICs in the Asia–Pacific region (28 nurses per 10,000 population). Source: WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Fiji has a lower-than-average number of HCW which may pose challenges for delivering a COVID vaccine campaign.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough information to rate.	
HCW EPI Training	• Vaccine provider curriculum is available. Source: FHSSP Annual Plan 2012.	Training for routine EPI available.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out-of-date; White = not enough information to rate.	Not enough info to rate.

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Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• Regulatory authority sits at Fiji Pharmaceutical and Biomedical Services (FPBS) and is overseen by three pharmacists. • Fiji has an agreement in place with the Australian TGA for laboratory testing of medicines under the Pacific Medicines Testing Program. Source: WHO Strengthening Regulation of Medical Pathways in PICs (Feb 2019).	All medications and vaccines are approved by Fiji's regulatory authority, which relies on other systems. No information available on enforcement.	Vaccine regulatory pathways are established: Green = well established and effective; Amber = somewhat established; Red = being established; White = not enough information to rate.	
Systems in Place for Procurement	• Vaccines and bundled consumables are procured through the UNICEF Supply Division and GSK (GSK will cease in 2021), fully financed by government. • Mass campaign vaccine and bundled consumables are procured through UNICEF, usually donor-funded. • Part of the regional Vaccine Independence Initiative (VII). • Not Gavi-eligible for routine immunisation support. • Gavi AMC eligible. Source: UNICEF Supply Annual Report 2019: Annex 1; Support for Fiji's Meningococcal Outbreak (21 May 2018); MOH Receives Additional 200,000 Measles Vaccines (11 Dec 2019).	Fiji rarely has vaccine stock outs and vaccines are all procured through UNICEF supply division, all funded by government except for mass campaigns. Fiji has access to the UNICEF buffer stock located in Fiji.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	

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EPI Funding	• The proportion of EPI that is government-funded by year is as follows: 2019 = no data; 2018 = no data; 2017 = no data; 2016 = 89%; 2015 = 100%. • MHMS fully funds the routine EPI program and has successfully introduced three new vaccines. • Eligible for Gavi COVAX AMC. Source: WHO VPD Monitoring: 2020 Global Summary: Fiji; FHSSP Final Program Evaluation (1 Jun 2016); Gavi 92 Economies Eligible to Get COVID-19 Vaccines (31 July 2020).	The government of Fiji fully funds its immunisation program and has successfully funded the introduction of three new vaccines. Fiji is eligible for Gavi COVAX AMC.	EPI funding: Green = fully government-funded for vaccines and program Amber = mainly government funded >50%; Red = mainly donor-funded, government funds <50%; White = not enough information to rate.	
Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• No information publicly available.	No information available.	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough	Not enough info to rate.

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			information to rate.	
Waste Management	• No information publicly available.	No information available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.
Security Arrangements	• Police and military are part of Fiji's IMT. Source: Fiji Police Force Facebook post (5 Apr 2020).	Police and military were used during the COVID-19 lockdown.	Has capacity for security surrounding COVID-19: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	

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Immunisation Information Systems				
Individual Immunisation Records	• National individually-held 'Child Health Record' (parent-held) captures all EPI. Source: Fiji Government Measles Update 6 (19 Nov 2019).	Not enough information available to assess.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough information to rate.	Not enough info to rate.
National Immunisation Register	• No information publicly available.			
Monitoring Vaccine Coverage	• No information publicly available.			
AEFI Reporting and Management	• No information publicly available.	No information available.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being	Not enough info to rate.

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			established; White = not enough information to rate.	
COVID-19 Surveillance Systems	• COVID-19 Incident Management Team. • Surveillance systems in place. • Fever clinics set up around the country. • COVID-19 awareness materials, which address water, sanitation and hygiene (WASH) and aim to prevent stigma, reached a total of 2,728 households, comprising 12,296 people (6,380 male; 5,919 female). Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #28 (18 Sep 2020).	Surveillance is strong and detected cases early; fever clinics set up nationally.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
Risk Communication				
Risk Communication Plan	• Communications are part of the IMT. Source: Fiji COVID-19 Preparedness and Response Plan 2020; MHMS COVID-19 Updates.	There is a risk communication team, and almost daily press releases by the Fiji Government.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being	

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			established; White = not enough information to rate.	
Community Mobilisation/ NGO	• No information publicly available.	No information available.	Community mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.
Vaccine Hesitancy	• No information publicly available.	No information available.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough information to rate.	Not enough info to rate.

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Vaccine Enablers	• No information publicly available.	No information available.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough information to rate.	Not enough info to rate.

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Summary Analysis – Fiji

Fiji has a young population, with 57% living in urban areas and 43% living in rural areas. A total of 31% of the population have one or more underlying conditions and is at increased risk of severe COVID-19, and 7% of the total population is at high risk of severe COVID-19. These figures are higher than the global average of 22% at increased risk and 4% at high risk. These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 30–69 years.

Fiji has a strong routine EPI and extensive experience in mass campaigns across age ranges. Routine EPI achieves high coverage and has a far reach, despite geographic challenges of islands and mountains.

Fiji appears to have strong leadership and governance in the management of the COVID-19 pandemic. There is not a publicly-available COVID-19 vaccination policy in place or a NITAG.

Fiji has an average number of nurses per 10,000 population.

Procurement systems are strong with support from UNICEF through the VII. Regulatory pathways are in place. The Fijian Government funds 100% of vaccine and program delivery costs.

Fiji has experience with risk communication during mass campaigns and the communication pillar sits under the IMT.

Fiji is very well-placed to roll out a COVID-19 mass vaccination program with donor and technical assistance.

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2. KIRIBATI

Country and Healthcare System Background

Geography

- The Republic of Kiribati is an isolated central-western Pacific island country, with a land area of 811 square kilometres, and a coastline that stretches over 1,143 km. The population lives on 23 islands that are spread over an ocean area of 3.5 million square kilometres.
- The unique geographic characteristics of Kiribati present challenges in delivering health services to the country's population.

Service Delivery

- Many population health outcomes have improved significantly in Kiribati in the two decades to 2017.
- Kiribati has a small, extremely dispersed population. Difficulty accessing basic health services in remote outer islands makes referral and health service logistics very difficult, expensive, and often only available by sea.
- Facilities and staff vary significantly across geographic locations and island groups, and nearly two-thirds of clinical staff are on the highly-urbanised island of South Tarawa (50% of the population). Outpatient consultations were 4.9 per person in 2016, much higher than rates reported by other countries in the region.
- Kiribati has 49 HCW/10,000 population.

Health Financing

- Kiribati is classified as a lower-middle-income country.
- In Kiribati, the majority of total health expenditure is funded by government, with an estimated one in every five dollars coming from external partners. Public expenditure on health was 81% of total health expenditure in 2014, similar to other countries in the Pacific.
- In recent years, the health sector in Kiribati received around 15% of the total Government of Kiribati annual budget, second after the Ministry of Education. Private expenditure was 19% of total health expenditure in 2014, mainly from NGOs, with minimal formal out-of-pocket payments.
- Indirect costs, such as travel and time lost can be a significant personal expense, particularly for those living in more remote areas.
- This health financing landscape is very particular to Pacific island countries, and is substantially different to countries in other regions with similar levels of income.

COVID-19 Situation Summary

- Kiribati does not have confirmed COVID-19 cases (as at November 2020).

Source: Kiribati Multi-Year Plan for Immunization 2011–2015; Grey literature: Wikipedia Geography of Kiribati; World Bank Kiribati Health Financing System Assessment (Apr 2018); WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020); WHO COVID-19 Western Pacific Situation Report #30 (25 Nov 2020).

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Population Data

- Total population in 2020 is 119,452.
- From this total, 56% of the population live in urban areas and 44% live in rural areas.
- The population with comorbidities at increased risk, requiring hospitalisation if infected, is 33,214 – which equates to 28% of the total population.
- The population with high risk, with one or more underlying conditions that increase risk for severe COVID-19, is 5,903 – which equates to 5% of the total population.
- Populations at risk of severe COVID-19 are distributed across age groups, with the majority aged 25–69 years (see Figures 1 and 2).

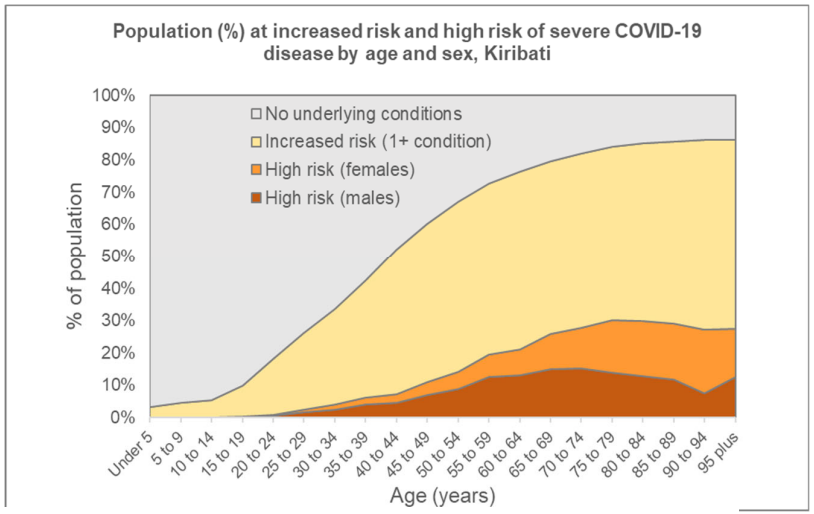


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

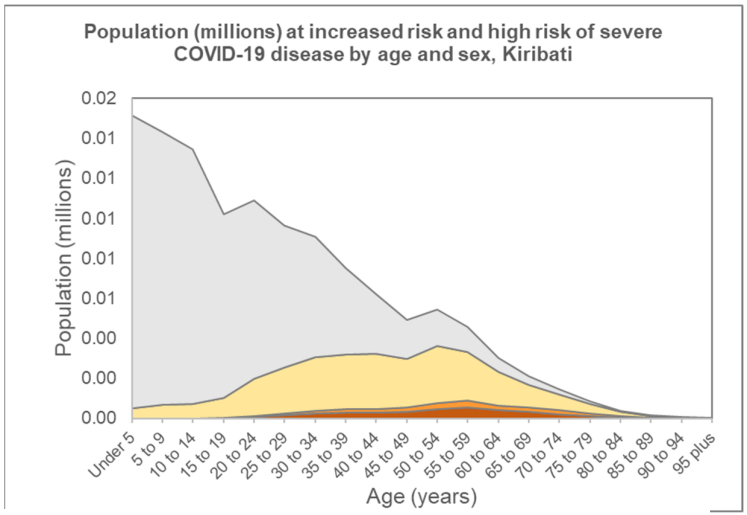


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare Workers (assumed to be 18–59 years)[2]	**100%**	589	1,177	5,887	11,774
Comorbidities at high risk[3], excluding HCW	**3%**	159	319	1,594	3,189
	20%	1,063	2,126	10,629	21,257
	40%	2,126	4,251	21,257	42,515
	60%	3,189	6,377	31,886	63,772
	80%	4,251	8,503	42,515	85,030
	100%	5,314	10,629	53,144	106,287
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	802	1,603	8,017	16,034
	20%	5,345	10,689	53,445	106,890
	40%	10,689	21,378	106,890	213,780
	60%	16,034	32,067	160,335	320,670
	80%	21,378	42,756	213,780	427,560
	100%	26,723	53,445	267,225	534,451
Adults ≥60 years excluding those at increased or high risk	**3%**	49	99	494	987
	20%	329	658	3,290	6,581
	40%	658	1,316	6,581	13,162
	60%	987	1,974	9,871	19,742
	80%	**1,316**	**2,632**	**13,162**	**26,323**
	100%	1,645	3,290	16,452	32,904
Adults 18–59 years, excluding HCW and those at increased or high risk	**3%**	1,125	2,249	11,246	22,491
	20%	7,497	14,994	74,970	149,940
	40%	14,994	29,988	149,940	299,880
	60%	22,491	44,982	224,910	449,820
	80%	29,988	59,976	299,880	599,761
	100%	37,485	74,970	374,850	749,701

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	1,396	2,791	13,956	27,911
	20%	9,304	18,607	93,037	186,075
	40%	18,607	37,215	186,075	372,150
	60%	27,911	55,822	279,112	558,225
	80%	37,215	74,430	372,150	744,300
	100%	46,519	93,037	465,187	930,375
Total population	**3%**	3,584	7,167	35,836	71,671
	20%	23,890	47,781	238,904	477,808
	40%	47,781	95,562	477,808	955,616
	60%	71,671	143,342	716,712	1,433,424
	80%	95,562	191,123	955,616	1,911,232
	100%	119,452	238,904	1,194,520	2,389,040

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country-specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th>Area of Analysis</th><th>Description</th><th colspan="3">Capability Assessment</th></tr>
<tr><th></th><th></th><th>Qualitative Assessment</th><th colspan="2">Traffic Light</th></tr>
<tr><td colspan="5">EPI Coverage and Mass Campaigns</td></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage 2019
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines</th></tr>
<tr><th>Official country estimates</th><th>WHO–UNICEF estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td>-</td><td>-</td></tr>
<tr><td>6 weeks</td><td>DTP-Hep B-Hib, OPV</td><td>>100%</td><td>99%</td></tr>
<tr><td>10 weeks</td><td>DTP-Hep B-Hib, OPV, RV</td><td>>100%</td><td>97%</td></tr>
<tr><td>14 weeks</td><td>DTP-Hep B-Hib, OPV, IPV, RV</td><td>-</td><td>-</td></tr>
<tr><td>12 months</td><td>MR</td><td>>100%</td><td>94%</td></tr>
<tr><td>13 years</td><td>Td</td><td>-</td><td>-</td></tr>
<tr><td>6 years</td><td>DTP, MR</td><td>>100%</td><td>91%</td></tr>
</table>

Kiribati has very high reported routine vaccination coverage.
In 2015, Kiribati introduced the Rotavirus vaccine, following a series of confirmed rotavirus diarrhoea outbreaks, with up to 70% of cases affecting children under five years.
Kiribati does not have a current Comprehensive Multi-Year Plan (cMYP).

Impact of COVID-19 on routine EPI

A World Food Program charter flight in August 2020 delivered more than 70,000 bundled doses of BCG, Pentavalent vaccine, IPV, MR, bOPV, Td, DTP, RV, and PCV, with immunisation devices; as well as 3 units of oxygen concentrators and 2 units of emergency trolleys.

</td><td>Kiribati has high reported routine coverage. There do not appear to be any vaccine campaigns targeting adults, except pregnant women (for H1N1) in 2010.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough information to rate.</td><td></td></tr>
</table>

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	Source: WHO VPD Monitoring: 2020 Global Summary: Kiribati; MCRI Rotavirus Vaccination article (13 May 2020); WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020); WFP Serving Communities in Remote Pacific Islands (24 Aug 2020); WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #27 (4 Sep 2020).			
Experience with Mass Campaigns	• In 2019, a targeted mass measles immunisation campaign was conducted in response to three confirmed cases of measles; no community transmission was established. • No other information on mass campaigns available. Source: WHO/UNICEF Measles Outbreak in the Pacific – Situation Report No. 11 (22 Jan 2020).	There is only one reference to a mass campaign targeting the whole population and those at most risk: with the H1N1 vaccine. This campaign appeared to achieve high coverage of the target population. Given the limited experience with mass campaigns Kiribati would likely need significant support to roll out a mass COVID-19 campaign.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough information to rate.	
Adult Vaccination Campaigns	• The target population coverage for H1N1 vaccine coverage was ~95% and H1N1 vaccine coverage for the entire population was 10% in 2010; no other data were available. Source: WHO H1N1 Vaccine Deployment and Update.			

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Governance				
Leadership and Governance	• Kiribati is part of the WHO COVID-19 Pacific Health Sector Support Plan. • A national COVID-19 Preparedness and Response Plan has been prepared and the response is aligned with WHO's COVID-19 global Strategic Preparedness and Response Plan. • The national COVID-19 Plan sets out 11 priority areas, which are supported through ongoing government resources, as well as additional assistance from a wide group of development partners, including relevant United Nations (UN) agencies, WHO, UNICEF, the Pacific Community (SPC), Asian Development Bank (ADB), and Governments of Australia (DFAT), China, Japan, Korea, New Zealand (MFAT), and the United States of America. The government is overseeing the implementation of its plan through weekly meetings of the Communicable Diseases Surveillance and Response Committee, chaired by MHMS, with participation of development partners based in Tarawa. • The COVID-19 Plan sets out support being provided for urgent procurement of much-needed equipment and supplies for laboratory services and personal protective equipment. However, MHMS is not able to effectively manage these supplies, given long-standing concerns about lack of adequate warehouse space and stock management system limitations. In response, the plan has two components: ○ Component 1: Strengthening essential health service delivery capacity, including the upgrading and construction of warehouses for pharmaceutical and medical supplies, and connecting health facilities to a centralised health information management database. ○ Component 2: Implementation management and monitoring and evaluation (M&E) that will provide technical and operational assistance on project management, including supporting project implementation, M&E of the government's COVID-19 plan, supervision and reporting, financial management, procurement, and environmental and social risk mitigation activities; as well as sharing lessons learnt.	There appears to be strong national leadership with support from partners for COVID-19 pandemic response, although there is no information on effectiveness of this leadership or implementation of the plan.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	

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	Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020); Stakeholder Engagement Plan: Kiribati COVID-19 Emergency Response Project (1 Jun 2020).			
COVID-19 Vaccine National Policy	• No evidence of a COVID-19 vaccine policy. However, being part of the WHO COVID-19 Pacific Health Sector Support Plan will likely support development of a policy. Source: WHO VPD Monitoring: 2020 Global Summary: Kiribati.	There is no evidence Kiribati has a COVID-19 vaccination policy. However, being part of the WHO COVID-19 Pacific Health Sector Support Plan will likely support the development of a policy.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough information to rate.	
National Immunisation Technical Advisory Group (NITAG)	• No NITAG. Source: WHO VPD Monitoring: 2020 Global Summary: Kiribati.	Kiribati does not have a NITAG.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet unestablished; White = not enough information to rate.	

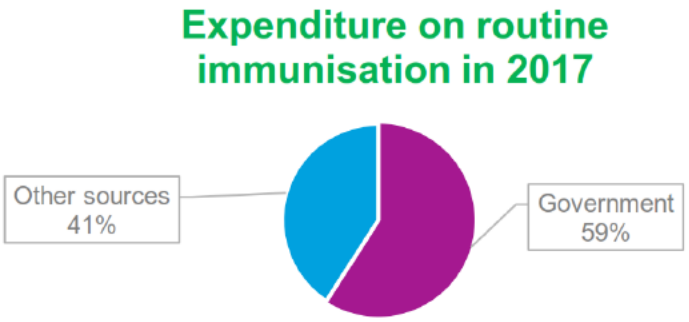
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Healthcare Workforce (vaccine providers)	• Kiribati has 42 nurses per 10,000 population, which is higher than the average for LMICs in the Asia–Pacific region (19 nurses per 10,000 population). Source: WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Kiribati has high numbers of nurses and midwives when compared with other LMICs in the region. This will be an asset when rolling out a mass COVID-19 vaccine campaign.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough information to rate.	
HCW EPI Training	• No publicly-available data.	No information available.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out-of-date; White = not enough information to rate.	Not enough data to rate.
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• Kiribati has a Medicines and Therapeutics Committee in the Pharmacy Department, Ministry of Health, which is led by the Chief Pharmacist. • Kiribati has an agreement in place with the TGA for laboratory testing of medicines under the Pacific Medicines Testing Program.	Kiribati has regulatory pathways and an agreement with the TGA;	Vaccine regulatory pathways are established:	

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	Source: WHO Strengthening Regulation of Medical Pathways in PICs (Feb 2019).	how well regulatory pathways are enforced is not known.	Green = well established and effective; Amber = somewhat established; Red = being established; White = not enough information to rate.	
Systems in Place for Procurement	• Vaccines and bundled consumables are procured through the UNICEF Supply Division. • For mass campaigns, vaccines and bundled consumables are procured through UNICEF (donor-funded). • Vaccine stock outs were reported by Gavi in 2015. • Gavi-eligible for IPV and Injection Safety Devices in 2019. • Eligible for Gavi COVAX AMC. • Support to sustain Rotavirus vaccine introduction is planned for 2021. Source: UNICEF Supply Annual Report 2019: Annex 1; Gavi 92 Economies Eligible to Get COVID-19 Vaccines (31 July 2020); Gavi Kiribati Support for Injection Safety Devices (8 Mar 2019); Gavi Joint Appraisal Report 2015 [Kiribati].	Vaccines are procured through UNICEF Supply Division and are funded by government and other sources. Eligible for Gavi COVAX AMC.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	

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EPI Funding	• Proportion of government funding for EPI: 2019 = 59%; 2018 = 39%; 2017 = no data; 2016 = no data; 2015 = no data.  Source: WHO VPD Monitoring: 2020 Global Summary: Kiribati; Gavi Kiribati Co-Financing Information Sheet (28 Jan 2019).	Kiribati remains heavily dependent on other sources to fund its EPI program. The country will require significant donor support with the roll-out of a mass COVID-19 vaccine campaign.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds < 50%; White = not enough information to rate.	
Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• A joint assessment by Gavi in 2015 noted inadequate cold chain capacity at half of the health facilities, resulting in few EPI clinics and services. Recommendations were made to expand cold chain capacity by procuring more vaccine refrigerators by June 2016. Source: Gavi Joint Appraisal Report 2015 [Kiribati].	Gaps were reported in the cold and supply chains by Gavi in 2015. These gaps were recommended to be addressed with the procurement of cold chain equipment.	Has capacity to store routine EPI vaccine at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough	

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			information to rate.	
Waste Management	• No information publicly available.	No information available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.
Security Arrangements	• No information publicly available.	No information available.	Has capacity for security surrounding COVID-19: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.

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Immunisation Information Systems				
Individual Immunisation Records	• No information publicly available.	No information available.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough information to rate.	Not enough info to rate.
National Immunisation Register	• No information publicly available.			
Monitoring Vaccine Coverage	• No information publicly available.			
AEFI Reporting and Management	• No AEFI surveillance or review committee. Source: WHO VPD Monitoring: 2020 Global Summary: Kiribati.	No AEFI surveillance or review committee.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being	Not enough info to rate.

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			established; White = not enough information to rate.	
COVID-19 Surveillance Systems	• No information publicly available.	No information available.	COVID-19 surveillance system is established: Green = well established and effective; Amber = established and somewhat effective; Red = not established or ineffective; White = not enough information to rate.	Not enough info to rate.
Risk Communication				
Risk Communication Plan	• Kiribati has developed an extensive Stakeholder Engagement Plan as part of its COVID-19 Plan, which leverages support from government agencies, HCW, communities, private business and families. The plan is resourced with staff and funding from donor partners (predominantly the World Bank). • The plan identifies disadvantaged and vulnerable groups. • The plan sets out a monitoring and evaluation framework.	A detailed Stakeholder Engagement Plan has been developed and resourced with donor support.	Risk communication plan is established: Green = well established; Amber =	

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	Source: Stakeholder Engagement Plan: Kiribati COVID-19 Emergency Response Project (1 Jun 2020).	The degree to which this plan has been implemented is not known.	somewhat established; Red = being established; White = not enough information to rate.	
Community Mobilisation/ NGO	• The Stakeholder Engagement Plan mentioned above outlines the ways in which the project team will communicate with stakeholders, and includes a mechanism by which people can raise concerns, provide feedback, or make complaints about the project and any activities related to the project. • Community representatives have been engaged to provide insight into local settings and act as conduits for dissemination of the COVID-19 Plan. These representatives will serve as a primary communication/liaison link between the plan and targeted communities and their established networks. • The Kiribati Red Cross Society has been coordinating with the Ministry of Health and the office of the President to implement COVID-19 preparedness activities. Source: Stakeholder Engagement Plan: Kiribati COVID-19 Emergency Response Project (1 Jun 2020); WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #25 (7 Aug 2020).	The Stakeholder Engagement Plan outlines extensive community consultation and engagement with stakeholders, with donor support. The degree to which this plan has been implemented is not known.	Community mobilisation/NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
Vaccine Hesitancy	• No information publicly available.	No information available.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough	Not enough info to rate.

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			information to rate.	
Vaccine Enablers	• There is no information on vaccine enablers in Kiribati; however, the Stakeholder Engagement Plan could be leveraged to promote the EPI and the roll-out of the COVID-19 mass vaccination campaign.	If the Stakeholder Engagement Plan has been implemented, support could be leveraged from this to support a COVID-19 mass vaccination campaign.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough information to rate.	Not enough info to rate.

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Summary Analysis – Kiribati

In Kiribati, 56% of the population live in urban areas and 44% in rural areas. The rural population live on hard-to-reach islands, a long way from the main island. Strong national leadership and firm border closures have seen Kiribati remain COVID-19 free. The vulnerable population, at increased risk of COVID-19 is 33,214 – which equates to 28% of the total population, slightly more than the global average of 22%. These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 30–69 years.

With limited available information, Kiribati appears to have a strong EPI system that achieves high coverage, despite the geographic challenges of dispersed island atolls. However, Kiribati has limited experience with mass immunisation campaigns.

Kiribati appears to have strong national leadership in response to the COVID-19 pandemic and has developed a detailed National COVID-19 Plan. The COVID-19 Plan includes a Stakeholder Engagement Plan.

Kiribati has a high number of nurses per 10,000 population; however, it is not clear if EPI routine training courses have been developed.

Procurement systems are strong through the VII. Kiribati relies on financial support for the procurement of vaccines.

Gavi support will have strengthened the cold and supply chain; however, the extent to which this has occurred is not known. Detail on waste management capacity was not available.

No information was available about EPI information systems or an AEFI committee. Kiribati does not have a NITAG.

Kiribati may seek support with rolling out a nationwide COVID-19 mass vaccination campaign. The high rates of nurses and midwives/10,000 population will be an asset for such a campaign and the Stakeholder Engagement Plan will be a useful tool for mobilising communities.

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3. NAURU

Country and Healthcare System Background

Geography

- Nauru is the smallest republic in the world, composed of only one island, with an area of 21 km^2. According to the Office for Coordination of Humanitarian Affairs (OCHA), Nauru is a country at low risk of being hit by natural disasters. However, rising sea levels and droughts threaten Nauru's potable water supplies and food security.

Service delivery

- Nauru's health sector is heavily reliant on expatriate professionals on short-term contracts, leading to significant fluctuations in the quality and coverage of services provided. Nauru has two hospitals, one public and one private. The public sector provides free medical and dental care for all citizens. The public hospital provides basic medical care; special treatment is limited to diabetes and other obesity-related diseases. Anyone with serious illnesses and injuries that cannot be treated on the island must be sent by air to Australia. The pharmacy imports pharmaceuticals from Australia and the Netherlands, and suffers from frequent shortages in supply, as well as disruptions in distribution.
- Nauru will receive support from UNICEF Pacific to introduce PCV, HPV, and Rotavirus vaccines through the Rotary-funded new vaccines project, but this has been delayed due to COVID-19 and will commence in 2021.

Health Financing

- Nauru's economy is heavily dependent on phosphate mining. Despite Nauru's status as an upper-middle-income country, it continues to rely heavily on external development aid. The country is plagued by high youth unemployment, and a significant proportion of the population continues to live below the poverty line.

COVID-19 Situation Summary

- Nauru does not have any confirmed COVID-19 cases (as at November 2020).

Source: UNICEF Situation Analysis of Children in Nauru (Dec 2017); Nauru RON Hospital; Rotary Centenary Immunisation Pacific Project; WHO COVID-19 Situation Report Western Pacific Region #30 (25 Nov 2020).

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Population Data

- Total population in 2020 is 11,554.
- Of this total, 100% of the population lives in urban areas.
- The population with comorbidities at high risk, requiring hospitalisation if infected, is 503 – which equates to 4% of the total population.
- The population with increased risk, with one or more underlying conditions that increase risk for severe COVID-19, is 2,687 – which equates to 23% of the total population.
- Populations at risk of severe COVID-19 are distributed across age groups, with the majority aged 30–69 years, as shown in Figures 1 and 2.

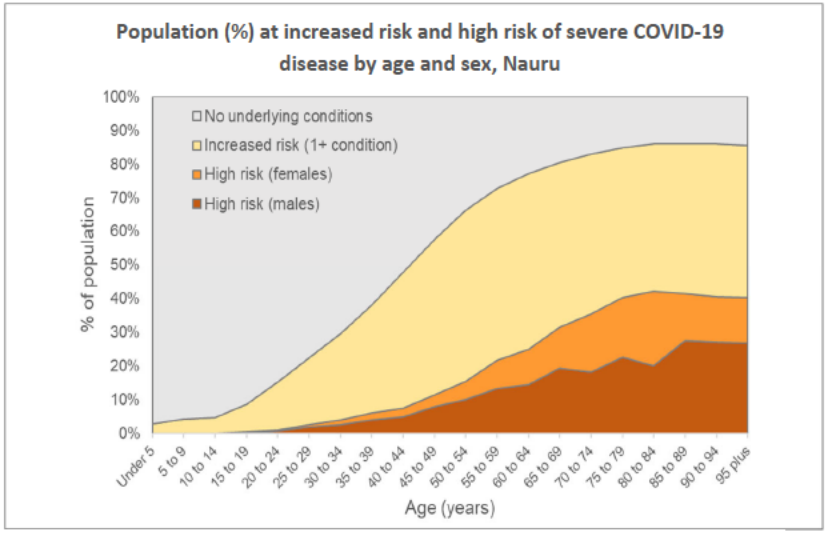


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

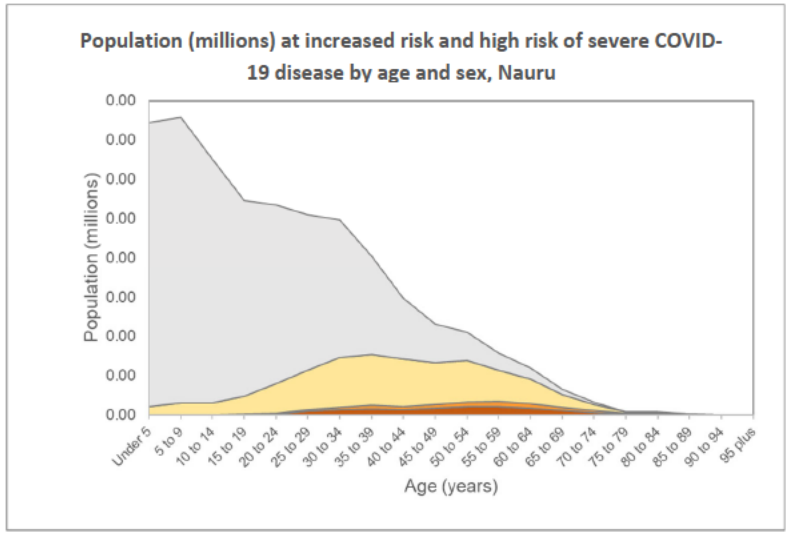


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
HCW (assumed to be 18–59yrs)[2]	100%	115	230	1,148	2,297
Comorbidities at high risk[3], excluding HCW	3%	12	23	116	233
	20%	78	155	776	1,552
	40%	155	310	1,552	3,104
	60%	233	466	2,328	4,655
	80%	310	621	3,104	6,207
	100%	388	776	3,879	7,759
Comorbidities at increased risk[4], excluding HCW and those at high risk	3%	62	124	621	1,242
	20%	414	828	4,139	8,278
	40%	828	1,656	8,278	16,556
	60%	1,242	2,483	12,417	24,835
	80%	1,656	3,311	16,556	33,113
	100%	2,070	4,139	20,696	41,391
Adults ≥60 years, excluding those at increased or high risk	3%	3	6	29	58
	20%	19	39	194	389
	40%	39	78	389	777
	60%	58	117	583	1,166
	80%	78	155	777	1,555
	100%	97	194	972	1,944
Adults 18–59 years, excluding HCW and those at increased or high risk	3%	117	235	1,175	2,350
	20%	783	1,567	7,833	15,665
	40%	1,567	3,133	15,665	31,331
	60%	2,350	4,700	23,498	46,996
	80%	3,133	6,266	31,331	62,662
	100%	3,916	7,833	39,163	78,327

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	142	284	1,422	2,843
	20%	948	1,895	9,477	18,954
	40%	1,895	3,791	18,954	37,908
	60%	2,843	5,686	28,431	56,861
	80%	3,791	7,582	37,908	75,815
	100%	4,738	9,477	47,384	94,769
Total population	**3%**	347	693	3,466	6,932
	20%	2,311	4,622	23,108	46,216
	40%	4,622	9,243	46,216	92,432
	60%	6,932	13,865	69,324	138,648
	80%	9,243	18,486	92,432	184,864
	100%	11,554	23,108	115,540	231,080

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country-specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th>Area of Analysis</th><th>Description</th><th colspan="3">Capability Assessment</th></tr>
<tr><th></th><th></th><th>Qualitative Assessment</th><th colspan="2">Traffic Light</th></tr>
<tr><td colspan="5">EPI Coverage and Mass Campaigns</td></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage 2019
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines</th></tr>
<tr><th>Official country estimates</th><th>WHO–UNICEF estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td>99%*</td><td>99%</td></tr>
<tr><td>6 weeks</td><td>DTP-Hep B-Hib, OPV</td><td>99%*</td><td>99%*</td></tr>
<tr><td>10 weeks</td><td>DTP-Hep B-Hib, OPV</td><td>-</td><td>-</td></tr>
<tr><td>14 weeks</td><td>DTP-Hep B-Hib, OPV, IPV</td><td>96%</td><td>96%</td></tr>
<tr><td>12 months</td><td>MR</td><td>95%</td><td>95%</td></tr>
<tr><td>15 months</td><td>MR</td><td>-</td><td>-</td></tr>
<tr><td>18 months</td><td>DTaP</td><td>-</td><td>-</td></tr>
<tr><td>4 years</td><td>DTaP</td><td>-</td><td>-</td></tr>
</table>
*Indicates the country reported above 100% coverage

Nauru is planning the introduction of PCV, Rotavirus, and HPV vaccines; these have been delayed until 2021, due to COVID-19.
There was no data available for coverage rates at 5 months, 18 months, and 4 years.

Source: Rotary and UNICEF Vaccine Project Launch in the Pacific; WHO VPD Monitoring: 2020 Global Summary: Nauru.
</td><td>Nauru has high routine coverage. There do not appear to have been any vaccination campaigns targeting adults.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough information to rate.</td><td></td></tr>
</table>

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Experience with Mass Campaigns	• No information publicly available.	There is only one reference to a mass campaign targeting the whole population and those at most risk: for the H1N1 vaccine. This campaign appeared to achieve high coverage of the target population.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough information to rate.	Not enough info to rate.
Adult Vaccination Campaigns	• The target population coverage for H1N1 vaccine coverage was ~90% and H1N1 coverage by the entire population was 80% in 2010; no other data were available. Source: WHO H1N1 Vaccine Deployment and Update.			
Governance				
Leadership and Governance	• Nauru is part of the WHO COVID-19 Pacific Health Sector Support Plan. • Nauru's Ministry of Health (MOH) web page refers the public to the WHO website for information about COVID-19. • No information is available publicly about Nauru's COVID-19 response. Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020); Government of Nauru Prevention of COVID-19.	Not enough information available to assess.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established; Red = being established; White = not enough	Not enough info to rate.

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			information to rate.	
COVID-19 Vaccine National Policy	• There is no evidence that Nauru has a COVID-19 vaccine policy. However, support from partners and being part of the WHO COVID-19 Pacific Health Sector Support Plan will likely support the development of a policy. Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020).	There is no evidence Nauru has a COVID-19 vaccine policy. However, support from partners and being part of the WHO COVID-19 Pacific Health Sector Support Plan will likely support the development of a policy.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough information to rate.	
National Immunisation Technical Advisory Group (NITAG)	• Nauru does not have a NITAG. Source: WHO VPD Monitoring: 2020 Global Summary: Nauru.	Nauru does not have a NITAG.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet established.	
Healthcare Workforce (vaccine providers)	• Nauru has 69 nurses per 10,000 population, which is higher than the average for UMICs in the Asia–Pacific region (28 nurses per 10,000 population). Source: WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Nauru has very high nurse ratios, which will be an asset with the roll-out of a mass	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than	

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		COVID-19 vaccine campaign.	average; White = not enough information to rate.	
HCW EPI Training	• No information publicly available.	No information publicly available.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out-of-date; White = not enough information to rate.	Not enough info to rate.
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• There is no data available about Nauru's regulatory pathways, but one pharmacist oversees the regulation. • Nauru has an agreement in place with the TGA for laboratory testing of medicines under the Pacific Medicines Testing Program. Source: WHO Strengthening Regulation of Medical Pathways in PICs (Feb 2019).	There is very limited information about regulatory pathways, but one pharmacist reportedly oversees this process. An agreement is in	Vaccine regulatory pathways are established: Green = well established and effective; Amber = somewhat established; Red = being established;	

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		place with the TGA.	White = not enough information to rate.	
Systems in Place for Procurement	• Vaccines and bundled consumables are procured through UNICEF Supply Division and fully funded by government. • Not Gavi eligible for routine immunisation support. • Not eligible for Gavi COVAX AMC, but has joined the COVAX Facility as a self-financing economy. • PCV, Rotavirus, and HPV vaccines are planned to be introduced in 2021, with funding from Rotary and technical support from UNICEF. Source: UNICEF Supply Annual Report 2019: Annex 1; Gavi 92 Economies Eligible to Get COVID-19 Vaccines (31 July 2020); Rotary and UNICEF Vaccine Project Launch in the Pacific; Rotary Centenary Immunisation Pacific Project.	Vaccines are all procured through UNICEF Supply Division; all funded by government. Participating in COVAX as a self-financing economy.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
EPI Funding	• Nauru fully funds routine immunisation expenditure. • Donor support is required to introduce new vaccines in 2021 through a phased financing mechanism with UNICEF. Source: WHO VPD Monitoring: 2020 Global Summary: Nauru.	Nauru fully funds immunisation expenditure.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds <50%; White = not	

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			enough information to rate.	
Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• No information publicly available.	No information available.	Has capacity to store vaccine at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.
Waste Management	• No information publicly available.	No information available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough	Not enough info to rate.

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			information to rate	
Security Arrangements	• No information publicly available.	No information available.	Has capacity for security surrounding COVID-19: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.
Immunisation Information Systems				
Individual Immunisation Records **National Immunisation Register** **Monitoring Vaccine Coverage**	• No information publicly available.	No information available.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not	Not enough info to rate.

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			centralised; Red = no individual immunisation record; White = not enough information to rate.	
AEFI Reporting and Management	• Nauru does not have an AEFI review committee. Source: WHO VPD Monitoring: 2020 Global Summary: Nauru.	No AEFI review committee.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.
COVID-19 Surveillance Systems	• Phase 1 PPE distribution has been delivered in full. GeneXpert cartridges are being delivered. Activity planning across various areas is underway, including training on surveillance and contact tracing. • No additional information publicly available about COVID-19 surveillance in Nauru. Source: WHO COVID-19 Joint External Situation Report for Pacific Islands #24 (24 Jul 2020).	Not enough information to rate.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being	Not enough info to rate.

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			established; White = not enough information to rate.	
Risk Communication				
Risk Communication Plan	• No information publicly available.	No information available.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.
Community Mobilisation/ NGO	• No information publicly available.	No information available.	Community mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being	Not enough info to rate.

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			established; White = not enough information to rate	
Vaccine Hesitancy	• No information publicly available.	No information available.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough information to rate.	Not enough info to rate.
Vaccine Enablers	• No information publicly available.	No information available.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough information to rate.	Not enough info to rate.

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Summary Analysis – Nauru

There was very limited publicly-available information about Nauru's EPI system or COVID-19 response.

Nauru has a young population, with 100% of the population living in urban areas on one main island. Those who have one or more underlying conditions equates to 23% of the total population; this is higher than the global average of 22% at increased risk and 4% at high risk. These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 30–69 years.

Nauru has high routine immunisation coverage and appears to have limited experience with mass immunisation campaigns. Routine EPI will be further strengthened by the UNICEF-led, Rotary-funded new vaccines campaign, which will revitalise the whole of EPI.

There is very little publicly-available information about the governance for the COVID-19 pandemic in Nauru, but Nauru is part of the WHO COVID-19 Pacific Health Sector Support Plan.

Nauru has a higher-than-average number of nurses per 10,000 population.

Procurement systems are strong, with support from UNICEF through the VII. The government fully funds 100% of current vaccine and program delivery costs. Nauru is participating in the Gavi COVAX Facility as a self-financing economy.

There was no information available about EPI health information documentation. Nauru has no AEFI reporting structure.

There is no information about risk communication in Nauru.

Nauru has strong vaccine procurement mechanisms. It is well placed to achieve high coverage with a mass COVID-19 vaccination campaign that will be further supported by its high nurse to population ratio, with technical and donor support.

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4. PAPUA NEW GUINEA

Country and Healthcare System Background

Geography

- Papua New Guinea (PNG) consists of over 600 islands with a total land area of 462,840 km^2. The topography of PNG is among the most rugged in the world, with some areas at an altitude of over 4,000 metres.
- PNG is one of the most culturally-diverse countries in the world. The majority of its 8.9 million inhabitants live in rural areas, and approximately 40% of the population is under 15 years of age.

Service Delivery

- PNG has an extremely dispersed population, with 85% living in rural areas. Access to basic health services in hard-to-reach areas is very difficult, expensive, and often only available by air or on foot.
- Health care is decentralised, with provinces and districts holding responsibility for primary health care services.
- It is estimated that churches provide 47% of the country's primary health services, and a significant share of secondary services, particularly in rural areas. PNG has 15 healthcare workers (HCW)/10,000 population, among the lowest across PICs. The PNG health system is challenged when there are natural disasters.

Health Financing

- PNG is classified as a lower-middle-income country.
- The economy of PNG is dominated by the agricultural, forestry, and fishing sectors, and the minerals and energy extraction sector. The agricultural, forestry, and fishing sectors account for most of the labour force of PNG, while the minerals and energy extraction sector is responsible for most of the export earnings.
- Total Health Expenditure (THE) as a percentage of GDP relies predominantly on government spending, with low out-of-pocket spending. The per capita government expenditure in real terms has been declining since 2004, in part because the absolute increase has been offset by population growth. On average, 20% of total annual health spending in PNG is from development partners.

COVID-19 Situation Summary

- There have been 630 COVID-19 cases and seven COVID-19 deaths reported in PNG (as at November 2020).

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Source: Health Financing System Assessment Papua New Guinea (2017); APO Papua New Guinea Health System Review (2019); WHO Papua New Guinea COVID-19 Situation Report 44 (26 Oct 2020); Grey literature: Wikipedia Economy of Papua New Guinea; WHO COVID-19 Western Pacific Situation Report #30 (25 Nov 2020).

Population Data

- Total population in 2020 is 8,947,027.
- From this total, 13% of the population live in urban areas and 87% live in rural areas.
- The population with comorbidities at high risk, requiring hospitalisation if infected, is 423,843 – which equates to 5% of the total population.
- The population with increased risk, with one or more underlying conditions that increases risk for severe COVID-19, is 2,125,544 – which equates to 24% of the total population.
- Populations at risk of severe COVID-19 are distributed across age groups, with the majority aged 30–59 years, as shown in Figures 1 and 2.

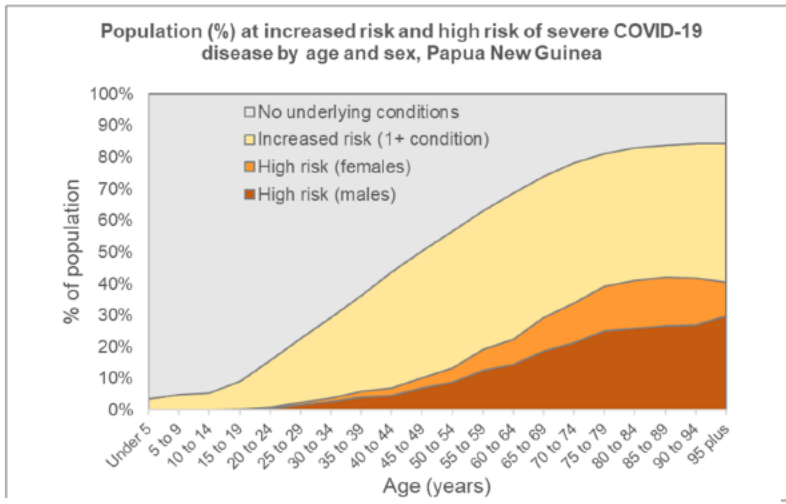


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

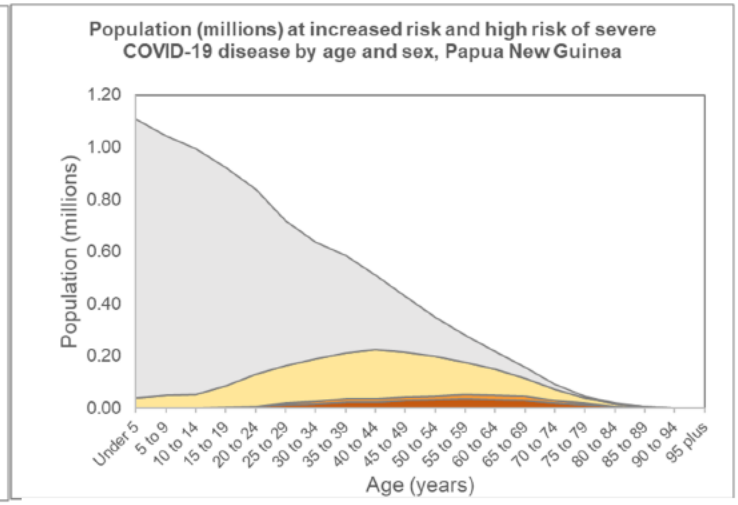


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers (assumed to be 18–59yrs)[2]	**100%**	5,580	11,159	55,796	111,592
Comorbidities at high risk[3], excluding HCW	**3%**	12,548	25,096	125,479	250,958
	20%	83,653	167,305	836,526	1,673,052
	40%	167,305	334,610	1,673,052	3,346,104
	60%	250,958	501,916	2,509,578	5,019,157
	80%	334,610	669,221	3,346,104	6,692,209
	100%	418,263	836,526	4,182,630	8,365,261
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	50,884	101,767	508,836	1,017,673
	20%	339,224	678,449	3,392,243	6,784,487
	40%	678,449	1,356,897	6,784,487	13,568,973
	60%	1,017,673	2,035,346	10,176,730	20,353,460
	80%	1,356,897	2,713,795	13,568,973	27,137,946
	100%	1,696,122	3,392,243	16,961,216	33,922,433
Adults ≥60 years, excluding those at increased or high risk	**3%**	4,256	8,512	42,561	85,121
	20%	28,374	56,747	283,737	567,475
	40%	56,747	113,495	567,475	1,134,949
	60%	85,121	170,242	851,212	1,702,424
	80%	113,495	226,990	1,134,949	2,269,899
	100%	141,869	283,737	1,418,687	2,837,373
Adults 18–59 years, excluding HCW and those at increased or high risk	**3%**	95,027	190,055	950,274	1,900,548
	20%	633,516	1,267,032	6,335,159	12,670,317
	40%	1,267,032	2,534,063	12,670,317	25,340,634
	60%	1,900,548	3,801,095	19,005,476	38,010,951
	80%	2,534,063	5,068,127	25,340,634	50,681,268
	100%	3,167,579	6,335,159	31,675,793	63,351,586

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	105,194	210,387	1,051,937	2,103,873
	20%	701,291	1,402,582	7,012,911	14,025,822
	40%	1,402,582	2,805,164	14,025,822	28,051,644
	60%	2,103,873	4,207,747	21,038,733	42,077,466
	80%	2,805,164	5,610,329	28,051,644	56,103,288
	100%	3,506,456	7,012,911	35,064,555	70,129,111
Total population	**3%**	268,411	536,822	2,684,108	5,368,216
	20%	1,789,405	3,578,811	17,894,054	35,788,108
	40%	3,578,811	7,157,622	35,788,108	71,576,216
	60%	5,368,216	10,736,432	53,682,162	107,364,324
	80%	7,157,622	14,315,243	71,576,216	143,152,432
	100%	8,947,027	17,894,054	89,470,270	178,940,540

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country-specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th rowspan="2">Area of Analysis</th><th rowspan="2">Description</th><th colspan="2">Capability Assessment</th></tr>
<tr><th>Qualitative Assessment</th><th>Traffic Light</th></tr>
<tr><td colspan="4">EPI Coverage and Mass Campaigns</td></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage 2019
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines</th></tr>
<tr><th>Official country estimates</th><th>WHO–UNICEF estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td>-</td><td>-</td></tr>
<tr><td>1 months</td><td>DTP-Hep B-Hib, OPV, PCV</td><td>55%</td><td>44%</td></tr>
<tr><td>2 months</td><td>DTP-Hep B-Hib, OPV, PCV</td><td>-</td><td>-</td></tr>
<tr><td>3 months</td><td>DTP-Hep B-Hib, OPV, IPV, PCV</td><td>40%</td><td>35%</td></tr>
<tr><td>9 months</td><td>MR</td><td>33%</td><td>37%</td></tr>
<tr><td>18 months</td><td>MR</td><td>30%</td><td>20%</td></tr>
<tr><td>15–49 years females and pregnant women</td><td>Td, TT</td><td>-</td><td>-</td></tr>
</table>
• Vaccination coverage in PNG is one of the lowest in the region.
• There are 9% of districts with DTP3 coverage >80%.

Source: WHO VPD Monitoring: 2020 Global Summary: Papua New Guinea.
</td><td>The EPI in PNG faces significant challenges, with coverage rates for all antigens very low. This has led to VPD outbreaks in the past decade. There has been a reduction in outreach services due to COVID-19.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough information to rate.</td></tr>
<tr><td>Experience with Mass Campaigns</td><td>• A comprehensive outbreak response plan implemented in response to the polio outbreak of 2018 resulted in an estimated polio vaccination coverage of 97% nationally. The target was 3.5 million children <15 years.
• This outbreak response plan included mass vaccination campaigns, enhanced surveillance, rapid convenience monitoring to find unvaccinated children, training of clinicians and public health staff, and communication and social mobilisation.</td><td>PNG has run multiple mass campaigns over the past decade to address low coverage and in</td><td>Experience with mass campaigns:
Green = highly experienced;
Amber = competent;</td></tr>
</table>

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	• The response to the polio outbreak in PNG in 2018 demonstrated the effectiveness of an emergency response in increasing immunisation coverage, and more recently these same structures have been redirected to coordinate the COVID-19 response. • A 2019 mass measles campaign was targeted at children aged 6 months to 5 years. • In 2015 there was also a mass measles campaign. Source: WHO Papua New Guinea Measles-Rubella and Polio Vaccination article (17 Jun 2019); BMC: Strengthening Routine Immunization in Papua New Guinea (23 Jan 2020); UNICEF Papua New Guinea Polio Vaccination Expanded (13 Sep 2018).	response to large VPD outbreaks. Campaigns have reached varying levels of coverage; however, the 2018 polio response reportedly reached high coverage (97%). Mass campaigns are logistically challenging in PNG and low numbers of HCW contribute to this.	Red = limited; White = not enough information to rate.	
Adult Vaccination Campaigns	• Td for tetanus in pregnant women and women of childbearing age. • The target population coverage for the H1N1 vaccine in 2010 was ~40% and H1N1 vaccination coverage for the entire population was ~3%; no other data were available. Source: WHO VPD Monitoring: 2020 Global Summary: Papua New Guinea; WHO H1N1 Vaccine Deployment and Update.			
Governance				
Leadership and Governance	• The National Control Centre for COVID-19 held a planning meeting for the NCC Operational Blueprint on 22 October 2020. Source: WHO Papua New Guinea COVID-19 Situation Report 44 (26 Oct 2020).	No further details available.	Governance capacity for COVID-19 vaccine: Green = strong; Amber = competent; Red = weak; White = not	Not enough info to rate.

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			enough information to rate.	
COVID-19 Vaccine National Policy	• No information publicly available.	No information available.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough information to rate.	Not enough info to rate.
National Immunisation Technical Advisory Group (NITAG)	• There is no NITAG in place. Source: WHO VPD Monitoring: 2020 Global Summary: Papua New Guinea.	PNG does not have a NITAG at present.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet established; White = not enough information to rate.	
Healthcare Workforce (vaccine providers)	• PNG has 4 nurses per 10,000 population, which is lower than the average for LMICs in the Asia–Pacific region (19 nurses per 10,000 population).	PNG has a very low nurse/ population ratio. This will pose a	HCW available to deliver EPI: Green = above average;	

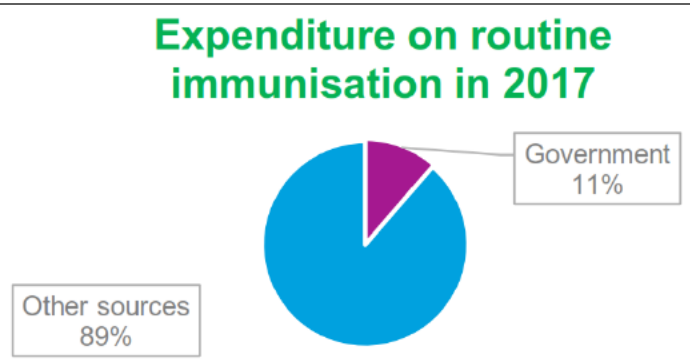
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	Source: WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	major challenge in the roll-out of a mass COVID-19 vaccination campaign.	Amber = average; Red = less than; White = not enough information to rate.	
HCW EPI Training	• No information publicly available.	No information available.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out-of-date; White = not enough information to rate.	Not enough info to rate.
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• Pharmaceutical Services Standards Branch (PSSB) in the Ministry of Health is responsible for administration and implementation of the *Medicines and Cosmetics Act 1999* and its regulations, to ensure that medicinal products and medical devices are safe, effective, and of good quality for use by people of Papua New Guinea. It does not typically evaluate vaccines and has a working relationship with Australia's TGA through the Centre for Health Security Regulatory Strengthening Program.	PNG will likely rely on UN regulatory approvals (e.g. WHO EUL) or an alternative stringent regulatory authority (SRA) such as the TGA.	Vaccine regulatory pathways are established: Green = well established; Amber = somewhat established; Red = being	Not enough info to rate.

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			established; White = not enough information to rate.	
Systems in Place for Procurement	• No information publicly available.	No information available.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.
EPI Funding	• Proportion of government-funded EPI: 2019 = no data; 2018 = no data; 2017 = 11%; 2016 = 34%; 2015 = 12%. • PNG is in a transition phase with Gavi support, where transition (reduction in co-financing from Gavi) commenced in 2017. However, PNG required significant support from Gavi to address the polio outbreak in 2019. • Eligible for COVAX AMC.	The EPI program is heavily reliant on donor support. PNG will need significant donor support to procure and roll out a COVID-19 vaccine.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds <50%;	

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	 Source: WHO VPD Monitoring: 2020 Global Summary: Papua New Guinea; Gavi Papua New Guinea Co-Financing Information Sheet (15 Dec 2018); GAVI Papua New Guinea.		White = not enough information to rate.	
Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• No information publicly available.	No information available.	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.

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Waste Management	• No information publicly available.	No information available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.
Security Arrangements	• No information publicly available.	No information available.	Has capacity for security surrounding COVID-19: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.

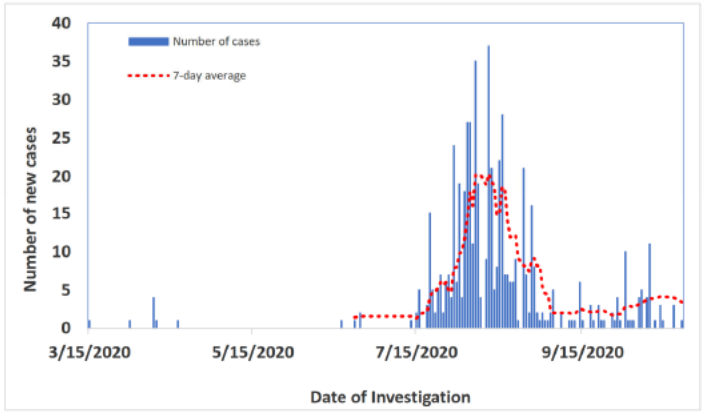
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Immunisation Information Systems				
Individual Immunisation Records	• No information publicly available.	No information available.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough information to rate.	Not enough info to rate.
National Immunisation Register	• No information publicly available.			
Monitoring Vaccine Coverage	• No information publicly available.			
AEFI Reporting and Management	• While no national data are available on AEFI and vaccine safety, an immunisation services assessment in rural health facilities in East New Britain found that there was no structured approach for observing AEFI and that limited advice was provided to caregivers on monitoring for AEFI at home. • A study on vaccine wastage in Madang during a measles outbreak reported that almost 40% of health centres reported incorrectly diluting vaccines, primarily due to inadequate communication and training on recent changes in the diluent available, with 40% of health centres also reporting incorrect injection techniques. The findings of this study further highlight the importance of	Systems for monitoring AEFI will need to be strengthened before the roll-out of a COVID-19 mass vaccination campaign.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being	

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	developing a comprehensive system for reporting AEFI, as well as the benefits of training and ongoing supervision for healthcare workers responsible for vaccine delivery. Source: BMC: Strengthening Routine Immunization in Papua New Guinea (23 Jan 2020); WPSAR: Lessons Learnt From a Measles Outbreak in Madang (2017).		established; White = not enough information to rate.	
COVID-19 Surveillance Systems	As at 25 October 2020, COVID-19 Situation Report, WHO: • Surveillance, contact tracing, rapid response team (RRT), and sample collection SOPs were approved for circulation. • Ongoing sub-national transmission stage assessments are being undertaken to provide greater discernment about transmission at the provincial level. Testing rates are low. • A risk assessment algorithm has been developed for evaluating risk of importation of COVID-19 from other countries in preparation for the resumption of international flights, with consideration of types of measures to be in place for risk level. • Updated surveillance and contact tracing training materials are being finalised in preparation for provincial and district training sessions. • The revised Community Testing Strategy is being finalised. Further development and improvement of the electronic Health Declaration Form (eHDF) is being undertaken, following a review of eHDF uptake and use to date. • The Quarantine Monitoring Database is also being optimised for use. Plans for a full roll-out, with the possibility of translating the eHDF into other languages, are underway.	COVID-19 surveillance systems appear to be in place; however, testing rates are low.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	

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	Figure 1. Epidemiological Curve of COVID-19 Cases in Papua New Guinea, 15 March to 25 October 2020  Source: WHO Papua New Guinea COVID-19 Situation Report 44 (26 Oct 2020).			
Risk Communication				
Risk Communication Plan	• No information publicly available.	No information available.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.

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Community Mobilisation/ NGO	• No information publicly available.	No information available.	Community mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.
Vaccine Hesitancy	• No information publicly available.	No information available.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough information to rate.	Not enough info to rate.
Vaccine Enablers	• No information publicly available.	No information available.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough information to rate.	Not enough info to rate.

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Summary Analysis – Papua New Guinea (PNG)

PNG has a young population. As at November 2020, there have been 604 COVID-19 cases and seven COVID-19 deaths reported in PNG, with case numbers peaking in mid-August 2020. The vulnerable population, at increased risk of COVID-19, is 2,125,544, which equates to 24% of total population; slightly more than the global average of 22% of the population at increased risk and 5% at high risk. These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged between 30 and 69 years.

In comparison with other low/middle-income countries in the region, PNG is well-positioned to leverage existing technical platforms from its Gavi-extended transition status to coordinate additional technical capacities to support a COVID-19 vaccine introduction. These include Gavi key partner in-country support already in place as part of PNG's extended Gavi Transition Plan. Additional technical partnerships could build on existing platforms to continue strengthening elements of essential routine immunisation programs, such as vaccine communications, vaccine impact evaluation, or integrated disease and coverage surveillance. This additional technical support would not only support strong progress towards technical standards for the COVID-19 vaccine introduction, but also leverage the opportunity to support under-addressed needs in various policies (e.g. National Health Strategic Plan, HSSP, and EPI Policy).

Long-term strengthening requires a major increase in centrally-allocated resources. Routine vaccination coverage is very low, with coverage for key antigens all <50%. Mass immunisation campaigns have been necessary in the past to address outbreaks of VPDs.

PNG has a very low nurse and HCW ratio per population, which will make the roll-out of the COVID-19 vaccine challenging.

PNG has experience with delivering mass vaccination campaigns and lessons learned from these will be valuable in informing COVID-19 vaccine roll-out. Technical and donor support may be requested to strengthen existing immunisation systems.

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5. SAMOA

Country and Healthcare System Background

Geography

- Samoa consists of two main islands – Upolu and Savaii – and seven smaller islets, of which some are uninhabited.
- Samoa is in the centre of the Pacific region and is prone to natural disasters.

Service Delivery

- Samoa's national hospital is in Apia, and supported by district hospitals and health centres.
- Samoan tertiary care is limited and mainly provided through arrangements with New Zealand's healthcare system.
- Current health service delivery in Samoa is heavily hospital-centric, which has resulted in overcrowding of hospitals. Doctors are concentrated in the main referral hospital in Apia, with the other 11 primary health care facilities almost exclusively staffed by nurses, with a physician visiting only one day a week.
- Basic infrastructure, diagnosis equipment, and competencies are lacking in the district hospitals.
- Health service delivery is managed by the government, with a very small private sector.
- Samoa is planning the introduction of PCV, Rotavirus, and HPV vaccines; however, this has been delayed until 2021, due to COVID-19.

Health Financing

- Samoa is classed as an upper-middle-income country and is reliant on tourism, agriculture, remittances, and development assistance economically.

COVID-19 Situation Summary

- Samoa does not have any confirmed COVID-19 cases (as at November 2020).

Source: World Bank PID: Samoa Health System Strengthening Program (17 Apr 2018); WHO COVID-19 Situation Report Western Pacific Region #30 (25 Nov 2020).

Population Data

- The total population of Samoa in 2020 is 198,410.
- From this total, 18% of the population live in urban areas and 82% live in rural areas.

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- The population with comorbidities at high risk, who would require hospitalisation if infected, is 8,842 – which equates to 5% of the total population.
- The population at increased risk, who have one or more underlying conditions that increase risk for severe COVID-19, is 44,718 – which equates to 23% of the total population.
- These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 30–69 years, as shown in Figures 1 and 2.

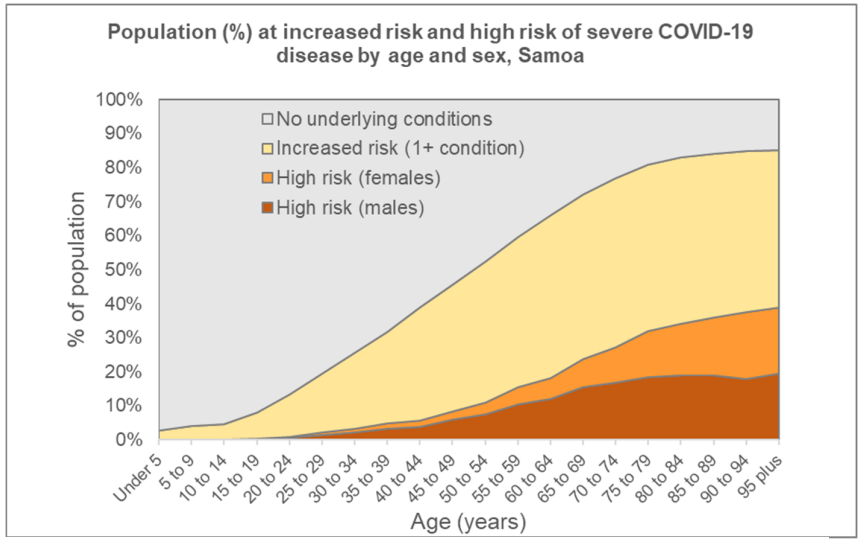


Figure 1: Population at increased risk of COVID-19 shown as a percentage of the total population

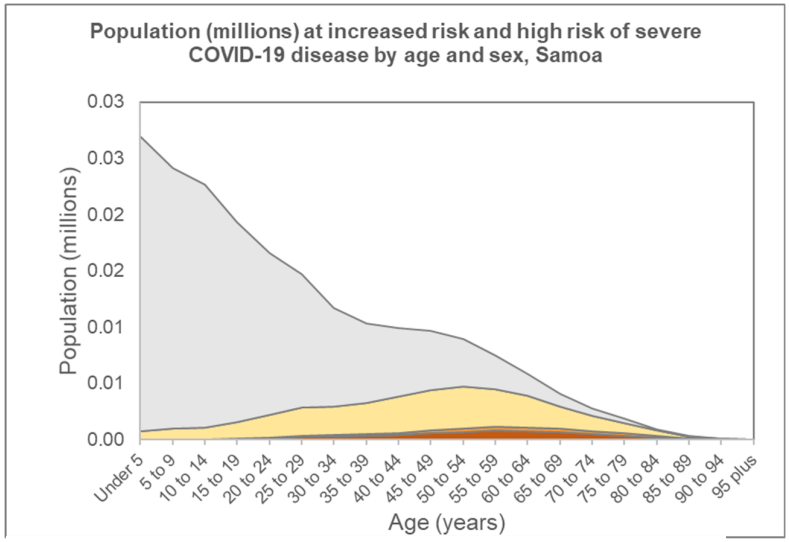


Figure 2: Population at increased risk of COVID-19 shown as the number of people

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers (assumed to be 18–59 years)[2]	**100%**	585	1,170	5,848	11,695
Comorbidities at high risk[3], excluding HCW	**3%**	248	495	2,477	4,954
	20%	1,651	3,303	16,514	33,029
	40%	3,303	6,606	33,029	66,058
	60%	4,954	9,909	49,543	99,087
	80%	6,606	13,212	66,058	132,116
	100%	8,257	16,514	82,572	165,145
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	1,059	2,117	10,587	21,175
	20%	7,058	14,117	70,583	141,166
	40%	14,117	28,233	141,166	282,332
	60%	21,175	42,350	211,749	423,498
	80%	28,233	56,466	282,332	564,664
	100%	35,291	70,583	352,915	705,830
Adults ≥60 years, excluding those at increased or high risk	**3%**	131	262	1,310	2,619
	20%	873	1,746	8,730	17,461
	40%	1,746	3,492	17,461	34,922
	60%	2,619	5,238	26,191	52,383
	80%	3,492	6,984	34,922	69,844
	100%	4,365	8,730	43,652	87,305
Adults 18–59 years, excluding HCW and those at increased or high risk	**3%**	2,012	4,024	20,120	40,240
	20%	13,413	26,827	134,135	268,269
	40%	26,827	53,654	268,269	536,539
	60%	40,240	80,481	402,404	804,808
	80%	53,654	107,308	536,539	1,073,077
	100%	67,067	134,135	670,673	1,341,347

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	2,450	4,900	24,502	49,005
	20%	16,335	32,670	163,349	326,698
	40%	32,670	65,340	326,698	653,395
	60%	49,005	98,009	490,047	980,093
	80%	65,340	130,679	653,395	1,306,791
	100%	81,674	163,349	816,744	1,633,488
Total population	**3%**	5,952	11,905	59,523	119,046
	20%	39,682	79,364	396,820	793,640
	40%	79,364	158,728	793,640	1,587,280
	60%	119,046	238,092	1,190,460	2,380,920
	80%	158,728	317,456	1,587,280	3,174,560
	100%	198,410	396,820	1,984,100	3,968,200

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country-specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<tr><th rowspan="2">Area of Analysis</th><th rowspan="2">Description</th><th colspan="2">Capability Assessment</th></tr>
<tr><th>Qualitative Assessment</th><th>Traffic Light</th></tr>
<tr><td colspan="4">EPI Coverage and Mass Campaigns</td></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">2019 Coverage for key indicator vaccines</th></tr>
<tr><th>Country estimates</th><th>WHO–UNICEF estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td>96%</td><td>90%</td></tr>
<tr><td>6 weeks</td><td>DTP-HepB-Hib, OPV</td><td>97%</td><td>86%</td></tr>
<tr><td>10 weeks</td><td>DTP-HepB-Hib, OPV</td><td>-</td><td>-</td></tr>
<tr><td>14 weeks</td><td>DTP-HepB-Hib, OPV, IPV</td><td>68%</td><td>58%</td></tr>
<tr><td>12 months</td><td>MMR</td><td>96%</td><td>87%</td></tr>
<tr><td>15 months</td><td>MMR</td><td>59%</td><td>44%</td></tr>
<tr><td>School Entry</td><td>DTP</td><td>-</td><td>-</td></tr>
</table>

Samoa reports mostly high estimated routine vaccine coverage.
Samoa reports having a cMYP in 2018, but not in 2019.
Samoa plans to introduce PCV, Rotavirus, and HPV vaccines in 2020.

Source: Samoa DHS-MICS 2019–20 (Jul 2020); WHO VPD Monitoring: 2020 Global Summary: Samoa; Project Administration Manual: Regional: Systems Strengthening for Effective Coverage of New Vaccines in the Pacific (PAM) (Oct 2018).
</td><td>Samoa reports mostly high routine vaccine coverage. There does not appear to be any routine immunisation program targeting adults, except pregnant women.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough information to rate.</td><td></td></tr>
</table>

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Experience with Mass Campaigns	• Samoa experienced a large and devastating measles outbreak in 2019, with 5,707 cases being reported, as well as 83 deaths and 1,868 hospitalisations. Vaccine coverage at the time was reported as low as 31%, as a result of the deaths of two infants following incorrectly-administered MMR vaccination the previous year, which interrupted the EPI for eight months. A mass vaccination campaign brought the outbreak under control, with the target population of people aged 6 months to 60 years achieving 95% coverage. Source: UNICEF Pacific Islands Effective Outbreak Response Reduces Risk of Measles (20 Jan 2020); Lancet: In the Aftermath: The Legacy of Measles in Samoa (May 2020).	Samoa has very recent experience with mass campaigns that reached a large adult population and achieved very high coverage; e.g. the H1N1 campaign achieved high coverage of its target population. Based on Samoa's measles campaign in 2019 reaching a large portion of the population, Samoa is very well-placed to roll out a COVID-19 mass vaccination campaign.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough information to rate.	
Adult Vaccination Campaigns	• The mass measles immunisation campaign in 2019 reached a target population of people aged 6 months to 60 years, and achieved high coverage. • The target population coverage for H1N1 vaccine was ~90% and H1N1 vaccine coverage for the entire population was 20% in 2010; no other data were available. Source : UNICEF Pacific Islands Effective Outbreak Response Reduces Risk of Measles (20 Jan 2020); Lancet: In the Aftermath: The Legacy of Measles in Samoa (May 2020); WHO H1N1 Vaccine Deployment and Update.			

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Governance				
Leadership and Governance	• Samoa is part of the WHO COVID-19 Pacific Health Sector Support Plan. • Simulation exercises and training activities are being undertaken, targeting nurses, doctors, cleaners, porters, and security guards on the screening and management of people under investigation. Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020).	Limited information publicly available.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.
COVID-19 Vaccine National Policy	• No information publicly available.	No information available.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough information to rate.	Not enough info to rate.

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National Immunisation Technical Advisory Group (NITAG)	• A NITAG exists in Samoa. • No additional information available. Source: WHO VPD Monitoring: 2020 Global Summary: Samoa.	NITAG established.	NITAG established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
Healthcare Workforce (vaccine providers)	• Samoa, an upper-middle-income country, has 17 nurses per 10,000 population, which is slightly lower than the average for LMICs in the Asia–Pacific region (19 nurses per 10,000 population). Source: WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Samoa has an average ratio of nurses/ population.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough information to rate.	
HCW EPI Training	• No information publicly available.	No information available.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out-of-date;	Not enough data to rate.

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			White = not enough information to rate.	
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• Samoa has an agreement in place with the TGA for laboratory testing of medicines under the Pacific Medicines Testing Program. Source: WHO Strengthening Regulation of Medical Pathways in PICs (Feb 2019).	Samoa has an agreement in place with the TGA for laboratory testing of medicines under the Pacific Medicines Testing Program.	Vaccine regulatory pathways are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
Systems in Place for Procurement	• Vaccines and bundled consumables are procured through UNICEF Supply Division and are fully financed by government. • Part of the Regional VII. • Not Gavi-eligible for routine immunisation support. • Eligible for Gavi COVAX AMC. • PCV, Rotavirus, and HPV vaccines are planned for introduction in 2021. Source: UNICEF Supply Annual Report 2019: Annex 1; PAM (Oct 2018); Gavi 92 Economies Eligible to Get COVID-19 Vaccines (31 July 2020).	Vaccines are all procured through UNICEF Supply Division; all funded by government.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established;	

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EPI Funding	• Government of Samoa fully funds vaccine procurement. • Samoa is part of the UNICEF/ADB project that will see a phased co-financing arrangement for the introduction of three new vaccines. Source: PAM (Oct 2018).	Government of Samoa fully funds vaccine procurement.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds <50%; White = not enough information to rate.	
Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• New vaccine project will see the strengthening of cold chains, including the procurement of WHO-prequalified vaccine refrigerators. • There were no data on the storage of vaccines at extreme temperatures. Source: PAM (Oct 2018).	Cold chain is currently being revitalised by the UNICEF/ADB project.	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity;	

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			Red = requires increased capacity; White = not enough information to rate.	
Waste Management	• No information publicly available.	No information available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.
Security Arrangements	• No information publicly available.	No information available.	Has capacity for security surrounding COVID-19 vaccine: Green = good capacity; Amber = some capacity; Red = requires increased	Not enough info to rate.

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			capacity; White = not enough information to rate.	
Immunisation Information Systems				
Individual Immunisation Records	• No information publicly available.	No information available.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough information to rate.	Not enough info to rate.
National Immunisation Register	• No information publicly available.			
Monitoring Vaccine Coverage	• No information publicly available.			

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AEFI Reporting and Management	• No national AEFI review committee but passive system to monitor AEFI in place. Source: WHO VPD Monitoring: 2020 Global Summary: Samoa.	Passive AEFI surveillance system in place but no national AEFI review committee.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.
COVID-19 Surveillance Systems	• Samoa has secured GeneXpert testing for COVID-19 with cartridges available. Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #25 (7 Aug 2020).	Limited information publicly available.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.

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Risk Communication				
Risk Communication Plan	• Samoa requested support for risk communication and community engagement, and health and hygiene promotion in August 2020. • Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #25 (7 Aug 2020).	Samoa has requested support with risk communication, community engagement, and health promotion.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
Community Mobilisation/ NGO	• Samoa has a strong matrix of village councils, community leaders, faith-based organisations, and NGO community groups that could be mobilised to support the communication strategy for the roll-out of the COVID-19 vaccine. • There is no information available to determine if these were used during the mass measles campaign. Source: PAM (Oct 2018).	Samoa has a strong platform for community mobilisation; however, it is not clear to what extent this was used to support health programs in the past. Support could be leveraged for the roll-out of a COVID-19 mass campaign.	Community mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	

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Vaccine Hesitancy	• There is reported vaccine hesitancy in Samoa; however, it is unclear if the measles outbreak has reduced any hesitancy. • WHO has directly linked anti-vaccination messaging to the spread of measles. Source: NewsGP: Anti-Vaccination Advocates Double Down as Measles Kills 50 Samoan Children (2 Dec 2019).	Samoa does have an active vaccine hesitancy community, and any campaign to roll out a COVID-19 vaccine would need to take this into account. Community consultation would need to be conducted to mitigate any impact from the hesitancy, together with efforts to effectively and accurately communicate the benefits and risks of the vaccine, and to proactively address any rumours about the campaign.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough information to rate.	

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Vaccine Enablers	• The UNICEF/ADB project aims to involve a community mobilisation strategy to embrace a partnership model that includes government agencies, MOH, Ministry of Education, Sports and Culture, and Ministry of Women, Community and Social Development, faith-based organisations, and civil society and community-based organisations/representatives. • There is no information available to ascertain whether this has occurred, or whether such mobilisation will be sufficiently progressed to benefit any COVID-19 vaccination campaign. Source: PAM (Oct 2018).	Limited information publicly available.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough information to rate.	Not enough info to rate.

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Summary Analysis – Samoa

Samoa has a young population. Across all age groups there is a high proportion of individuals who are at increased or high risk of severe COVID-19. Those who have one or more underlying conditions equate to 23% of the total population; the global average is 22% of the total population at increased risk and 5% at high risk. These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged between 30 and 69 years.

Samoa demonstrated strong national leadership during the 2019 mass measles immunisation campaign, and could use large community-based organisations and social institutions to mobilise the population to respond positively to a COVID-19 vaccination campaign.

There was limited information available about the governance for the COVID-19 pandemic. However, Samoa is part of the COVID-19 Pacific Health Sector Support Plan.

Samoa has 17 nurses and midwives per 10,000 population, which is average for an LMIC in the Western Pacific Region.

Procurement systems are strong, with support from UNICEF through the VII. There is no publicly-available information about Samoa's regulatory pathways. The government funds 100% of vaccine and program delivery costs. New vaccine introduction will be supported through a UNICEF/ADB project with a phased financing arrangement.

Given the recent measles outbreak and subsequent mass vaccination campaign targeting people aged six months to 60 years, which achieved high coverage quickly, Samoa is very well-placed to roll out a COVID-19 vaccination campaign.

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6. SOLOMON ISLANDS

Country and Healthcare System Background

Geography

- Solomon Islands is a small Pacific nation in the Melanesian region.
- The archipelago comprises more than 900 islands and atolls, and lies within the South Pacific Ocean.
- Solomon Islands is prone to regular natural disasters.

Service Delivery

- Solomon Islands has a small and geographically-dispersed population, which makes access to health services in the outer islands very difficult, expensive, and often only available by sea.
- The EPI sits under the reproductive, maternal, newborn, child and adolescent health (RMNCAH) division at the Ministry of Health and Medical Services (MHMS) in Solomon Islands.
- The MHMS functions as funder, regulator, and provider of nearly all health services.
- NGOs and faith-based service providers play a small but important role, with support from government.
- Solomon Islands has 27 HCW/10,000 population.
- The health service delivery system is based on a network of primary care facilities, and an integrated public health care approach.

Health Financing

- Solomon Islands is classified as a lower-middle-income country.
- The country's economy is largely based on subsistence agriculture, with the farming of some cash crops (cocoa and palm oil) and fishing, forestry, mining, and high foreign aid dependence.
- The two main sources of financing for health are general internal revenue through the government (e.g. taxes), and external development partners, which together account for 94% of total health expenditure.
- The health system provides a high degree of financial risk protection, as only 6% of total health spending is from household out-of-pocket sources.

COVID-19 Situation Summary

- Solomon Islands has reported 16 cases of COVID-19 (as at November 2020).

Source: APO Solomon Islands Health System Review (2015); WHO COVID-19 Western Pacific Situation Report #30 (25 Nov 2020).

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Population Data

- Total population in 2020 is 686,878.
- From that total, 25% of the population live in urban areas and 75% live in rural areas.
- The population with comorbidities at high risk, requiring hospitalisation if infected, is 23,682 – which equates to 3% of the total population.
- The population at increased risk, with one or more underlying conditions that increase risk for severe COVID-19, is 144,525 – which equates to 21% of the total population.
- Populations at risk of severe COVID-19 are distributed across age groups, with the majority aged 30–69 years, as shown in Figures 1 and 2.

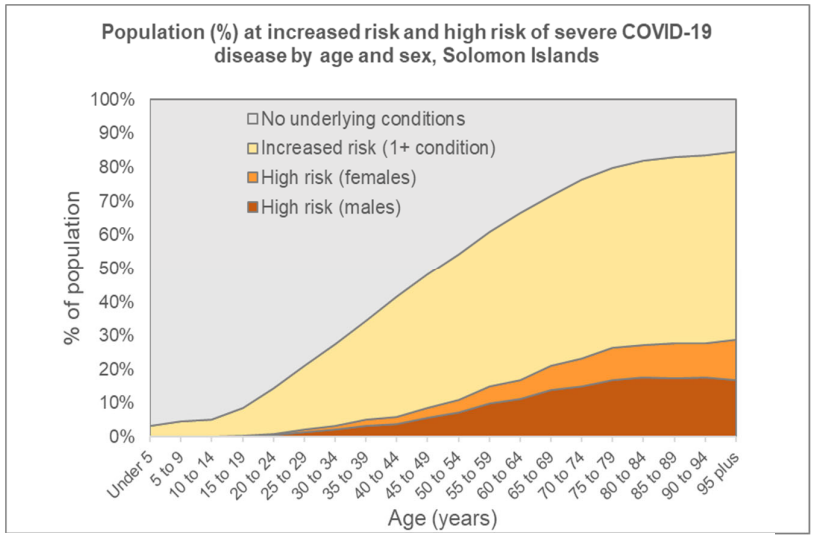


Figure 1: Population at increased risk of COVID-19 shown as a percentage of the total population

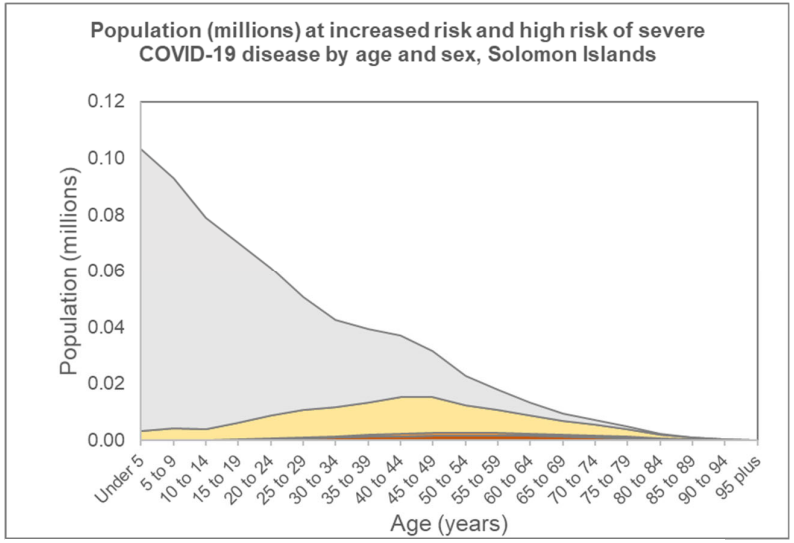


Figure 2: Population at increased risk of COVID-19 shown as the number of people

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers[2]	**100%**	1,860	3,721	18,604	37,208
Comorbidities at high risk[3], excluding HCW	**3%**	655	1,309	6,547	13,093
	20%	4,364	8,729	43,644	87,288
	40%	8,729	17,458	87,288	174,576
	60%	13,093	26,186	130,932	261,865
	80%	17,458	34,915	174,576	349,153
	100%	21,822	43,644	218,221	436,441
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	3,569	7,139	35,695	71,389
	20%	23,796	47,593	237,964	475,928
	40%	47,593	95,186	475,928	951,855
	60%	71,389	142,778	713,891	1,427,783
	80%	95,186	190,371	951,855	1,903,710
	100%	118,982	237,964	1,189,819	2,379,638
Adults ≥60 years, excluding those at increased or high risk	**3%**	316	633	3,165	6,330
	20%	2,110	4,220	21,099	42,197
	40%	4,220	8,439	42,197	84,395
	60%	6,330	12,659	63,296	126,592
	80%	8,439	16,879	84,395	168,790
	100%	10,549	21,099	105,494	210,987
Adults 18–59 years, excluding those HCW and those at increased or high risk	**3%**	6,846	13,693	68,465	136,929
	20%	45,643	91,286	456,430	912,860
	40%	91,286	182,572	912,860	1,825,721
	60%	136,929	273,858	1,369,290	2,738,581
	80%	182,572	365,144	1,825,721	3,651,441
	100%	228,215	456,430	2,282,151	4,564,301

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	9,052	18,104	90,519	181,037
	20%	60,346	120,691	603,457	1,206,914
	40%	120,691	241,383	1,206,914	2,413,828
	60%	181,037	362,074	1,810,371	3,620,742
	80%	241,383	482,766	2,413,828	4,827,656
	100%	301,728	603,457	3,017,285	6,034,570
Total population	**3%**	20,606	41,213	206,063	412,127
	20%	137,376	274,751	1,373,756	2,747,512
	40%	274,751	549,502	2,747,512	5,495,024
	60%	412,127	824,254	4,121,268	8,242,536
	80%	549,502	1,099,005	5,495,024	10,990,048
	100%	686,878	1,373,756	6,868,780	13,737,560

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country-specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<tr><td>14 weeks</td><td>DTP-Hep B-Hib, OPV, IPV, PCV</td><td>94%</td><td>94%</td></tr>
<tr><td>6 months</td><td>Vitamin A</td><td>-</td><td>-</td></tr>
<tr><td>12 months</td><td>MR, Vitamin A</td><td>81%</td><td>81%</td></tr>
<tr><td>18 months</td><td>MR, Vitamin A</td><td>-</td><td>-</td></tr>
<tr><td>24 months</td><td>Vitamin A</td><td>-</td><td>-</td></tr>
<tr><td>9-14 years, girls only</td><td>HPV</td><td>-</td><td>-</td></tr>
<tr><td>15-49 years females and pregnant women</td><td>Td</td><td>-</td><td>-</td></tr>
</table>

WHO–UNICEF coverage estimates align with administrative coverage.
COVID-19 delayed the introduction of the Rotavirus vaccine; however, planning for its introduction has been resumed.
A national EPI coverage survey was being considered for 2020; it is not clear if this has been delayed due to COVID-19.

</td><td>WHO–UNICEF estimates align with country estimates. Routine coverage has been reasonably consistent over the past few years. MCV2 was only introduced in 2018, and MR1 coverage is not high enough to prevent outbreaks. There have been some difficulties in estimating an accurate target population.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough information to rate.</td><td></td></tr>
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	• An EPI Review was also planned in 2020; it is not clear if this has been delayed due to COVID-19. • In 2019, the Health Information Systems (HIS) Unit at MHMS highlighted two different data sets of population estimates based on the 2009 census. As a result, the population <1 year of age is relatively steady in the new projections, compared with steadily increasing by 2.3% in the old data. • The differences significantly affect the population of children aged under 1 year, which is used as the denominator to calculate the immunisation rate. • There are pockets of low coverage in remote areas within Solomon Islands. • Solomon Islands has a cMYP covering 2016–2020. *Impact of COVID-19 on Routine EPI* • There is no information on the impacts of COVID-19 on the routine EPI; however, some activities have been delayed. Source: Gavi COVID-19 Situation Report #19 (15 Oct 2020); WHO VPD Monitoring: 2020 Global Summary: Solomon Islands; Gavi Joint Appraisal Update Report 2019 [Solomon Islands].			
Experience with Mass Campaigns	• Solomon Islands experienced a large outbreak of measles in 2014–2015 that claimed nine lives and led to 4,600 cases, in response to which there was a nation-wide measles immunisation campaign targeting those aged 6 months to 30 years. Coverage was reportedly 100%. • Analysis of the campaign noted vaccines and supplies were delayed, resulting in the need for the campaign to be rolled out in separate phases, instead of being conducted simultaneously in all provinces. • Measles SIA was conducted in 2012; no coverage data available. • Rubella outbreaks occurred in 2012 and 2015, with the 2012 outbreak resulting in at least 13 children being born with congenital rubella syndrome. • In response to the 2019 Pacific measles outbreak, Solomon Islands undertook a mass measles campaign, targeting children aged from 6 months to 5 years, and reporting 95% vaccination coverage.	Solomon Islands has some experience with mass campaigns, with three in the last decade. Difficulty was noted in the 2014 campaign in achieving a simultaneous national roll-out.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough information to rate.	

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	Source: WHO Solomon Islands Measles Campaign Under Way (14 Oct 2019); Measles Control in Pacific Island Countries and Territories (Nov 2016); WPSAR Outbreak Investigation of Congenital Rubella Syndrome (3 Feb 2016).	Limited experience with mass campaigns in older populations.		
Adult Vaccination Campaigns	• The target population coverage for the H1N1 vaccine was ~75% and H1N1 vaccine coverage for the entire population was 10% in 2010; no other data were available • In 2014, young adults up to 30 years were targeted with an MCV, reportedly achieving high coverage. Source: Measles Control in Pacific Island Countries and Territories (Nov 2016); WHO H1N1 Vaccine Deployment and Update.			
Governance				
Leadership and Governance	• Solomon Islands is part of the WHO COVID-19 Pacific Health Sector Support Plan. • Solomon Islands is part of the WHO-led Joint External Incident Management Team. • There is little publicly-available information about COVID-19 management and response in Solomon Islands. MHMS does appear to update the public through press releases and its official Facebook page, and there are various resources available on the MHMS web page. Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020); Solomon Islands Government Learn About Coronavirus.	There is very little information available about the structure and activities of the MHMS in response to COVID-19, but they are part of the WHO-led Joint External Incident Management Team.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.
COVID-19 Vaccine National Policy	• No information publicly available.	No information available.	COVID-19 vaccine national policy in place:	Not enough

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			Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough information to rate.	info to rate.
National Immunisation Technical Advisory Group (NITAG)	• Solomon Islands does not have a NITAG; however, it does have an EPI Technical Advisory Group. No information is readily available on its roles or how often it meets. Source: WHO VPD Monitoring: 2020 Global Summary: [Solomon Islands]; Gavi Joint Appraisal Update Report 2019 [Solomon Islands].	Solomon Islands does not have a NITAG.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet established; White = not enough information to rate.	
Healthcare Workforce (vaccine providers)	• Solomon Islands has 19 nurses per 10,000 population, which is average for LMICs in the Asia–Pacific region (19 nurses per 10,000 population). • Solomon Islands MHMS is implementing the Role Delineation Policy health reform, which will help define the package of services for each of the healthcare service delivery points. Source: WHO Global Health Workforce Statistics (Dec 2018); Gavi Joint Appraisal Update Report 2019 [Solomon Islands]; MHMS Role Delineation Policy for Solomon Islands.	Solomon Islands has an average ratio of nurses/ population.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough	

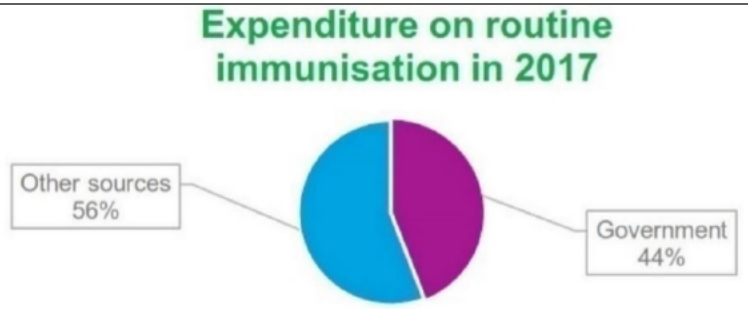
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			information to rate.	
HCW EPI Training	• Effective vaccine management training conducted in 2019. • Healthcare worker training in EPI includes training on the development of health facility micro-plans, effective vaccine management training, and refresher training for health workers across provinces. Source: Gavi Joint Appraisal Update Report 2019 [Solomon Islands].	Good systems appear to be in place to conduct comprehensive EPI training. This will be a strong base on which to build COVID-19 vaccine training for HCW.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out-of-date; White = not enough information to rate.	
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• The system for regulation of medicines and medical devices relies on the National Medicines and Therapeutics Committee to oversee treatment guidelines and evidence-based practice. Wider regulation is conducted by the Pharmacy and Poisons Board, under the *Pharmacy and Poisons Act 1978*. • Legal provisions requiring authorisation to import medicines exist. Laws that allow the sampling of imported products for testing exist. Legal provisions requiring importation of medicines through authorised ports of entry also exist. Regulations or laws to allow for inspection of imported pharmaceutical products at authorised ports of entry exist. • Relevant laws include *Pharmacy and Poisons Act 1978*, *Pharmacy Practitioners Act 1997*, and *Dangerous Drugs Act 1941*. • A National Medicines Policy is in place. • Solomon Islands has an agreement in place with the TGA for laboratory testing of medicines under the Pacific Medicines Testing Program.	Regulatory pathways are in place with the relevant acts. There was no information on the enforcement of these acts.	Vaccine regulatory pathways are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	

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	Source: APO Solomon Islands Health System Review (2015); Solomon Islands Pharmaceutical Country Profile (Jun 2012); SPC Solomon Islands.			
Systems in Place for Procurement	• Vaccines and bundled consumables are procured through UNICEF Supply Division and are not fully funded by government. • Solomon Islands is part of the Regional VII. • Gavi-eligible for routine immunisation support planned to transition in 2022, based on 2019 economic data. • Eligible for Gavi COVAX AMC. • Rotavirus vaccine introduction was planned for 2020 with Gavi support. Source: Gavi COVID-19 Situation Report #19 (15 Oct 2020); WHO VPD Monitoring: 2020 Global Summary: Solomon Islands.	Vaccine procurement is through the UNICEF Supply Division. The country is eligible for Gavi COVAX AMC.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
EPI Funding	• Data for Solomon Islands immunisation expenditure financed with government funds were not available for 2019. In 2018 the percentage was 44%; 2017 = 10%; 2016 = 13%; 2015 = 36%. • Because the EPI Unit is embedded under the larger RMNCAH division, regular monthly reports issued by the finance unit do not break down Government and Donor Partner recurrent expenditure for the EPI unit. • EPI programs in the provinces also seem to be largely funded from Gavi transfers to provincial divisions for service implementation.	Solomon Islands Government is heavily reliant on donor funding to procure vaccines and implement the program. The government only contributed 10% of total expenditure in 2017.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds <50%; White = not enough	

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	 Source: Gavi Solomon Islands Co-Financing Information Sheet (1 Feb 2019); WHO VPD Monitoring: 2020 Global Summary: Solomon Islands; Gavi Joint Appraisal Update Report 2019 [Solomon Islands].		information to rate.	
Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• Essential Vaccines Management (EVM) led to vaccine and cold chain management training, procurement, installation, maintenance and replacement of cold chain equipment, and minimum stock outs, especially in low coverage zones. • Annual cold chain inventory conducted in 2019. • Capacity building for vaccine supply, stock management, and cold chain equipment management conducted in 2019. • Cold chain officers across the 10 provinces and 18 second-level medical stores, in addition to four national officers, have received training on cold chain maintenance. • There was no information on cold chain storage at extreme temperatures. Source: Gavi Joint Appraisal Update Report 2019 [Solomon Islands].	The cold and supply chain has been strengthened, with improved coverage of vaccine refrigerators to remote health clinics. This has improved the ability to conduct outreach. Ability to store the COVID-19 vaccine will depend on	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	

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		the presentation of the vaccine.		
Waste Management	• A vaccine wastage assessment was conducted in 2019; no publicly-available information on the findings (they were expected in November 2019). • Repair/procurement of incinerators conducted in 2019. • Vaccine wastage report completed – implementation of the recommendations from the report were to commence in 2020. Source: Gavi Joint Appraisal Update Report 2019 [Solomon Islands].	Gavi support has seen strengthened waste management at all levels. Support was provided to repair and procure incinerators.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	
Security Arrangements	• No information publicly available.	No information available.	Has capacity for security surrounding COVID-19 vaccine: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.

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Immunisation Information Systems				
Individual Immunisation Records	• No information publicly available on individually-held immunisation records.	Limited information on EPI information systems at lower levels. Gavi support has seen strengthening of national reporting. Support was provided to improve the integration of EPI disaggregated data into DHIS2. The MHMS plans to develop a digital health strategy in 2020. If plans to build on government efforts to introduce National Digital ID data were achieved this could be an excellent way of tracking COVID-19 vaccines to individuals.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough information to rate.	Not enough info to rate.
National Immunisation Register	• No information available on national immunisation register; however, Solomon Islands does use DHIS2 and the immunisation program would also like to build on wider government efforts to introduce National Digital ID data. This could also allow for trackable electronic medical records, which will help in providing immunisation for defaulting children.			
Monitoring Vaccine Coverage	• In 2020, MHMS planned to develop a Digital Health Strategy, overseen by the recently-established National Health Management Information Systems Committee. There is no information available on whether this plan was impacted by COVID-19. • Plans were proposed to strengthen the implementation of existing and upcoming digital health strategies to improve, amongst other things, the national EPI program. This includes strengthening the data management capacity for immunisation at central and regional levels in the country. This will provide strategic investment to strengthen local capacity in Solomon Islands to build a robust immunisation information system, which will ideally be sustained beyond the country's transition from Gavi support in 2023. • In 2005, Solomon Islands established mSupply in 50% of facilities and it does include vaccines. • Solomon Islands is strengthening the integration of EPI and other health data in DHIS2 and ensuring adequate data disaggregation. Source: Gavi Joint Appraisal Update Report 2019 [Solomon Islands].			

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AEFI Reporting and Management	• Solomon Islands does not have an AEFI committee, but there is a passive system to monitor AEFI. Source: WHO VPD Monitoring: 2020 Global Summary: Solomon Islands.	AEFI surveillance is passive and there is no AEFI review committee.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
COVID-19 Surveillance Systems	• MHMS has developed a concept note for strengthening the health system response to COVID-19 along the Solomon Islands/Papua New Guinea border. • The laboratory team in Solomon Islands is setting up COVID-19 testing in remote sites, particularly in the Western Province, bordering Papua New Guinea. • GeneXpert and PCR testing is available in country. Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #25 (7 Aug 2020); WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #27 (4 Sep 2020).	Very little information was available on COVID-19 surveillance. Limited information was gained from WHO Sit Reps. There is the capacity to test for COVID-19, and testing in remote areas at the border with PNG has become an urgent priority for the government.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.

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Risk Communication				
Risk Communication Plan	• The roll-out of the national EPI communication strategy was conducted in 2019. • As at 16 September 2020, Solomon Island Red Cross Society (SIRCS) has mobilised and trained 31 staff in Honiara, Guadalcanal, and at four provincial branches. • Volunteers printed and disseminated government-approved COVID-19 information, education and communication (IEC) material, reaching 28,544 individuals and 638 households. • MOH launched the COVID-19 radio and social media campaign with the following key messages: ○ COVID-19 preparedness, mitigation, and WASH best practice. ○ Non-communicable diseases (NCDs), access to safe water, and routine immunisations. • The MHMS risk communication team is developing a community engagement tool to be used by villages/communities in response to COVID-19. Source: Gavi Joint Appraisal Update Report 2019 [Solomon Islands]; WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #25 (7 Aug 2020); WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #28 (18 Sep 2020).	There was no information available about a risk communication strategy for COVID-19, but there is a risk communication strategy developed and implemented for routine EPI. Media campaigns about COVID-19 are underway but there was no data available.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
Community Mobilisation/ NGO	• Volunteers have been trained in epidemic control to assist the health sector and Honiara City Council in house-to-house awareness campaigns, hygiene promotion, and tracking surveys for COVID-19. • CSO engagement assisted in addressing some of the equity issues around immunisation, taking services and information to remote communities. • Strong partnerships established with local and religious leaders have also been used to maximise reach of campaign messages through church and other community platforms. • MHMS has supported the development of relationships and memoranda of understanding (MOUs) with the major faith-based organisations.	There is strong engagement with CSO and community groups established for routine EPI. These groups could be easily used for the roll-out of the COVID-	Community mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established;	

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	• Source: WHO COVID-19 Joint External Situation Report for Pacific Islands #24 (24 Jul 2020); Gavi Joint Appraisal Update Report 2019 [Solomon Islands].	19 vaccine. However, there was no information available on effectiveness; the systems are in place and appear strong (see also vaccine enablers).	White = not enough information to rate.	
Vaccine Hesitancy	• No information publicly available.	No information available.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough information to rate.	Not enough info to rate.
Vaccine Enablers	• During 2019, activities included: dissemination and implementation of the National Communication Strategy for RMNCAH; advocacy for immunisation; immunisation week activities; strengthening partnership and coordination systems in provinces and zones; and capacity building for communication, community engagement, and equity and gender relevant to immunisation and primary health care. Source: Gavi Joint Appraisal Update Report 2019 [Solomon Islands].	EPI communication strategy included activities such as community engagement.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough information to rate.	

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Summary Analysis – Solomon Islands

In Solomon Islands, 25% of the population live in urban areas and 75% live in rural areas. Access to health facilities is difficult, as the population is geographically dispersed, in hard-to-reach areas.

Solomon Islands has reported 16 cases of COVID-19 as of November 2020. A total of 3% and 21% or the population are at high and increased risk respectively of COVID-19, which is slightly below the global averages of 4% and 22% respectively. These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 30–69 years.

There has been significant strengthening in routine EPI, which has seen coverage improve over the past years. A high portion of the population living in rural areas creates challenges for vaccine delivery. Solomon Islands has some experience with mass campaigns. There does not appear to be a COVID-19 vaccine policy in place.

Solomon Islands has a slightly lower that average number of nurses per population for an LMIC. EPI training has been delivered. AEFI systems will need to be strengthened to capture potential AEFIs from a COVID-19 vaccine.

Procurement systems are strong, with support through the VII. The cold and supply chains are being strengthened. Regulatory pathways are in place with the relevant Acts, however there was no information available on the enforcement of these laws.

There was very little information on the EPI information systems; however, there is a digital health strategy under development.

Community mobilisation is strong, with links to CSOs and faith-based organisations established.

The revitalisation of the EPI since 2008 has seen vaccination coverage and systems strengthened.

Solomon Islands is well-placed to roll out a mass COVID-19 vaccination campaign; and lessons from previous mass campaigns have shown a phased approach may be required.

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7. TONGA

Country and Healthcare System Background

Geography

- Tonga is a small Pacific nation comprised of over 170 islands and islets scattered in a north-south direction over 800 km, of which around 36 are inhabited.
- Tonga experiences somewhat regular tropical cyclones and is vulnerable to earthquakes and the potential of tsunamis.

Service Delivery

- Since the 1950s Tonga has had one of the best overall levels of health within the Pacific due to a dramatic reduction in communicable diseases and maternal and child mortality.
- Health services are predominantly public with a very small private sector. Tertiary services are not available in Tonga and are referred offshore for treatment. Health-care services are decentralised and managed geographically through four health districts which correspond to the main island groups.
- Tonga has 53 HCW/10,000 population.

Health Financing

- Tonga is classed as an upper middle-income country.
- Tonga's economy is driven by tourism and agriculture, forestry and fisheries.
- The Government is the main financer of the health system, providing close to half (47%) of financing in 2007/2008, supplemented by a large degree of donor and development partner funding (38%).

COVID-19 Situation Summary

- Tonga does not have confirmed COVID-19 cases (as at November 2020).

Source: APO Tonga Health System Review (2015); WHO COVID-19 Situation Report Western Pacific Region #30 (25 Nov 2020).

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Population Data

- Total population in 2020 is 105,697.
- From that total, 23% of the population live in urban and 77% live in rural areas.
- Population with high-risk comorbidities, requiring hospitalisation if infected, is 5,513 – which equates to 5% of the total population.
- Population with increased risk, with one or more underlying conditions that increase risk for severe COVID-19, is 26,856 – which equates to 25% of the total population.
- Populations at risk of severe COVID-19 are distributed across age groups, with the majority aged 30–69 years, as shown in Figures 1 and 2.

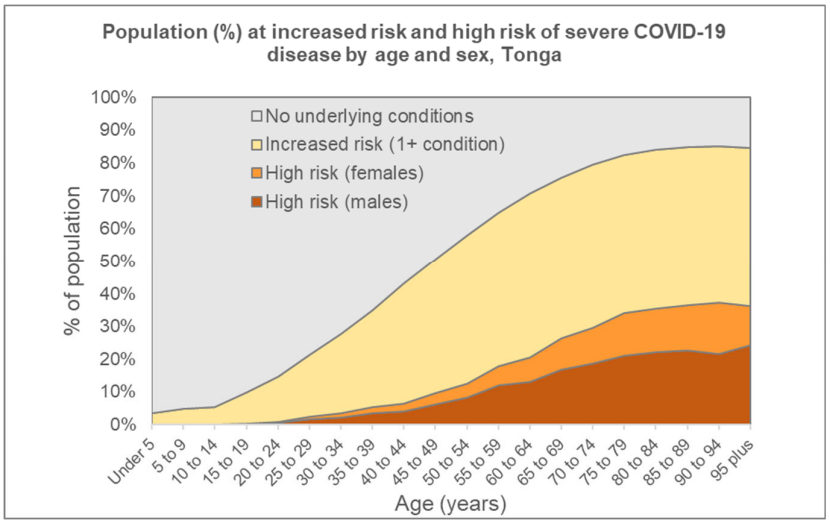


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

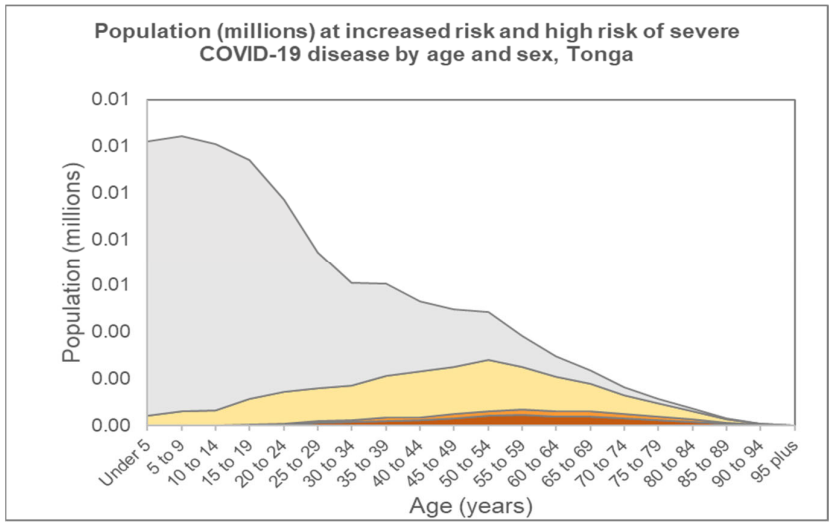


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers[2]	100%	556	1,112	5,559	11,118
Comorbidities at high risk[3], excluding HCW	3%	149	297	1,487	2,974
	20%	991	1,983	9,915	19,830
	40%	1,983	3,966	19,830	39,659
	60%	2,974	5,949	29,744	59,489
	80%	3,966	7,932	39,659	79,319
	100%	4,957	9,915	49,574	99,148
Comorbidities at increased risk[4], excluding HCW and those at high risk	3%	624	1,247	6,236	12,472
	20%	4,157	8,315	41,573	83,146
	40%	8,315	16,629	83,146	166,291
	60%	12,472	24,944	124,719	249,437
	80%	16,629	33,258	166,291	332,583
	100%	20,786	41,573	207,864	415,729
Adults ≥60 years, excluding those at increased or high risk	3%	65	129	646	1,293
	20%	431	862	4,310	8,619
	40%	862	1,724	8,619	17,238
	60%	1,293	2,586	12,929	25,857
	80%	1,724	3,448	17,238	34,476
	100%	2,155	4,310	21,548	43,095
Adults 18–59 years, excluding HCW and those at increased or high risk	3%	1,048	2,095	10,475	20,951
	20%	6,984	13,967	69,836	139,671
	40%	13,967	27,934	139,671	279,342
	60%	20,951	41,901	209,507	419,014
	80%	27,934	55,868	279,342	558,685
	100%	34,918	69,836	349,178	698,356

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	1,236	2,473	12,364	24,728
	20%	8,243	16,485	82,426	164,852
	40%	16,485	32,970	164,852	329,704
	60%	24,728	49,456	247,278	494,555
	80%	32,970	65,941	329,704	659,407
	100%	41,213	82,426	412,130	824,259
Total population	**3%**	3,171	6,342	31,709	63,418
	20%	21,139	42,279	211,394	422,788
	40%	42,279	84,558	422,788	845,576
	60%	63,418	126,836	634,182	1,268,364
	80%	84,558	169,115	845,576	1,691,152
	100%	105,697	211,394	1,056,970	2,113,940

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country-specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th rowspan="2">Area of Analysis</th><th rowspan="2">Description</th><th colspan="2">Capability Assessment</th></tr>
<tr><th>Qualitative Assessment</th><th>Traffic Light</th></tr>
<tr><td colspan="4">EPI Coverage and Mass Campaigns</td></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage 2019
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="3">Coverage for key indicator vaccines</th></tr>
<tr><th>Official country estimates</th><th>WHO–UNICEF estimates</th><th>2019 MICS results</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td>99%</td><td>99%</td><td>98%</td></tr>
<tr><td>6 weeks</td><td>DTP-Hep B-Hib, OPV,</td><td>99%</td><td>99%</td><td>96.4%</td></tr>
<tr><td>10 weeks</td><td>DTP-Hep B-Hib, OPV,</td><td></td><td></td><td></td></tr>
<tr><td>14 weeks</td><td>DTP-Hep B-Hib, OPV, IPV,</td><td>99%*</td><td>99%</td><td>93.5%</td></tr>
<tr><td>12 months</td><td>MR,</td><td>99%</td><td>99%</td><td>88%</td></tr>
<tr><td>18 months</td><td>MR, DTwP</td><td></td><td></td><td></td></tr>
<tr><td>5 years</td><td>DTwP</td><td></td><td></td><td></td></tr>
<tr><td>17 years</td><td>Td</td><td></td><td></td><td></td></tr>
</table>
* Indicates the country reported above 100% coverage

Tonga has very high reported vaccination coverage.
Tonga is planning the introduction of PCV, Rotavirus, and HPV vaccines. A package of support from ADB will see a comprehensive reinvigoration of the EPI program.
Tonga has a cMYP 2017–2020.

Impact of COVID-19 on Routine EPI

COVID-19 has delayed the introduction of the new vaccines until 2021.

</td><td>Reported routine vaccination coverage is high in Tonga.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%.</td><td></td></tr>
</table>

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	Source: WHO VPD Monitoring: 2020 Global Summary: Tonga; PAM (Oct 2018): Appendix 5 Gender Action Plan; Tonga MICS 2019.			
Experience with Mass Campaigns	• In addition to routine outbreak response activities, a time-limited vaccination program targeting secondary school students and infants aged 6 to 11 months was conducted between October and December 2019. Vaccination activities were conducted in January and February 2020 to target children aged 1 to 9 years. • As at 5 February 2020, 656 cases of measles were reported in Tonga. A mass measles vaccination campaign targeted the following groups: extended family contacts of suspected and confirmed cases; adolescents and young adults aged 10 to 24 years; outbound travellers aged 6 months to 24 years without documented evidence of two doses of measles-containing vaccine; and migrant workers and infants aged 6 to 11 months-old. This campaign achieved high vaccination coverage. Source: Ministry of Health Situation Report: Tonga Measles Outbreak 2019–20 (6 Feb 2020).	Tonga has some experience with mass campaigns reaching a population up to 24 years of age. The H1N1 vaccination campaign appears to be a far-reaching campaign and achieved high coverage of the target population.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = being established; White = not enough information to rate.	
Adult Vaccination Campaigns	• The target population coverage for H1N1 vaccine was ~90% and H1N1 vaccine coverage for the entire population was 85% in 2010; no other data were available. Source: WHO H1N1 Vaccine Deployment and Update.			
Governance				
Leadership and Governance	• Tonga is part of the WHO COVID-19 Pacific Health Sector Support Plan. • An inter-disciplinary Ministry of Health Epidemic Taskforce meets weekly to advise on management of the COVID-19 pandemic outbreak. • Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020); Tonga Ministry of Health COVID-19 Information.	There is an interdisciplinary taskforce in place to deal with COVID-19, which meets weekly.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat	

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			established; Red = being established; White = not enough information to rate.	
COVID-19 Vaccine National Policy	• There is no evidence Tonga has a COVID-19 vaccine plan. • Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020).	There is no evidence Tonga has a COVID-19 vaccine plan. However, being part of the WHO COVID-19 Pacific Health Sector Support Plan will likely support the development of the policy.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough information to rate.	
National Immunisation Technical Advisory Group (NITAG)	• Tonga does not have a NITAG. • Source: WHO VPD Monitoring: 2020 Global Summary: Tonga.	No NITAG in place.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet established; White = not enough	

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			information to rate.	
Healthcare Workforce (vaccine providers)	• Tonga has 29 nurses per 10,000 population, which is average for UMICs in the Asia–Pacific region (28 nurses per 10,000 population). Source: WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Tonga has a high average ratio for nurses/ population, which will support the roll-out of the mass COVID-19 vaccination program.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough information to rate.	
HCW EPI Training	• A formal EPI training course will be developed as part of the UNICEF/ADB project that will see the introduction of PCV, Rotavirus, and HPV vaccines into the routine schedule. • Source: PAM (Oct 2018).	Introduction of new vaccines will support the development of training materials for EPI. This could further support training for a COVID-19 vaccination campaign.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out-of-date; White = not enough information to rate.	

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Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• Therapeutic goods regulations (2011) are publicly available online; however, there is no information on how well they are enforced. • There is also a *Pharmacy Act 2001* publicly available online, which outlines the roles and responsibilities of the Pharmacy Board, regulates the registration on pharmacists, and deals with complaints, disciplinary proceedings, and the licensing of pharmacies. • A National Drugs and Medical Supplies Committee is overseen by two pharmacists. • Tonga has an agreement in place with the TGA for laboratory testing of medicines under the Pacific Medicines Testing Program. • Source: Tonga Therapeutic Goods Regulations 2011; Tonga *Pharmacy Act 2001*; WHO Strengthening Regulation of Medical Pathways in PICs (Feb 2019).	Therapeutic goods regulations (2011) are publicly available online; however, there is no information on how well they are enforced; there is an agreement with the TGA for laboratory testing of medicines.	Vaccine regulatory pathways are established: Green = well established and effective; Amber = established and somewhat effective; Red = not established or ineffective; White = not enough information to rate.	
Systems in Place for Procurement	• Vaccines and bundled consumables are procured through UNICEF Supply Division. • Part of the Regional VII. • Not Gavi-eligible for routine immunisation support. • Eligible for Gavi COVAX AMC. • PCV, Rotavirus, and HPV vaccines are planned for introduction in 2021. Source: UNICEF Supply Annual Report 2019: Annex 1; Gavi 92 Economies Eligible to Get COVID-19 Vaccines (31 July 2020); PAM (Oct 2018).	Tonga rarely has vaccine stock outs and vaccines are all procured through UNICEF Supply Division. Tonga also has access to vaccine buffer stock based at a regional cold store in Fiji,	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough	

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		managed by UNICEF Suva, so vaccine can be deployed in the event of stock outs. Eligible for Gavi COVAX AMC.	information to rate.	
EPI Funding	• Data is only available for 2018–2019 that states the government funds 90% of immunisation expenditure. • The government is the main financier of the health system, providing close to half (47%) of financing in 2007–2008, supplemented to a large degree by donor and development partner funding (38%). • Source: WHO VPD Monitoring: 2020 Global Summary: Tonga; APO Tonga Health System Review (2015).	Tonga is reliant on donor funding to support health financing.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government <50%; White = not enough information to rate.	

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Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• Support from the ADB new vaccine introduction will support the revitalisation of the cold chain. Source: PAM (Oct 2018).	Limited information publicly available.	Has capacity to store routine EPI vaccine at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.
Waste Management	• No information publicly available.	No information available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.

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Security Arrangements	• No information publicly available.	No information available.	Has capacity for security surrounding COVID-19: Green = good capacity; Amber = some capacity; Red =requires increased capacity; White= not enough information to rate.	Not enough info to rate.
Immunisation Information Systems				
Individual Immunisation Records	• No information publicly available.	It is not clear whether the DHIS2 will collate individual and aggregated data.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no	Not enough info to rate.
National Immunisation Register	• In 2018, Tonga piloted a DHIS2 to test the possibility of rolling out DHIS2 as a public health information system. A full roll-out is planned. Source: Tonga Health Systems Support Program Phase 2: Mid Term Evaluation Report (25 Apr 2019); Tupaia Fanafana Ola – Implementing DHIS2 in Tonga (31 Jul 2018).			
Monitoring Vaccine Coverage	• Tonga has high reported routine vaccination coverage. Source: WHO VPD Monitoring: 2020 Global Summary: Tonga; Tonga MICS 2019.			

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			individual immunisation record; White = not enough information to rate.	
AEFI Reporting and Management	• Tonga does not have an AEFI review committee, but has a passive national system to monitor AEFI. Source: WHO VPD Monitoring: 2020 Global Summary: Tonga.	AEFI monitoring in Tonga is passive, this will need to be strengthened before a COVID-19 vaccine is rolled out.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
COVID-19 Surveillance Systems	• There was no detailed information available to outline Tonga's COVID-19 surveillance systems; however, Tonga is using GeneXpert for testing.	Limited information publicly available.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not	Not enough info to rate.

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			enough information to rate.	
Risk Communication				
Risk Communication Plan	• UNICEF/ADB project aims to ensure caregivers have improved knowledge and skills to adopt recommended immunisation practices. The project includes the development of communication and social mobilisation plans. Source: PAM (Oct 2018).	The new vaccines project is supporting risk communication and community mobilisation; however, there is no information available on how far this has been developed/ implemented.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.
Community Mobilisation/ NGO	• Part of the UNICEF/ADB project includes support to leverage existing community structures through partnerships with other ministries, non-government and civil society organisations, community and church leaders, and other local community groups to improve public health knowledge, attitudes, and practice for better overall health-seeking behaviour, sexual and reproductive health, and vaccine acceptance. • Source: PAM (Oct 2018).	Limited information publicly available.	Community mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not	Not enough info to rate.

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			enough information to rate.	
Vaccine Hesitancy	• No information publicly available.	No information available.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White =not enough information to rate.	Not enough info to rate.
Vaccine Enablers	• No information publicly available.	No information available.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough information to rate.	Not enough info to rate.

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Summary Analysis – Tonga

Tonga has a largely rural population (with 23% living in urban areas and 77% living in rural areas), spread across many remote islands, with a relatively high proportion of individuals who are at increased or high risk of severe COVID-19. Those who have one or more underlying conditions with increased risk for severe COVID-19 equate to 25% of the total population (global average 22%) and 4% at high risk (global average 4%). These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 30–69 years.

Routine EPI coverage is high, and has strengthened considerably over the past decade. Tonga has some experience with mass campaigns and vaccinations, with the H1N1 vaccine reaching 85% of the population, and a mass measles immunisation campaign that achieved high coverage in 2019 in response to a measles outbreak.

Tonga remains COVID-19 free. An inter-disciplinary Ministry of Health Epidemic Taskforce meets weekly to advise on management of the COVID-19 pandemic outbreak. There is no publicly-available COVID-19 vaccination policy in place, and Tonga does not have a NITAG.

Tonga has a high nurse to population ratio, which will be a strength with the roll-out of a mass vaccination campaign.

Procurement systems are strong, with support from UNICEF through the VII. Regulatory pathways are in place, with support from the TGA in Australia. Government of Tonga will require donor assistance to fund vaccine and program delivery costs.

Tonga was planning the roll-out of DHIS2. If this has occurred, it may assist in the documentation and follow-up of a COVID-19 vaccine roll-out. The AEFI reporting and assessment system will need to be strengthened.

Tonga is donor-dependent for health care financing and may request funding support for COVID-19 vaccine procurement and roll-out. The cold chain system is being strengthened and an effective vaccine storage management (EVSM) assessment has been conducted recently.

Tonga is well-placed to roll out a COVID-19 mass vaccination campaign that will achieve high coverage.

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8. TUVALU

Country and Healthcare System background

Geography

- Tuvalu is a Polynesian island nation comprised of nine atolls, located in the Pacific Ocean, midway between Hawaii and Australia.
- Tuvalu is a small, scattered group of low-lying atolls that have poor soil, and a total land area of only about 26 square kilometres.

Service Delivery

- Tuvalu has one hospital located on the main island of Funafuti; two health clinics, one south and the other north of Funafuti; and eight health centres covering outer islands. These facilities are staffed by nurses who mainly provide primary care and preventive services.
- However, patients needing advanced clinical care that exceed the hospital level are required to travel to overseas hospitals through the Tuvalu Medical Treatment Scheme.
- In Tuvalu, progress has been made in strengthening the health system to tackle emerging health issues, such as the non-communicable diseases epidemic, climate change, and communicable diseases.
- A STEPwise Approach to Non-communicable Disease Surveillance (STEPS) survey conducted in 2015 showed a high rate of obesity among adults aged 18–69 years, with a prevalence of 55.2% in males and 70.7% in females.
- Tuvalu has 77 healthcare workers (HCW)/10,000 population, which is above average for an LMIC in the Asia–Pacific region.
- Most health services are provided by the public health services, but family planning services are jointly provided by the public health services and the Tuvalu Family Planning Association.
- The Ministry of Health has endorsed the National Health Reform Strategy 2016–2019 to improve health management at all levels. The management reform is to support the core business of healthcare delivery.

Health Financing

- Tuvalu is classified as a lower-middle-income country.
- The economy of Tuvalu is constrained by its remoteness and lack of economies of scale.
- Government revenues largely come from fishing licences, direct grants from international donors and development banks, and income from the Tuvalu Trust Fund.

COVID-19 Situation Summary

- Tuvalu does not have any confirmed COVID-19 cases (as at November 2020).

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Source: WHO Tuvalu Country Cooperation Strategy (May 2018); Grey literature: Wikipedia Economy of Tuvalu; WHO COVID-19 Situation Report Western Pacific Region #30 (25 Nov 2020).

Population Data

- Total population in 2020 is 10,577.
- From this total, 23% of the population live in urban areas and 77% live in rural areas.
- Population with comorbidities at high risk, requiring hospitalisation if infected, is 747 – which equates to 7% of the total population.
- Population at increased risk, with one or more underlying conditions that increase risk for severe COVID-19, is 3,137 – which equates to 30% of the total population.
- Populations at risk of severe COVID-19 are distributed across age groups, with the majority aged 30–69 years, as shown in Figures 1 and 2.

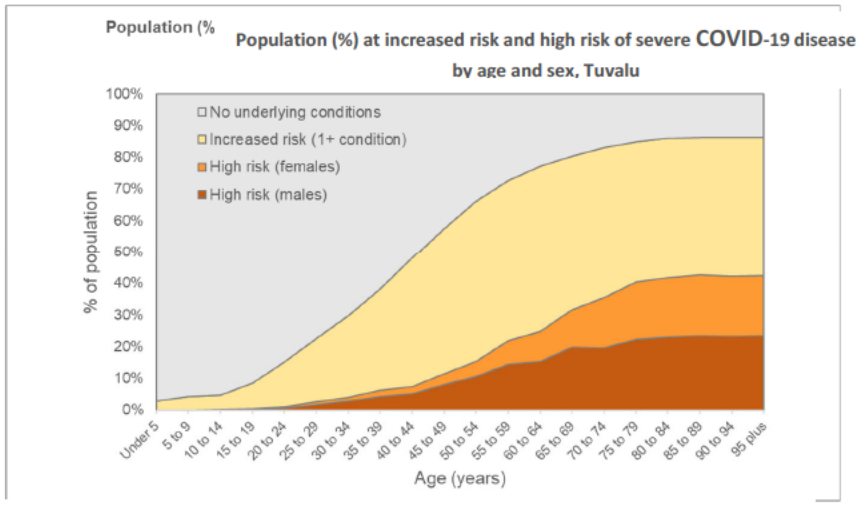


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

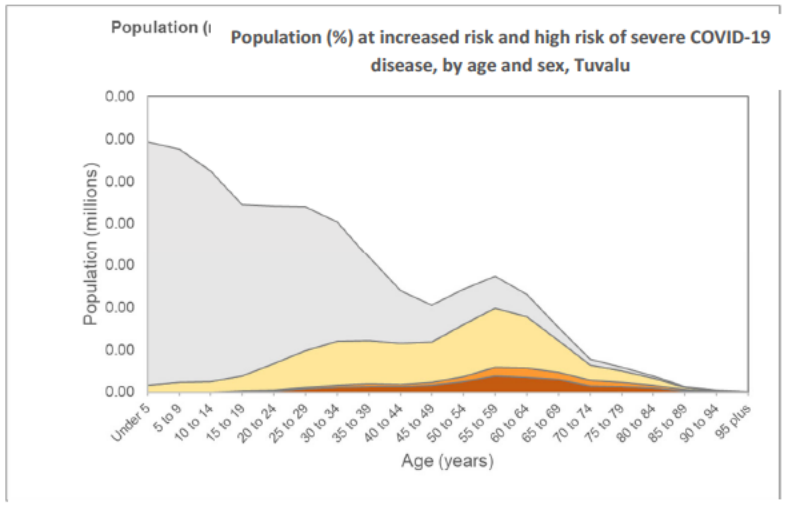


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers[2]	**100%**	77	155	773	1,546
Comorbidities at high risk[3], excluding HCW	**3%**	20	40	201	402
	20%	134	268	1,338	2,677
	40%	268	535	2,677	5,354
	60%	402	803	4,015	8,031
	80%	535	1,071	5,354	10,707
	100%	669	1,338	6,692	13,384
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	69	139	694	1,388
	20%	463	925	4,626	9,251
	40%	925	1,850	9,251	18,503
	60%	1,388	2,775	13,877	27,754
	80%	1,850	3,701	18,503	37,006
	100%	2,313	4,626	23,129	46,257
Adults ≥60 years, excluding those at increased or high risk	**3%**	7	14	68	136
	20%	45	91	453	905
	40%	91	181	905	1,811
	60%	136	272	1,358	2,716
	80%	181	362	1,811	3,621
	100%	226	453	2,263	4,527
Adults 18-59 years, excluding HCW and those at increased or high risk	**3%**	102	203	1,016	2,031
	20%	677	1,354	6,771	13,542
	40%	1,354	2,708	13,542	27,084
	60%	2,031	4,063	20,313	40,627
	80%	2,708	5,417	27,084	54,169
	100%	3,386	6,771	33,856	67,711

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	113	225	1,125	2,251
	20%	750	1,500	7,502	15,004
	40%	1,500	3,001	15,004	30,009
	60%	2,251	4,501	22,507	45,013
	80%	3,001	6,002	30,009	60,018
	100%	3,751	7,502	37,511	75,022
Total population	**3%**	317	635	3,173	6,346
	20%	2,115	4,231	21,154	42,308
	40%	4,231	8,462	42,308	84,616
	60%	6,346	12,692	63,462	126,924
	80%	8,462	16,923	84,616	169,232
	100%	10,577	21,154	105,770	211,540

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country-specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th rowspan="2">Area of Analysis</th><th rowspan="2">Description</th><th colspan="2">Capability Assessment</th></tr>
<tr><th>Qualitative Assessment</th><th>Traffic Light</th></tr>
<tr><td colspan="4">EPI Coverage and Mass Campaigns</td></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage 2019
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines</th></tr>
<tr><th>Official country estimates</th><th>WHO–UNICEF estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td>99%*</td><td>99%</td></tr>
<tr><td>6 weeks</td><td>DTP-Hep B-Hib, IPV</td><td>99%*</td><td>99%</td></tr>
<tr><td>10 weeks</td><td>DTP-Hep B-Hib, IPV</td><td>-</td><td>-</td></tr>
<tr><td>14 weeks</td><td>DTP-Hep B-Hib, IPV</td><td>92%</td><td>92%</td></tr>
<tr><td>12 months</td><td>MR</td><td>96%</td><td>96%</td></tr>
<tr><td>18 months</td><td>MR</td><td>-</td><td>-</td></tr>
<tr><td>5 years</td><td>DTwP</td><td>-</td><td>-</td></tr>
<tr><td>Pregnant women</td><td>Td</td><td>-</td><td>-</td></tr>
</table>
*Indicates the country reported above 100% coverage.

Tuvalu planned to introduce PCV, Rotavirus, and HPV vaccines in 2020.
Tuvalu has EPI Annual Operating Plans in place.

Impact of COVID-19 on Routine EPI

No data available.

Source: WHO VPD Monitoring: 2020 Global Summary: Tuvalu; PAM (Oct 2018).
</td><td>Tuvalu has high routine coverage and WHO–UNICEF agree with their estimates. There does not appear to be any vaccine campaigns targeting adults, except pregnant women.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough information to rate.</td></tr>
</table>

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Experience with Mass Campaigns	• No information publicly available.	No information available.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough information to rate.	Not enough info to rate.
Adult Vaccination Campaigns	• The target population for H1N1 vaccine coverage was ~65% and H1N1 vaccine coverage for the entire population was 15% in 2010; no other data were available. Source: WHO H1N1 Vaccine Deployment and Update.	There is only one reference to a mass campaign targeting the whole population and those at most risk, with the H1N1 vaccine.		
Governance				
Leadership and Governance	• Tuvalu is part of the WHO COVID-19 Pacific Health Sector Support Plan. Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020).	Limited information publicly available.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.

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COVID-19 Vaccine National Policy	• There is no evidence Tuvalu has a COVID-19 vaccine policy. Source: WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #12 (18 Apr 2020).	There is no evidence Tuvalu has a COVID-19 vaccine policy.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough information to rate.	Not enough info to rate.
National Immunisation Technical Advisory Group (NITAG)	• Tuvalu does not have a NITAG. Source: WHO VPD Monitoring: 2020 Global Summary: Tonga.	No NITAG in place.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet established.	
Healthcare Workforce (vaccine providers)	• Tuvalu has 77 nurses per 10,000 population, which is higher than average for UMICs in the Asia–Pacific region (28 nurses per 10,000 population). Source: WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Tuvalu has a high ratio for nurses/ population, which will support the roll-out of a mass COVID-19 vaccination program.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough	

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			information to rate.	
HCW EPI Training	• Not information publicly available.	No information available.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out of date; White = not enough information to rate.	Not enough info to rate
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• The national regulatory pathway is part of the National Drugs and Therapeutics Committee led by the Chief Pharmacist. • Tuvalu has an agreement in place with the TGA for laboratory testing of medicines under the Pacific Medicines Testing Program. Source WHO Strengthening Regulation of Medical Pathways in PICs (Feb 2019); Tuvalu *Pharmacy and Therapeutic Goods Act* (2016).	Tuvalu has regulatory pathways and an agreement with the TGA.	Vaccine regulatory pathways are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	

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Systems in Place for Procurement	• Vaccines and bundled consumables are procured through UNICEF Supply Division. • Part of the Regional VII. • Not Gavi-eligible for routine immunisation support. • Eligible for Gavi COVAX AMC. • PCV, Rotavirus, and HPV vaccines are planned for introduction in 2021. Source: UNICEF Supply Annual Report 2019: Annex 1; ADB PAM 2018; Gavi 92 Economies Eligible to Get COVID-19 Vaccines (31 July 2020).	Vaccines are all procured through UNICEF Supply Division; all funded by government, except for mass campaigns. Eligible for Gavi COVAX AMC.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
EPI Funding	• No primary data are available on the percentage of funding the government provides for EPI. Source: WHO VPD Monitoring: 2020 Global Summary: Tuvalu.	No data available.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds <50%; White = not enough information to rate.	Not enough info to rate.

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Infrastructure and systems for vaccine management				
Cold and Supply Chain	• Tuvalu is part of the UNICEF/ADB project to introduce new vaccines that will revitalise the cold chain. Source: PAM (Oct 2018).	Limited information publicly available.	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.
Waste management	• No information publicly available.	No information available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.

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Security Arrangements	• No information publicly available.	No information available.	Has capacity for security surrounding COVID-19 vaccine: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	Not enough info to rate.
Immunisation Information Systems				
Individual Immunisation Records	• No information publicly available.	No information available.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised;	Not enough info to rate.
National Immunisation Register	• No information publicly available.			
Monitoring Vaccine Coverage	• No information publicly available.			

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			Red = no individual immunisation record; White = not enough information to rate	
AEFI Reporting and Management	• Tuvalu does have an AEFI review committee. Source: WHO VPD Monitoring: 2020 Global Summary: Tuvalu.	AEFI monitoring in Tuvalu is passive; this will need to be strengthened before a COVID-19 vaccine is rolled out.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
COVID-19 Surveillance Systems	• No information publicly available.	No information available.	COVID-19 surveillance system is established: Green = well established and effective; Amber = established and somewhat effective;	Not enough info to rate.

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			Red = not established or ineffective; White = not enough information to rate.	
Risk Communication				
Risk Communication Plan	• No information publicly available.	No information available.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	Not enough info to rate.
Community Mobilisation/ NGO	• Part of the UNICEF/ADB project includes support to leverage existing community structures through partnerships with other ministries, non-government and civil society organisations, community and church leaders, and other local community groups – to improve public health knowledge, attitudes, and practice for better overall health-seeking behaviour, sexual and reproductive health, and vaccine acceptance. Source: PAM (Oct 2018): Appendix 4 Procurement Plans.	Links have been established with CSOs and these could be used to support the roll-out of a mass COVID-19	Community mobilisation/ NGO is established: Green = well established; Amber = somewhat	

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		vaccine campaign.	established; Red = being established; White = not enough information to rate.	
Vaccine Hesitancy	• No information publicly available.	No information available.	Vaccine hesitancy: Green=none or little; Amber=some; Red= present; White = not enough information to rate.	Not enough info to rate.
Vaccine Enablers	• No information publicly available.	No information available.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough information to rate.	Not enough info to rate

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Summary Analysis – Tuvalu

Tuvalu has a young population, with 23% living in urban areas and 77% living in rural areas. The population with comorbidities at high risk, requiring hospitalisation if infected, equates to 7% of the total population. The population with increased risk, with one or more underlying conditions that increase risk for severe COVID-19, equates to 30% of the total population. This is higher than the global averages (22% at increased risk and 4% at high risk). These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 30–69 years.

Tuvalu has a strong EPI program that achieves high coverage despite the geographic challenges of dispersed island atolls. Tuvalu has limited experience with mass immunisation campaigns. Routine EPI will be further strengthened by the UNICEF/ADB-funded new vaccines campaign that will revitalise the whole of EPI.

Tuvalu has no confirmed COVID-19 cases. There does not appear to be a COVID-19 vaccine policy in place or a NITAG.

Tuvalu has a very high ratio of nurses to population, which will be an asset with a mass vaccination campaign roll-out.

Procurement systems are strong, with support from UNICEF through the VII. Regulatory pathways are in place with support from the TGA in Australia.

Tuvalu will require some support to roll out a COVID-19 mass immunisation campaign. Such a campaign will be a challenge due to the remoteness of the outer atolls.

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9. VANUATU

Country and Healthcare System Background

Geography

- The Republic of Vanuatu is located within an archipelago of 83 islands, of which 65 are inhabited, extending over 1,000 kilometres in the South Pacific Ocean.
- The region is subject to a range of natural threats, including relatively frequent tropical cyclones, earthquakes, and volcanic eruptions.

Service Delivery

- Administratively, the country has six provinces. Delivering basic health services to a largely rural population spread across a large group of small islands is a significant challenge for the government.
- EPI sits under the Public Health Unit that aspires to the Healthy Islands vision, the aim of Universal Health Coverage and the Sustainable Development Goals.
- Vanuatu is planning the introduction of PCV, Rotavirus, and HPV vaccines, which have been delayed until 2021 due to COVID-19. The package of support from UNICEF and ADB will see a comprehensive reinvigoration of the EPI program.

Health Financing

- Vanuatu is a lower-middle-income country. Most of Vanuatu's population lives in rural areas, where subsistence farming, fishing, and production of cash crops such as kava, coconut and cocoa, are the main sources of livelihood.
- Major exports are dominated by agricultural products, particularly kava, coconut products, beef, and cocoa.
- Vanuatu's economic growth has been driven largely by tourism and construction. Tourism usually makes up 40% of GDP.
- Health expenditure in Vanuatu is predominantly funded by government (public), from both domestic and external development partner funding sources. In 2014, reported public expenditure on health was 90% of total health expenditure, 6% was out-of-pocket (OOP), and the remaining 4% was a mixture of private health insurance and expenditure by NGOs (World Bank 2016).

COVID-19 Situation Summary

- Vanuatu has reported one case of COVID-19 (as at November 2020).

Source: MOH Vanuatu Directorate Office; WHO COVID-19 Situation Report Western Pacific Region #30 (25 Nov 2020).

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Population Data

- The total population of Vanuatu in 2020 is 307,150.
- From this total, 26% of the population live in urban areas and 74% live in rural areas.
- The population with comorbidities at high risk, who would require hospitalisation if infected, is 12,970 – which equates to 4% of the total population.
- The population at increased risk, who have one or more underlying conditions that increase risk for severe COVID-19, is 68,341 – which equates to 22% of the total population.
- These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 30–59 years, as shown in Figures 1 and 2.

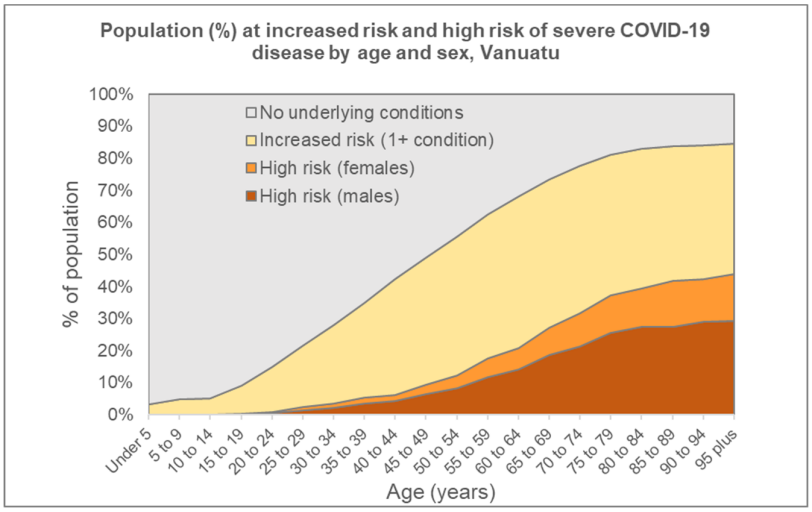


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

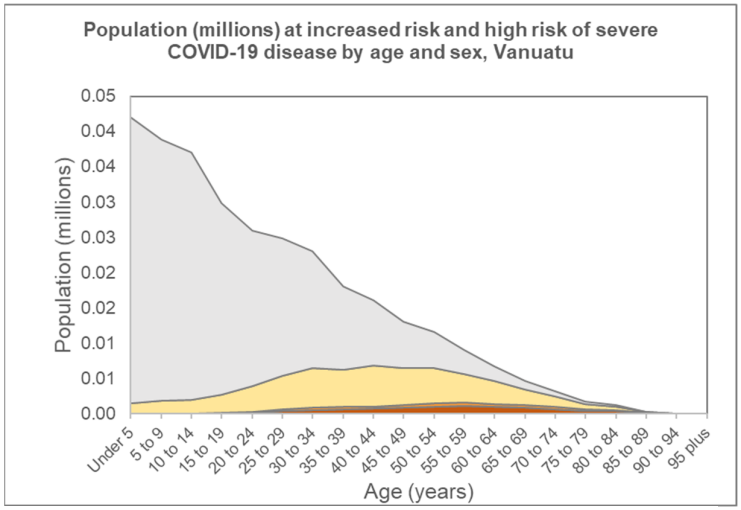


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers[2]	**100%**	758	1,516	7,578	15,156
Comorbidities at high risk[3], excluding HCW	**3%**	366	733	3,664	7,327
	20%	2,442	4,885	24,424	48,848
	40%	4,885	9,770	48,848	97,696
	60%	7,327	14,654	73,272	146,544
	80%	9,770	19,539	97,696	195,391
	100%	12,212	24,424	122,120	244,239
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	1,638	3,277	16,384	32,768
	20%	10,923	21,845	109,227	218,453
	40%	21,845	43,691	218,453	436,906
	60%	32,768	65,536	327,680	655,359
	80%	43,691	87,381	436,906	873,812
	100%	54,613	109,227	546,133	1,092,266
Adults ≥60 years, excluding those at increased or high risk	**3%**	141	282	1,411	2,821
	20%	940	1,881	9,405	18,809
	40%	1,881	3,762	18,809	37,619
	60%	2,821	5,643	28,214	56,428
	80%	3,762	7,524	37,619	75,237
	100%	4,702	9,405	47,023	94,047
Adults 18-59 years, excluding HCW and those at increased or high risk	**3%**	3,130	6,260	31,300	62,600
	20%	20,867	41,733	208,667	417,334
	40%	41,733	83,467	417,334	834,668
	60%	62,600	125,200	626,001	1,252,002
	80%	83,467	166,934	834,668	1,669,336
	100%	104,333	208,667	1,043,335	2,086,670

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	3%	3,870	7,741	38,705	77,409
	20%	25,803	51,606	258,031	516,062
	40%	51,606	103,212	516,062	1,032,125
	60%	77,409	154,819	774,093	1,548,187
	80%	103,212	206,425	1,032,125	2,064,249
	100%	129,016	258,031	1,290,156	2,580,311
Total population	3%	9,215	18,429	92,145	184,290
	20%	61,430	122,860	614,300	1,228,600
	40%	122,860	245,720	1,228,600	2,457,200
	60%	184,290	368,580	1,842,900	3,685,800
	80%	245,720	491,440	2,457,200	4,914,400
	100%	307,150	614,300	3,071,500	6,143,000

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country-specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th>Area of Analysis</th><th>Description</th><th colspan="3">Capability Assessment</th></tr>
<tr><th></th><th></th><th>Qualitative Assessment</th><th colspan="2">Traffic Light</th></tr>
<tr><td colspan="5">EPI Coverage and Mass Campaigns</td></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines</th></tr>
<tr><th>Country Estimates</th><th>WHO–UNICEF Estimates</th></tr>
<tr><td>Birth</td><td>BGC, Hep B</td><td>97%</td><td>97%</td></tr>
<tr><td>6 weeks</td><td>DTP-Hep B-Hib, OPV</td><td>96%</td><td>95%</td></tr>
<tr><td>10 weeks</td><td>DTP-Hep B-Hib, OPV</td><td>-</td><td>-</td></tr>
<tr><td>14 weeks</td><td>DTP-Hep B-Hib, OPV, IPV</td><td>90%</td><td>90%</td></tr>
<tr><td>12 months</td><td>MR1</td><td>80%</td><td>80%</td></tr>
<tr><td>Class 1</td><td>Td</td><td>-</td><td>-</td></tr>
<tr><td>Class 6</td><td>Td</td><td>-</td><td>-</td></tr>
</table>

Despite challenging terrain and hard-to-reach populations, Vanuatu reports high routine EPI coverage.
Vanuatu does not have a cMYP.
Vanuatu planned to introduce PCV, Rotavirus, and HPV vaccines in 2020.

Source: WHO VPD Monitoring: 2020 Global Summary: Vanuatu; PAM (Oct 2018).
</td><td>Vanuatu has made significant improvements in routine EPI coverage over the past decade, with MR1 increasing from 70% in 2010 to 80% in 2019. However, Vanuatu only has one dose of MCV currently on its schedule.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough information to rate.</td><td></td></tr>
</table>

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Experience with Mass Campaigns	• 2013 MR immunisation campaign targeting children aged 1 year to 5 years. • 2015 MR immunisation campaign targeting children aged 6 months to 5 years. • 2016 MDA for trachoma visited every home in Vanuatu. • 2019 MR for children and young people aged 6 months to 15 years, travellers, port staff, air crew, transport and hospitality staff, and health facility-based. Source: WHO Protecting the Children of Vanuatu from Measles (1 May 2015); Vanuatu Immunization Campaign Reaches 37,000 Children (27 Apr 2013); NTD Support Centre MDA Campaign for Trachoma Begins in Vanuatu; Daily Post No Confirmed Measles Case: Ministry (29 Nov 2019).	Vanuatu has some experience with mass campaigns, but only limited data could be found on experience with mass campaigns in adults. However, an MDA did reach every household in 2016. The H1N1 vaccination campaign reportedly reached 10% of the target population.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough information to rate.	
Adult Vaccination Campaigns	• The 2016 Trachoma MDA reportedly did reach every household. • The target population coverage for H1N1 vaccine was 90% and H1N1 vaccine coverage for the entire population was 10% in 2010; no other data were available. Source: NTD Support Centre MDA Campaign for Trachoma Begins in Vanuatu; WHO H1N1 Vaccine Deployment and Update.			
Governance				
Leadership and Governance	• Vanuatu has established an Incident Management Team (IMT) that reports to the National Health Emergency Operations Centre. The following pillars sit under the IMT: ○ Management and coordination. ○ Information and planning. ○ Health operations. ○ Finance, administration, and logistics. • COVID-19 Pacific Health Sector Support Plan initiated by WHO.	It appears Vanuatu has strong leadership for the COVID-19 response, including good support from in-	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat	

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	• Preparation and dissemination of the National Health Sector COVID-19 Preparedness and Response Plan. • Operations pillar manages repatriation and quarantine, including information management, daily monitoring, psychosocial surveys and support, and discharge. Phase 2 commenced 1 August 2020; a total of 139 people were received to 31 August 2020 (mainly returning seasonal workers). Additional repatriation flights planned for Phase 2 from September to December 2020. • Technical support has been provided to infection prevention and control, including: ○ Training for people supporting quarantine procedures and to guide quality control of locally-produced fabric masks and face shields. ○ Risk communications activities, including to manage stigma for those released from quarantine. ○ Defining health measures for safe business operations, including for travel and tourism sectors. ○ Simulation exercises and preparedness are ongoing. Source: MOH COVID-19 Vanuatu Situation Report #13 – 17 April 2020; WHO South Pacific COVID-19 Joint External Situation Report for Pacific Islands #27 (4 Sep 2020).	country partners. COVID-19 Preparedness and Response Plans are being developed with technical support from in-country partners. Vanuatu remains free of COVID-19 community transmission as at November 2020.	established; Red = being established; White = not enough information to rate.	
COVID-19 Vaccine National Policy	• No information publicly available.	No information available.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough	Not enough info to rate.

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			information to rate	
National Immunisation Technical Advisory Group (NITAG)	• Vanuatu does not have an established NITAG. Source: WHO VPD Monitoring: 2020 Global Summary: Vanuatu.	Vanuatu does not have an established NITAG.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet established; White = not enough information to rate.	
Healthcare Workforce (vaccine providers)	• Vanuatu has 17 nurses per 10,000 population, which is slightly lower than average for LMICs in the Asia–Pacific region (19 nurses per 10,000 population). Source: WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Nursing numbers are slightly lower than average, which may pose a challenge to quickly delivering a large-scale mass campaign for COVID-19 vaccine.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough information to rate.	
HCW EPI Training	• No information publicly available.	No information available.	HCW trained in EPI: Green = very recent; Amber = somewhat	Not enough info to rate.

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			recent; Red = out of date; White = not enough information to rate.	
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• Vanuatu has a National Drugs and Therapeutic Committee that is overseen by a pharmacist. • Vanuatu has an agreement in place with the TGA for laboratory testing of medicines under the Pacific Medicines Testing Program. Source: WHO Strengthening Regulation of Medical Pathways in PICs (Feb 2019).	Vanuatu has regulatory pathways; how well these are enforced is not known. Vanuatu has an agreement with the TGA on medicines testing.	Vaccine regulatory pathways are established: Green = well established; Amber = somewhat established; Red = being established; White =not enough information to rate.	
Systems in Place for Procurement	• Vaccines and bundled consumables are procured through the UNICEF Supply Division for both routine and mass campaigns. • Part of the Regional VII. • Not Gavi-eligible for routine immunisation support. • Eligible for Gavi COVAX AMC. • PCV, Rotavirus, and HPV vaccines are planned for introduction in 2021.	Vanuatu rarely has vaccine stock outs and vaccines are all procured through UNICEF's Supply Division, with	Vaccine procurement systems are established: Green = well established; Amber = somewhat	

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	Source: UNICEF Supply Annual Report 2019: Annex 1; PAM (Oct 2018); Gavi 92 Economies Eligible to Get COVID-19 Vaccines (31 July 2020).	donor support for routine and for mass campaigns.	established; Red = being established; White = not enough information to rate.	
EPI Funding	• Vanuatu did not report the proportion of government funding for routine EPI in 2019; they reported to have financed 48% of immunisation expenditure in 2018, 17% in 2017, 8% in 2016, and 25% in 2015. Information identifying donors is not available. Source: WHO VPD Monitoring: 2020 Global Summary: Vanuatu.	Vanuatu relies on donor funding to support immunisation expenditure; this will also be required for the COVID-19 vaccine roll-out.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds <50%; White =not enough information to rate.	
Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• New UNICEF/ADB vaccine project will see the strengthening of cold chain, including the procurement of WHO-prequalified vaccine refrigerators. • All cold chain equipment is procured through UNICEF. • Data on vaccine storage at more extreme temperatures, of the kind required for certain COVID vaccines, was not available.	Cold chain is currently being revitalised by the UNICEF/ADB project.	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity;	

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	Source: MOH Vanuatu EPI Unit; PAM (Oct 2018).		Amber = some capacity; Red = requires increased capacity; White = not enough information to rate.	
Waste Management	• No information publicly available.	No information available.	Has capacity to manage COVID-19 vaccine waste: Green= good capacity; Amber=some capacity; Red= requires increased capacity; White = not enough information to rate	Not enough info to rate.
Security Arrangements	• No information publicly available.	No information available.	Has capacity for security surrounding COVID-19 vaccine: Green = good capacity; Amber = some capacity;	Not enough info to rate.

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			Red = requires increased capacity; White = not enough information to rate.	
Immunisation Information Systems				
Individual Immunisation Records	• No information publicly available.	No information available.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough information to rate.	Not enough info to rate.
National Immunisation Register	• No information publicly available.			
Monitoring Vaccine Coverage	• No information publicly available.			

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AEFI Reporting and Management	• Vanuatu does not have an AEFI reporting system. Source: WHO VPD Monitoring: 2020 Global Summary: Vanuatu.	Vanuatu does not have an AEFI reporting system.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
COVID-19 Surveillance Systems	• GeneXpert testing available in Vanuatu. • 24 negative tests. • Surveillance has been expanded to include quarantined individuals. • DHIS2 is used for data management. • Syndromic surveillance has been enhanced to detect increases in influenza-like illness or acute respiratory infection in the community. Source: WHO COVID-19 Pacific Islands Situation Report; MOH COVID-19 Vanuatu Situation Report #23 – 01 October 2020.	COVID-19 surveillance systems appear strong and Vanuatu has the capacity to conduct GeneXpert testing. In-country technical support is available for surveillance; there is no information on effectiveness of the surveillance system.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	

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Risk Communication				
Risk Communication Plan	• There is a risk communication pillar under the IMT. • Intensive community awareness campaigns have been undertaken. • Mass multi-media campaigns continue on various platforms, including radio interviews, talkback shows, jingles, SMS messaging, TV, and newspaper. • Increase in social media presence (Facebook). • IEC materials targeting community members and health workers have been developed, translated, and printed. • Formative research in routine EPI new vaccine introduction and COVID-19 disease and vaccine is currently being undertaken by the Australian Regional Immunisation Alliance (ARIA). Results from this research may be useful in informing a risk communication plan. Source: MOH COVID-19 Vanuatu Situation Report 10 – 03 April 2020.	There appears to be a strong risk communication system in place, although there was no information to confirm. Results from formative research may inform this plan. There is strong in-country partner support for communication.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough information to rate.	
Community Mobilisation/ NGO	• Vanuatu has many CSOs and NGOs that have been used to deliver health messaging in the past. • The MDA for trachoma in 2016 used CSOs and NGOs as volunteers. • The Wan Smolbag Theatre company has been used in the past to deliver health messages to the community. Source: Wan Smolbag Theatre.	There was little online about community mobilisation; however, the Wan Smolbag Theatre company has delivered health messages in the past and could help to mobilise communities for a mass COVID-	Community mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough	

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		19 vaccination campaign.	information to rate.	
Vaccine Hesitancy	• No information publicly available.	No information available.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough information to rate.	Not enough info to rate.
Vaccine Enablers	• No information publicly available.	No information available.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough information to rate.	Not enough info to rate.

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Summary Analysis – Vanuatu

Vanuatu has a young population, with 26% of the population living in urban areas, and 74% in rural areas spread across many remote islands. The population with high risk of severe COVID-19 equates to 4% of the total population, and the population with increased risk equates to 22% of the total population. This is equal to the global averages (22% at increased risk and 4% at high risk). These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 30–69 years.

Vanuatu has a strong EPI system and coverage has steadily increased over the past few years.

Although coverage is reportedly high nationally, there are pockets of low coverage, usually on the remote islands. Vanuatu has some experience with mass campaigns, including a trachoma MDA in 2016 that reportedly 'reached every household'; lessons from this campaign would be valuable in rolling out a COVID-19 vaccination campaign.

There appears to be a strong government-led response to COVID-19, which is well supported by in-country technical support from partner agencies.

Vanuatu has average numbers of nurses per population, which could pose a challenge for delivering a mass campaign.

Procurement systems are strong, with support from UNICEF through the VII. Regulatory pathways are in place, with support from the TGA in Australia. The government does not appear to fully fund vaccine procurement.

An active AEFI system will need to be established.

Risk communication appears to have been strengthened through COVID-19, and there has been use of social media and NGOs.

Vanuatu is well-placed to achieve high coverage with a COVID-19 mass vaccination campaign, with significant donor and technical support.

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Desk-Based Vaccine Capability and Gap Analysis

Southeast Asian Countries

24 November 2020

Strategic input on health to the Australian Government

Specialist Health Service

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Executive Summary

This is a desk-based analysis of vaccine delivery capability and gaps in selected Southeast Asian countries. The analysis includes a regional and country level overview of vaccine delivery systems, identifying existing strengths and gaps for potential further support. The purpose of the analysis was to collate publicly-available data to inform the early consultations of the Australian Department of Foreign Affairs and Trade (DFAT) with Southeast Asian countries, following Australia's AUD 500 million commitment to the Pacific and Southeast Asia over the period 2020–2021 to 2022–2023.[1]

The Southeast Asian countries assessed through the analysis are:

1. Cambodia
2. Indonesia
3. Lao PDR
4. Myanmar
5. Philippines
6. Timor-Leste
7. Vietnam.

DFAT engaged two experienced consultants to undertake this work, through the Specialist Health Service.

This analysis was completed between October and November 2020. It involved reviewing publicly-available documents only, to avoid duplication of country consultations already underway to complete the COVID-19 Vaccine Introduction Readiness Assessment Tool (VIRAT/VRAF 2.0), led by WHO, UNICEF, and the World Bank.

Data for areas of assessment were collated from public sources at a point in time, noting that the vaccine landscape is rapidly progressing, and an independent analysis was made by the consultants, where publicly available data were available.

Key findings from the desk-based capability and gap analysis are presented in the document below.

[1] The views and recommendations expressed in the publication are those of the authors and do not necessarily reflect the views of the Australian Government.

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Abbreviations and Acronyms

ADB	Asian Development Bank
AEFI	Adverse events following immunisation
AESI	Adverse events of special interest
AMC	Advance Market Commitment
APO	Asia Pacific Observatory on Health Systems and Policies
ARIA	Australian Regional Immunisation Alliance
BCG	Bacillus Calmette-Guérin [vaccine]
BNPB	National Disaster Management Agency [Indonesia]
CCE	Cold chain equipment
CDC	Centers for Disease Control and Prevention [United States]
cMYP	Comprehensive multi-year plan
COVAX	COVID-19 Vaccines Global Access [initiative]
DFAT	Department of Foreign Affairs and Trade [Australia]
DHIS2	District Health Information Software 2
DHO	District Health Office
DHS	Demographic Health Survey
DILG	Department of Interior and Local Government
DLIs	Disbursement Linked Incentives
DOH	Department of Health
DOT	Department of Tourism
DPS	Division of Pacific Technical Support
DTP	Diphtheria and tetanus toxoids, and whole-cell pertussis
DTP-Hep B-Hib	Diphtheria, tetanus, pertussis, hepatitis B, and *Haemophilus influenzae* type B [vaccine]
eHDF	Electronic health declaration form
EOC VPD	Emergency Operations Centre for Vaccine Preventable Diseases
EPI	Expanded program of immunisation
EVM	Effective vaccine management
EVSM	Effective vaccine storage management
EVMSA	Effective vaccine management supply-chain assessment
FPBS	Fiji Pharmaceutical and Biomedical Services
Gavi	Gavi, The Vaccine Alliance
GBD	Global burden of disease
GDP	Gross domestic product
Global Fund	The Global Fund to Fight AIDS, Tuberculosis and Malaria [also GFATM]
GSK	GlaxoSmithKline
H1N1	Influenza A virus subtype H1N1
HCW	Healthcare workers
Hep B	Hepatitis B
HMIS	Health management information system
HPV	Human papillomavirus
HRC	High-risk communities
HSS	Health systems strengthening

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HTA	Health technology assessment
IATWG	Inter-Agency Technical Working Group
IDA	International Development Association
IEC	Information, education, and communication
IIP	Immunisation in practice
ILI	Influenza-like illness
ILO	International Labour Organization
IMT	Information management technology
INS	National Institute of Health
IPC	Infection prevention and control
IPV	Inactivated polio vaccine
ISDS	Infant sudden death syndrome
JE	Japanese encephalitis
JRF	Junior Research Fellowship
LGUs	Local government units
LMIC	Lower-middle-income country
LMIS	Logistics management information system
MCV	Measles containing vaccine
MDTF	Multi-donor trust fund
MFAT	Ministry of Foreign Affairs and Trade [New Zealand]
MHMS	Ministry of Health and Medical Services
MHS	Municipal Health Services
MOH	Ministry of Health
MOHS	Ministry of Health and Sports
MOF	Ministry of Finance
MMR	Measles, mumps, rubella [vaccine]
MR	Measles and rubella [vaccine]
NCR	National Capital Region
NGO	Non-government organisation
NIP	National Immunisation Program
NITAG	National Immunisation Technical Advisory Groups
NPI	Non-pharmaceutical measures
NRA	Drug Administration (Vietnam)
NVDP	National Vaccine Deployment Plan
OCHA	Office for the Coordination of Humanitarian Affairs [United Nations]
OOP	Out-of-pocket
OPV	Oral poliovirus vaccine
PICTs	Pacific Island Countries and Territories
PCR	Polymerase chain reaction
PCV	Pneumococcal conjugate vaccine
POE	Points of entry
PPE	Personal protective equipment
PQ	Pre-qualification
Puskesmas	Community Health Centre

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RCA	Rapid coverage assessment
RMNCAH	Reproductive, maternal, newborn, child and adolescent health
RRT	Rapid response team
RI	Routine immunisation
RV	Rotavirus vaccine
SAMES	National Medicine Procurement Agency
SARI	Severe acute respiratory illness
SIA	Supplementary immunisation activity
SISCA	Integrated Community Health Services [Timor-Leste]
SOP	Standard operating procedure
SPC	The Pacific Community
Td	Tetanus toxoid and diphtheria [vaccine]
TGA	Therapeutics Goods Administration [Australia]
TT	Tetanus toxoid [vaccine]
UMIC	Upper-middle-income country
UNICEF	United Nations Children's Fund
VII	Vaccine Independence Initiative
VPD	Vaccine-preventable disease
vLMIS	Vaccine logistics management information system
WB	World Bank
WHO	World Health Organization
WPRO	Western Pacific Regional Office

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Glossary

Term	Definition	Source
Administrative coverage	In most countries, 'administrative coverage data' are the number of doses administered to the target population. To estimate percentage immunisation coverage, this number is divided by the total estimated number of people in the target population. The target population groups vary from country to country and are dependent on the national immunisation schedule in place. The coverage estimates calculated using the administrative method can be biased due to inaccurate numerators or denominators. **Numerators may be:** • underestimated (due to incomplete reporting from reporting units or non-inclusion of other vaccinating sources; e.g. private sector, non-governmental organisations); or • overestimated (due to over-reporting from reporting units; e.g. inclusion of other target groups). **Denominator inaccuracies may be due to issues such as:** • population movement; • inaccurate census estimations or projections; and/or • numerous sources of denominator data.	WHO
AEFI	An adverse event following immunisation is any untoward medical occurrence which follows immunisation, and which does not necessarily have a causal relationship with the usage of the vaccine. If not rapidly and effectively dealt with, it can undermine confidence in a vaccine and ultimately have dramatic consequences for immunisation coverage and disease incidence. Alternatively, vaccine-associated adverse events may affect healthy individuals and should be promptly identified to allow additional research and appropriate action to take place.	WHO
Bundled consumables	Vaccines procured through UNICEF Supply Division, come with auto-disable syringes and safety boxes that meet the quantities of vaccines ordered.	
Burn and bury	Incineration of used syringes and needles prior to safe burial of waste. Syringes and needles can be burned via incineration, in metal drums or in open burn pits. Incineration can destroy syringes and needles. Fires burning at temperatures higher than 800˚C kill microorganisms and reduce the volume of waste to a minimum. Properly functioning incinerators ensure the most complete destruction of syringes and needles.	

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Cold chain	The 'cold chain' is a system of storing and transporting vaccines at recommended temperatures from the point of manufacture to the point of use. That is, the role of the cold chain is to maintain the potency of vaccines. There is also a concept called 'reverse cold chain', which is a system of storing and transporting samples at recommended temperatures from the point of collection to the laboratory.	WHO
EPI waste management	A system to safely manage the waste generated through Expanded Programs on Immunisation, including sharps and infectious non-sharps waste.	WHO
EVSM	Effective vaccine storage management Is a system of equipment procurement, installation, operation, and maintenance to ensure that cold stores of vaccine are optimally functional, reducing waste and vaccine damage.	WHO
Gavi AMC IDA	Gavi Advance Market Commitment (AMC) and World Bank International Development Association (IDA)-eligible countries. In an AMC, donors commit funds to guarantee the price of medicines once they have been developed. The AMC provides an innovative financing mechanism for accelerating access to life-saving medicines in low-income countries and reduces the time gap between access to new vaccines in industrialised countries and low-income countries by incentivising pharmaceutical manufacturers to develop and manufacture medicines for diseases more prevalent in low-income countries.	Gavi
Gavi COVAX AMC	The Gavi COVAX AMC forms part of the COVAX Facility, a mechanism hosted by Gavi, the Vaccine Alliance, designed to guarantee rapid, fair, and equitable access to COVID-19 vaccines for every country in the world, rich and poor.	Gavi
LMIC	Lower-middle-income country. Based on a country's Gross National Income (GNI) per capita (which can change with economic growth, inflation, exchange rates, and population), the World Bank classifies countries into low, lower-middle, upper-middle, and high income. Lower-middle-income countries have a GNI of between USD 1,026 and USD 3,995 per capita.	World Bank
Mass immunisation campaigns	Administration of vaccine doses to many people at one or more locations over a short period of time.	Grabenstein J.D., Nevin R.L. Mass immunization programs: principles and standards.

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		Curr. Top. Microbiol. Immunol. 2006; 304:31-51. DOI: 10.1007/3-540-36583-4_3. PMID: 16989263.
mSupply	A logistics management information system (LMIS) for health supplies.	mSupply website
NITAG	National Immunisation Technical Advisory Groups (NITAGs) are multidisciplinary groups of national experts responsible for providing independent, evidence-informed advice to policy makers and program managers on policy issues related to immunisation and vaccines.	WHO
Passive AEFI	An AEFI is defined as any untoward medical occurrence which follows immunisation, and which does not necessarily have a causal relationship with the use of the vaccine. The adverse event may be any unfavourable or unintended sign, an abnormal laboratory finding, a symptom, or a disease. Passive surveillance systems theoretically allow anyone in a country to report and, due to their broad coverage, they can provide the first indication of an unexpected AEFI.	WHO
Regulatory pathways	A regulatory pathway is a mechanism which allows a product to be imported into a country when otherwise it would be unavailable. That could be because it has not been approved yet, has been withdrawn from market, is in shortage, or if a patient is unable to participate in a clinical trial.	WHO
Risk comms	Risk communication plans at country level to promote awareness of vaccine risks and benefits, understand perceptions of risk, and prepare for managing any adverse events and concerns about vaccine safety promptly. Communicating about vaccine safety is always important. It is essential in at least three situations, namely: • explaining properly the benefits and risks of a recommended vaccine; • addressing public concerns and upcoming or persistent rumours about vaccine safety; • preparing to address vaccine safety crises if and when they occur	WHO

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Supplementary immunisation activities	Also known as mass immunisation days, supplementary immunisation activities (SIA) are one of the four pillars of eradication. They are intended to complement, not replace, routine immunisation and are often conducted in response to an outbreak of a vaccine-preventable disease.	Global Polio Eradication Initiative (GEPI)
Supply chain DHIS2	A logistics management information system for digital health commodities.	DHIS2 website
UMIC	Upper-middle-income country. Based on a country's GNI per capita (which can change with economic growth, inflation, exchange rates, and population), the World Bank classifies countries into low, lower-middle, upper-middle, and high income. Upper-middle-income countries have a GNI of between USD 3,996 and USD 12,375 per capita.	World Bank
UNICEF Supply Division	UNICEF's supply and logistics headquarters.	UNICEF
Vaccine enablers	People, policies, and strategies that increase availability and uptake of vaccines.	Paraphrased from WHO article: *Improving vaccination demand and addressing hesitancy*
Vaccine hesitancy	Delay in acceptance or refusal of vaccines despite availability of vaccination services.	WHO
Vaccine Independence Initiative	The Vaccine Independence Initiative (VII) was initiated by UNICEF to address procurement and financing challenges faced by national vaccine programs globally. It allows low- and middle-income countries that can finance their vaccine programs to benefit from UNICEF procuring vaccines on their behalf. Before VII, the experiences of these countries ordering independently, with small volume orders, coupled with their poor credit ratings, resulted in high prices and other challenges. The VII has been providing pooled procurement and bridge-financing support to PICTs since 1995. Currently 13 PICs, including Cook Islands, Fiji, Kiribati, Republic of the Marshall Islands, Federated States of Micronesia, Nauru, Niue, Samoa, Solomon Islands, Tokelau, Tonga, Tuvalu, and Vanuatu, procure their vaccines through the VII procurement and financing mechanism for vaccines and immunisation devices (syringes).	UNICEF

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Methodology

Summary Methodology

- Areas of assessment were based on key components for routine EPI and mass vaccination campaign delivery.
- Data for areas of assessment were collated from public sources at the time of the assessment (October–November 2020).
- Population data:
  - Country population data were sourced from UN World Population Prospects 2019.
  - Data for Healthcare Workers (HCW) were sourced from WHO Global Health Workforce Statistics (Dec 2018).
  - Data for 'vulnerable population at high or increased risk' were sourced from the Lancet Global Health article (2020).
- Collated data were analysed for each area of assessment by country, to assess country-level capacity to deliver a COVID-19 mass vaccination campaign.

Detailed Methodology

Table Summary Data

To determine country readiness for delivering a COVID-19 mass vaccination campaign, data were aggregated on the country's capacity to deliver EPI services, including mass campaigns and surveillance for COVID-19. The areas considered necessary to deliver a successful COVID-19 vaccination campaign and therefore included in this review were: country and healthcare system background, including COVID-19 summary situation and EPI coverage; governance; vaccine access and procurement; infrastructure and systems for vaccine management; immunisation information systems; and risk communication. Internet searches and literature reviews were undertaken to source documents that contained reliable information on the identified areas for analysis. All information in the description column of the table was copied from existing documents, and source documents referenced. This information was then critically reviewed, with a brief capability assessment, as well as overall summary analysis provided for each country. Where data were not available in the public domain, capability assessment and analysis were limited.

Population Data

To estimate the number of healthcare workers in 2020, data on the number of HCW per population were downloaded from the WHO Global Health Observatory data repository (Source: WHO Global Health Workforce Statistics (Dec 2018)). Data were available for the following cadres of HCW: doctors and psychiatrists, nurses and midwives, dentists, pharmacists, laboratory personnel, physiotherapists, social workers in mental health, and biomedical engineers, as well as Environmental and Occupational Health and Hygiene Personnel. Community health workers were not included in this analysis, as the assumption is that they are not based in health facility settings. Where data were missing for HCW cadres, the number was estimated using the Fijian rate for PICs and the rate in Myanmar for Southeast Asian countries, and applied to the relevant country's population. This had a minimal impact on total numbers of HCW, as most cadres and all countries have doctors and nurses who make up the majority of the cohort.

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Data were not available for all years, and some countries showed large variation in rates between years, which suggests variation in data collection methods. To adjust for this, the average rate of HCW was calculated for all available years from 2010 onwards. If no data were available for 2010 onwards, the most recent year of data were taken (environmental health data: Samoa only 2008, Vanuatu only 2007; Myanmar physiotherapists only 2004). To generate one final rate for all HCW in the country, the rates for each cadre were summed to generate the rate of HCW per population for each country. This rate was applied to the 2020 population from the UN population database to generate the number of HCW in 2021 by country.

To estimate the number of people vulnerable to COVID-19 per population, data were extracted from a study that calculated the number of people at high risk and increased risk of COVID-19 infection (Source: Lancet Global Health article (2020)). The study estimated the number of individuals at increased risk of severe disease (defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines published by WHO and public health agencies in the UK and the USA), by age, sex and country for 188 countries and mapping prevalence data for underlying conditions from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020. The number of individuals at high risk (defined as those who would require hospital admission if infected) were calculated using age-specific infection-hospitalisation ratios for COVID-19 (i.e. the number of non-hospitalised cases for each hospitalised COVID-19 case) estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed males were twice as likely as females to be at high risk.

Full detail of the methods used can be found by accessing the source document (Source: Lancet Global Health article (2020)). The Lancet article did not present data on the number of people at high risk and increased risk for Nauru or Tuvalu. Therefore, this was calculated manually using the same methods as the Lancet article, with population data sourced from the Pacific Data Hub, The Pacific Community (SPC), and applying the rates of underlying conditions for the population of Fiji.

Details on the characteristics of the most likely COVID-19 vaccine candidate were not available at the time of writing this report; therefore, the vaccine target population could not be generated. For example, the age group for paediatric COVID-19 vaccine was not available. Once a vaccine candidate is clearer, the target populations and pricing should be updated accordingly.

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Vaccine Capability and Gap Analysis by Country

1. CAMBODIA

Country and Healthcare System Background

Geography

- Cambodia has a total land area of 181,035 square kilometres. Cambodia's landscape is characterised by a low-lying central plain that is surrounded by uplands and low mountains and includes the river basin Tonle Sap (Great Lake), which accounts for 75% of Cambodia's land area and the upper reaches of the Mekong River delta.

Service Delivery

- The Cambodian health market has a wide variety of healthcare providers. While the public sector is dominant in promotion and prevention activities for essential reproductive, maternal, neonatal and child health care, and also control of major communicable diseases, private practitioners remain particularly frequented for curative care.
- There has been a substantial drop in child mortality, to which immunisation has contributed, but momentum needs to be sustained.
- Cambodia has 17 HCW/10,000 population.

Health Financing

- Cambodia is classified as a lower-middle-income country.
- Cambodia's two largest industries are textiles and tourism, while agricultural activities remain the main source of income for many Cambodians living in rural areas.
- Cambodia has three major health financing sources: (1) the government's general revenues; (2) donors' development assistance; and (3) individuals' out-of-pocket (OOP) payments for receiving services. The government and donors finance about the same share (~20% each) of the health sector.
- All vaccines in the national immunisation schedule are provided free of charge in government health facilities.

COVID-19 Situation Summary

- As of 18 November 2020, Cambodia has reported 304 cases of COVID-19.
- 170 contacts are being quarantined at quarantine centres or in hotels in Phnom Penh and in their respective province, and are monitored daily for possible development of symptoms.

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- Twelve clusters of influenza-like illness symptoms have been detected around Cambodia. All have been confirmed as influenza A H3N2 outbreaks and all samples tested (>300) negative for SARS-CoV-2. This supports existing evidence that SARS-CoV-2 is not circulating in the community.

Source: APO Cambodia Health System Review (2015); Cambodia NIP Strategic Plan 2016–2020*; Grey literature: Wikipedia for Cambodian geography and economy; USAID Cambodia Health Financing Profile (May 2016); WPRO COVID-19 Situation Report #16 (19 Oct 2020); WHO Global Health Workforce Statistics (Dec 2018); WHO COVID-19 Western Pacific Situation Report #29 (18 Nov 2020).
*Accessed October 2020; URL no longer found (SHS can provide if required).

Population Data

- The total population of Cambodia in 2020 is 16,718,971.
- From this total, 24% live in urban areas and 76% live in rural areas.
- The population with high-risk comorbidities, who would require hospitalisation if infected, is 628,369, which equates to 4% of the total population.
- The population with increased risk, who have one or more underlying conditions that increase risk of severe COVID-19, is 3,078,851, which equates to 18% of the total population.
- These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 30–69 years, as shown in Figures 1 and 2.

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

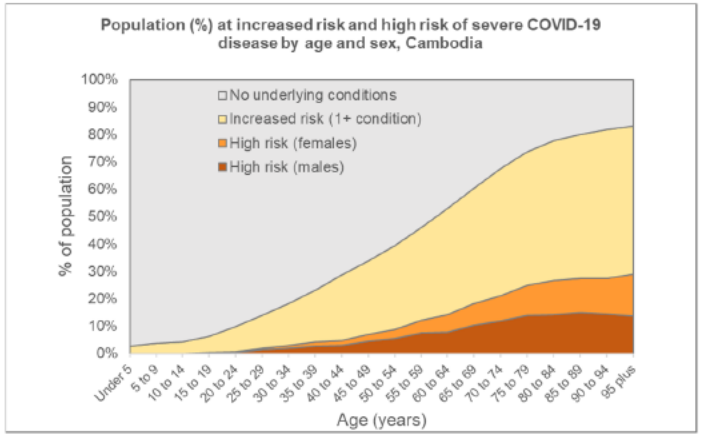


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

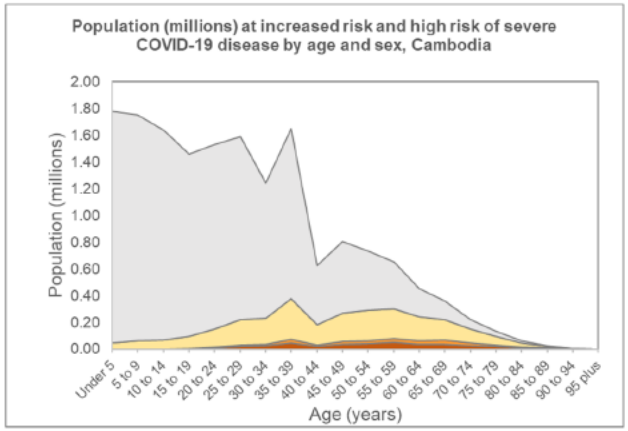


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers[2]	**100%**	29,065	58,130	290,650	581,299
Comorbidities at high risk[3], excluding HCW	**3%**	17,979	35,958	179,791	359,583
	20%	119,861	239,722	1,198,609	2,397,218
	40%	239,722	479,444	2,397,218	4,794,435
	60%	359,583	719,165	3,595,826	7,191,653
	80%	479,444	958,887	4,794,435	9,588,870
	100%	599,304	1,198,609	5,993,044	11,986,088
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	72,642	145,285	726,425	1,452,850
	20%	484,283	968,567	4,842,833	9,685,666
	40%	968,567	1,937,133	9,685,666	19,371,332
	60%	1,452,850	2,905,700	14,528,499	29,056,998
	80%	1,937,133	3,874,266	19,371,332	38,742,664
	100%	2,421,417	4,842,833	24,214,165	48,428,330
Adults ≥60 years, excluding those at increased or high risk	**3%**	14,525	29,050	145,252	290,505
	20%	96,835	193,670	968,348	1,936,697
	40%	193,670	387,339	1,936,697	3,873,394
	60%	290,505	581,009	2,905,045	5,810,091
	80%	387,339	774,679	3,873,394	7,746,787
	100%	484,174	968,348	4,841,742	9,683,484
Adults 18–59 years, excluding HCW and those at increased or high risk	**3%**	219,532	439,065	2,195,325	4,390,649
	20%	1,463,550	2,927,100	14,635,498	29,270,996
	40%	2,927,100	5,854,199	29,270,996	58,541,991
	60%	4,390,649	8,781,299	43,906,494	87,812,987
	80%	5,854,199	11,708,398	58,541,991	117,083,983
	100%	7,317,749	14,635,498	73,177,489	146,354,979

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	174,274	348,548	1,742,740	3,485,479
	20%	1,161,826	2,323,653	11,618,264	23,236,528
	40%	2,323,653	4,647,306	23,236,528	46,473,056
	60%	3,485,479	6,970,958	34,854,792	69,709,585
	80%	4,647,306	9,294,611	46,473,056	92,946,113
	100%	5,809,132	11,618,264	58,091,321	116,182,641
Total population	**3%**	501,569	1,003,138	5,015,691	10,031,383
	20%	3,343,794	6,687,588	33,437,942	66,875,884
	40%	6,687,588	13,375,177	66,875,884	133,751,768
	60%	10,031,383	20,062,765	100,313,826	200,627,652
	80%	13,375,177	26,750,354	133,751,768	267,503,536
	100%	16,718,971	33,437,942	167,189,710	334,379,420

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th rowspan="2">Area of Analysis</th><th rowspan="2">Description</th><th colspan="2">Capability Assessment</th></tr>
<tr><th>Qualitative Assessment</th><th>Traffic Light</th></tr>
<tr><th colspan="4">EPI Coverage and Mass Campaigns</th></tr>
<tr>
<td>Routine Immunisation Schedule and Coverage</td>
<td>
Table 2. Routine immunisation schedule and coverage 2019
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines</th></tr>
<tr><th>Official country estimates</th><th>WHO–UNICEF estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td></td><td></td></tr>
<tr><td>6 weeks</td><td>DTP-Hep B-Hib, OPV, PCV</td><td>>100%</td><td>94%</td></tr>
<tr><td>10 weeks</td><td>DTP-Hep B-Hib, OPV, PCV</td><td></td><td></td></tr>
<tr><td>14 weeks</td><td>DTP-Hep B-Hib, IPV, PCV</td><td>>100%</td><td>92%</td></tr>
<tr><td>9 months</td><td>MR, JE</td><td>>100%</td><td>84%</td></tr>
<tr><td>18 months</td><td>MR</td><td>93%</td><td>82%</td></tr>
<tr><td>9 years</td><td>HPV (2 doses)</td><td></td><td></td></tr>
<tr><td>Pregnant women</td><td>TT (up to 5 doses)</td><td></td><td></td></tr>
</table>

By reviewing the measles and pertussis cases, it is noted that there are pockets of unvaccinated children throughout the country.
Major disparities in immunisation coverage remain, due to variations driven by geographic location, wealth, and maternal education levels.
Populations with low immunisation coverage tend to be in more remote locations or unregistered villages, have high numbers of ethnic minority households or be transient groups, often in urban locations.

Impact of COVID-19 on Routine EPI

Immunisation levels have been maintained, even during the COVID-19 crisis.

</td>
<td>While national coverage rates are high, there are pockets of unimmunised populations, evident from outbreaks of vaccine-preventable diseases (VPDs), including a sustained measles outbreak.

Cambodia has sustained immunisation services throughout the pandemic with the support of UNICEF and WHO.

There is some discrepancy between official</td>
<td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough info to rate.</td>
<td></td>
</tr>
</table>

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	• In the early stages of the COVID-19 pandemic, Ministry of Health (MOH), with support from UNICEF and WHO, issued interim guidelines for health workers. • These guidelines supported frontline health workers in delivering essential health and outreach activities safely, including vaccinations. • Once health workers were prepared, MOH and UNICEF launched a nationwide immunisation campaign, encouraging parents and caregivers to continue using vaccination services. Social media messages, and TV and radio spots addressed concerns parents may have about COVID-19 transmission, while also stressing the importance of immunity from other diseases. Source: WHO VPD Monitoring: 2020 Global Summary: Cambodia; Cambodia NIP Strategic Plan 2016–2020*; UNICEF Protecting Immunisations During COVID-19 (1 Oct 2020). *Accessed October 2020; URL no longer found (SHS can provide if required).	and WHO–UNICEF estimates.		
Experience with Mass Campaigns	• Information not readily available. • Cambodia does conduct multi-antigen catch-ups, and outreach sessions for high-risk communities (HRC) are part of routine immunisation. Source: Gavi Joint Appraisal Report 2019 [Cambodia].	Cambodia does run SIAs and information below suggests they have good micro planning. However, further details on mass campaigns were not available.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough info to rate.	Not enough info to rate.
Adult Vaccination Campaigns	• Information not readily available.			

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Governance				
Leadership and Governance	• Strong leadership and coordination of whole-of-government, and whole-of-society response led by the Prime Minister, with public health actions led by Minister of Health. • National Master Plan for COVID-19 developed with budget of USD 62 million for first year. • The National Master Plan for COVID-19 includes the creation of multi-sectorial provincial committees led by the Provincial Governors. • Incident management systems are comprised of: ○ Inter-Ministerial Committee, chaired by the Minister of Health, with Secretaries of State. ○ National COVID-19 Committee, chaired by Prime Minister. ○ Provincial COVID-19 Committees, chaired by Provincial Governors. ○ Committee on Economic and Financial Policy (CEFP)/Ministry of Economy and Finance (MEF), comprised of four Working Groups to address the socio-economic impacts of COVID-19. Source: WPRO COVID-19 Situation Report #16 (19 Oct 2020).	Leadership for COVID-19 appears to be strong at national and sub-national levels, which could support the introduction of a COVID-19 vaccine.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
COVID-19 Vaccine National Policy	• The National Immunisation Program is drafting the COVID-19 National Deployment and Vaccination Plan (NDVP). • MOH has developed a rapid containment strategy to plan detection and response activities in the event of localised transmission of COVID-19. Source: WPRO COVID-19 Situation Report #16 (19 Oct 2020).	Cambodia is in the process of developing its COVID-19 Vaccine National Policy, with support from technical partners.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough info to rate.	

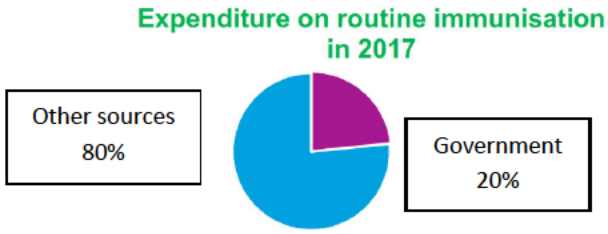
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National Immunisation Technical Advisory Group (NITAG)	• Cambodia has a standing NITAG; however, there was no information on the structure or how often it meets. Source: WHO VPD Monitoring: 2020 Global Summary: Cambodia.	NITAG is in place, but no information on who participates and the group's functionality to allow for further evaluation.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet established; White = not enough info to rate.	Not enough info to rate.
Healthcare Workforce (vaccine providers)	• Workforce planning underway in Cambodia; WHO and International Labour Organization participated in a week-long mission in September 2019 to assist with health workforce planning for the future. Outcomes of these meetings were not available. • Cambodia has 7 nurses per 10,000 population, which is lower than the average for LMICs in the Asia–Pacific region (19 nurses per 10,000 population). Source: WHO Investing in the Health Workforce news feature (7 Nov 2019); WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Cambodia's health system is understaffed. There are plans to improve this; however, current staffing numbers may be a challenge for COVID-19 vaccination.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough info to rate.	
HCW EPI Training	• Conducted national training workshop for all provinces and districts for national implementation in 2019. • NIP planned to conduct health centre level training for service delivery assessment in 2019, but it has been delayed. • Good quality micro-planning process at local level. • Immunisation supply chain management: NIP conducted training of trainers (TOT) in standard operating procedures (SOPs) for immunisation supply chain and logistics management in December 2018 (using Gavi Health Systems Strengthening (HSS) funding).	Training programs have been implemented. Micro-planning capacity is good.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out-of-date;	

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	• UNICEF at zone level provided technical and financial support to train health centre level in five north-east provinces (using USAID/UNICEF funding). A total of 109 health centres (with two staff trained from each health facility) trained in SOP early 2019. • Slow progress in scaling up the training at health centre level was due to delay in HSS funding. Source: Gavi Joint Appraisal Report 2019 [Cambodia].		White = not enough info to rate.	
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• No data readily available.	No information available.	Vaccine regulatory pathways are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.
Systems in Place for Procurement	• Gavi supported and used UNICEF supply chain for vaccine procurement. • With travel restrictions imposed by COVID-19, traditional shipment routes for supplies of vaccines were badly affected. UNICEF's global operational capacity worked hand-in-hand with UNICEF Cambodia to bring sufficient and timely essential vaccines into Cambodia. Source: Gavi Joint Appraisal Report 2019 [Cambodia]; UNICEF Protecting Immunisations During COVID-19 (1 Oct 2020).	Procurement systems are well-established and effective via UNICEF. Procurement was not disrupted in the pandemic.	Vaccine procurement systems are established: Green = well established; Amber = somewhat	

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			established; Red = being established; White = not enough info to rate.	
EPI Funding	• Proportion of government funding for EPI: 2019 = 28%; 2018 = 23%; 2017 = 20%; 2016 = 19%; 2015 = 55%. • The National Immunisation Program (NIP) is a priority program of Government of Cambodia. • The government has committed and increased funding for EPI (there are increased amounts for annual vaccine procurement). • Cambodia has consistently budgeted for vaccine co-financing in 2019; they contributed 28% of vaccine expenditure, which has increased annually since 2016. There is a challenge to absorb some of the recurrent and operational costs, and for now these are covered by Gavi.  Source: Gavi Joint Appraisal Report 2019 [Cambodia]; WHO VPD Monitoring: 2020 Global Summary: Cambodia; Gavi Cambodia Co-Financing Information Sheet (1 Feb 2019).	Immunisations in Cambodia are heavily donor-supported. There have been some increases in government funding since 2016. Operational costs are co-financed by Gavi; however, proportions of Gavi vs. Government funding are not available.	EPI funding: Green = fully government funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds <50%; White = not enough info to rate.	

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Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• Cold chain equipment is ageing and in need of repairs and maintenance. In 2018, 46% of facilities with cold chain refrigerators were >10 years old. • Strong cold chain management systems in place. • Replacement of old cold chain equipment and installation of new cold chain equipment to new health centres, by using Gavi HSS funds, allowed health staff to deliver regular immunisation services closer to the population. • Procurement of cold chain equipment: In 2019, MOH requested to procure cold chain equipment and spare parts through UNICEF with a total of USD 599,280, which was reported to arrive between Jun–Dec 2019. • EVM assessment: NIP decided to conduct the next EVM assessment using the tablet-based tool, EVM 2.0. UNICEF Regional Office introduced the tool to NIP. The tool required that NIP develop capacity by conducting 12 self-assessments (learning by doing) at health facilities, before each of them could be qualified to use the tablet-based tool EVM 2.0. With this prerequisite requirement, Cambodia will shift the planned EVM assessment to early 2020 (no information was available on whether this happened). • Temperature monitoring for vaccine storage: In five north-east provinces, UNICEF staff stationed at the Zone Office provided technical support to collect and analyse the temperature monitoring for vaccine storage by collecting the data from Fridge Tags to understand temperature variations and ensure prompt repairs by a technician. Between January and August 2019, a total of 436 Fridge Tags recording data from 25,724 days were collected. The temperature data was analysed, showing 0.3% (85/25,724) freeze alarms, and 2% (547/25,724) upper temperature alarms, which indicates improvements in cold chain are needed at the sub-national health facilities. Source: Gavi Joint Appraisal Report 2019 [Cambodia].	In 2018 the cold chain equipment was in poor condition, with almost half being >10 years old. Gavi and UNICEF have been working to improve this situation; however, no data were available on the improvements in the last 2 years. Strong cold chain management is reassuring. Data on vaccine storage at more extreme temperatures was not available.	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	

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Waste Management	• No data readily available.	No data available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	Not enough info to rate.
Security Arrangements	• No data readily available.	No data available.	Has capacity for security surrounding COVID-19 vaccine: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	Not enough info to rate.

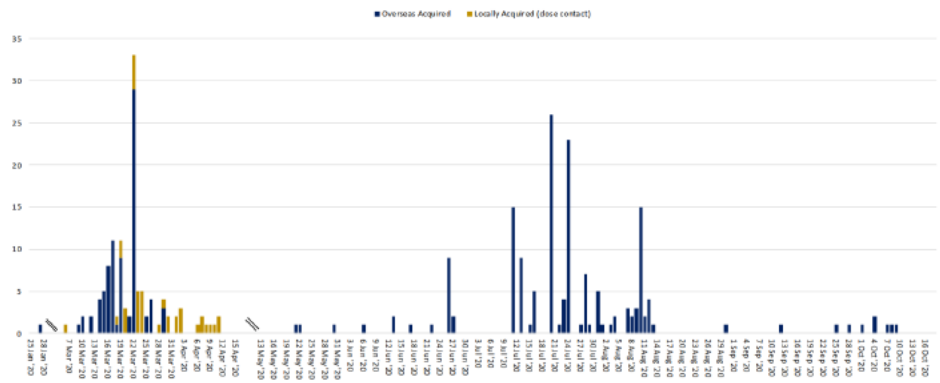
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Immunisation Information Systems				
Individual Immunisation Records	• Individual held 'Child Health Record' or 'yellow card' (parental held) captures all EPI and health milestones. Source: Cambodia NIP Strategic Plan 2016–2020*. *Accessed October 2020; URL no longer found (SHS can provide if required).	Individual paper-based immunisation records exist. The computerised management of the immunisation data system needs to be strengthened; it is not clear if this is individual data or aggregated data.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White= not enough info to rate.	
National Immunisation Register	• Computerised management of the system needs to be strengthened. Source: Cambodia NIP Strategic Plan 2016–2020*. *Accessed October 2020; URL no longer found (SHS can provide if required).			
Monitoring Vaccine Coverage	• Multi-antigen catch-up campaigns through outreach are part of routine immunisation. • Administrative coverage is used to identify areas of low coverage. Source: Gavi Joint Appraisal Report 2019 [Cambodia].			
AEFI Reporting and Management	• Cambodia has an AEFI surveillance and review committee; however, there is no information available on membership or how often they meet. Source: WHO VPD Monitoring: 2020 Global Summary: Cambodia.		AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established;	Not enough info to rate.

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			White = not enough info to rate.	
COVID-19 Surveillance Systems	• As of 16 November 2020, Cambodia has reported 302 cases of COVID-19. • 170 contacts are being quarantined at a quarantine centre in Phnom Penh or in their respective province, and are monitored daily for possible development of symptoms. • Twelve clusters of influenza-like illness (ILI) symptoms have been detected around Cambodia. All have been confirmed as influenza A H3N2 outbreaks and all samples tested (>300) negative for SARS-CoV-2. This supports existing evidence that SARS-CoV-2 is not circulating in the community; however, points to lapses in adherence to non-pharmaceutical intervention (NPI) measures, such as mask wearing, hand hygiene, and respiratory etiquette. • A broad testing strategy is being implemented nationwide, including testing all suspected cases meeting case definition, active surveillance for pneumonia cases in hospitals, testing at points of entry (POEs) at day one and day 13 of a 14-day quarantine, and testing ILI and severe acute respiratory illness (SARI) samples from sentinel sites for COVID-19. • Hot-spot surveillance strategies and targeted testing of high-risk populations are also being implemented as necessary. • Rapid response teams (RRTs) at provincial level have received refresher training to build their surveillance and contact tracing capacities. The training is being cascaded to districts and health centre RRTs. • MOH is conducting national weekly transmission stage assessments using multi-source surveillance. • MOH has trained a further five ILI sentinel sites across the country to strengthen surveillance and early detection for COVID-19. • MOH has developed a rapid containment strategy to plan the detection and response activities in the event of localised transmission of COVID-19, particularly in specific contexts such as schools, pagodas, and prisons. • MOH is progressing with plans to expand and decentralise laboratory testing capacity for COVID-19 to three provincial laboratories.	COVID-19 surveillance is in place nationally, and continues to build capacity with training of HCW at all levels and increasing testing capacity by equipping laboratory facilities in the north and south of the country. Testing for those meeting the case definition (not described) is reported as being done nationwide, as well as active surveillance for pneumonia in hospitals. Some ILI clusters have been detected and confirmed as influenza H3N2 which indicates the surveillance system	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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	Figure 1. Number of confirmed COVID-19 cases by acquisition status and date of positive test  Source: WPRO COVID-19 Situation Report #16 (19 Oct 2020); WHO COVID-19 Western Pacific Situation Report 16 Nov 2020.	is functioning. The COVID-19 Situation Report implies that surveillance is functioning well; however, no information available on case definitions, data management, training or reporting is.		
Risk Communication				
Risk Communication Plan	• A strategy for surveillance using community engagement has been developed and will be piloted for case detection at the health centre level and in the community. • The Ministry of Interior is reinforcing the monitoring of quarantine through follow-up and fines for individuals who do not follow guidelines. • Timely messages disseminated through TV, radio and social media, regular press releases, press conferences, and media briefings. • Targeted communication materials developed for at-risk groups, including migrants and garment factory workers. • Community engagement strategy being rolled out to encompass all aspects of surveillance and response for COVID-19, particularly in the event of community transmission.	Risk communication is being conducted and further strategies to use community engagement for surveillance are in progress.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not	

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	• Developing, printing and distribution of information, education and communication (IEC) materials at health centres and at the community level has increased awareness and demand, especially in hard-to-reach areas/high-risk communities. • Development and airing of video clips for education on the National Immunisation Program on national television increased awareness throughout the country. Source: WPRO COVID-19 Situation Report #16 (19 Oct 2020).		enough info to rate.	
Community Mobilisation/ NGO	• User-friendly and interactive training packages were developed to strengthen the interpersonal communication skills of frontline health workers on immunisation. Source: Gavi Joint Appraisal Report 2019 [Cambodia].	Analysis of community mobilisation methods by the Gavi appraisal suggests innovative approaches are needed. Such approaches appear to have been adopted for the recent risk communications activities for COVID-19, as described in the 'Risk Communication Plan' section above.	Community Mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
Vaccine Hesitancy	• No data readily available.	No data available.	Vaccine hesitancy: Green = none	Not enough

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			or little; Amber = some; Red = present; White = not enough info to rate.	info to rate.
Vaccine Enablers	• No data readily available.	No data available.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough info to rate.	Not enough info to rate.

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Summary Analysis – Cambodia

Cambodia has fared well in the COVID-19 pandemic. As at 18 November 2020, Cambodia has reported 304 cases of COVID-19 and no deaths. Local transmission appears not to have been established. Current surveillance systems have detected clusters of influenza (H2N3) cases, as well as active surveillance in hospitals for pneumonia, which suggests (not conclusively) that undocumented community transmission is not occurring at present.

Cambodia has a young population in general. The proportion of the population who are at increased of severe COVID-19 is 18%, which is lower than the global average of 22%. The proportion of the population at high risk is the same as the global average at 4%.

While national coverage rates are high, there are pockets of unimmunised populations, which result in vaccine-preventable disease (VPD) outbreaks. With support from UNICEF, there have been minimal disruptions to EPI due to COVID-19. Information on mass campaigns were limited, but SIAs have been conducted. There is no publicly available data on mass vaccination campaigns.

Cambodia has shown strong national and sub-national leadership in response to COVID-19. A NITAG is in place, although it is not clear who participates and how often they meet. A national COVID-19 vaccine deployment plan is currently being developed. The healthcare workforce is limited in number and capacity, which will pose challenges for a COVID-19 vaccination campaign.

Regulatory pathways are unclear, but there are good procurement systems via UNICEF, which have been maintained during COVID-19, with support from UNICEF and Gavi. EPI is majority donor-funded.

Cold chain management is good. Data were unavailable for waste management or security.

There is minimal information on individual or national immunisation records, which is of particular importance if COVID-19 is a multi-dose schedule. AEFI surveillance is in place, but minimal data are available.

Risk communication is being conducted and further strategies to use community engagement for surveillance are in progress.

Cambodia is well placed to deliver a mass COVID-19 vaccination campaign, and may request some support from technical partners.

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2. INDONESIA

Country and Healthcare System Background

Geography

- Indonesia is the largest archipelago in the world, with an estimated total of 17,504 islands and a land area of 1,904,569 square kilometres.
- The country is ranked fourth globally in terms of population, at approximately 270 million people.
- This large population includes numerous ethnic, cultural, and linguistic groups, speaking 724 distinct languages and dialects.

Service Delivery

- The Indonesian health system has a mixture of public and private providers and financing.
- The public system is administered in line with the decentralised government system in Indonesia, with central, provincial, and district government responsibilities.
- Human resources for health have grown in the last two decades, with increases in health worker to population ratios. However, the ratio of physician to population is still lower than the WHO-recommended figure, and ongoing geographic disparities exist.
- Indonesia has 21 HCW/10,000 population.
- There is a pronounced shortage of nurses and midwives at both hospital and health facility level, despite the increase in absolute numbers.

Health Financing

- Since July 2020, Indonesia has been classified as an upper-middle-income country (UMIC).
- The economy of Indonesia is the largest in Southeast Asia and is an emerging market economy. Gross domestic product (GDP) by sector is: services 45%; industry 41%; and agriculture 14%.
- Although there has been a substantial increase in health spending at national level, health spending as a proportion of GDP remains below average for UMICs (3.1% of GDP in 2012).
- The government share of total health expenditure also remains low, at only 40%, whereas private, primarily out-of-pocket (OOP) expenditure, is 60%.

COVID-19 Situation Summary

- As of 18 November 2020, there have been 493,308 confirmed cases of COVID-19, and 15,774 deaths in Indonesia.

Source: APO Indonesia Health System Review (2017); Assessing Supply-Side Readiness in Indonesia (Feb 2018); Grey literature: Wikipedia for Indonesian Geography of Indonesia; World Bank, COVID-19 Situation Report #30 – Oct 2020; WHO Global Health Workforce Statistics (Dec 2018); WHO COVID-19 Western Pacific Situation Report #29 (18 Nov 2020).

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Population Data

- The total population of Indonesia in 2020 is 273,523,621.
- A total of 56% of the population live in urban areas and 44% live in rural areas.
- The population with high-risk comorbidities, who would require hospitalisation if infected with COVID-19, is 12,893,608, which equates to 5% of the total population.
- The population with increased risk, who have one or more underlying conditions that increase the risk of severe COVID-19, is 60,675,821, which equates to 22% of the total population.
- These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged between 40–64 years, as shown in Figures 1 and 2.

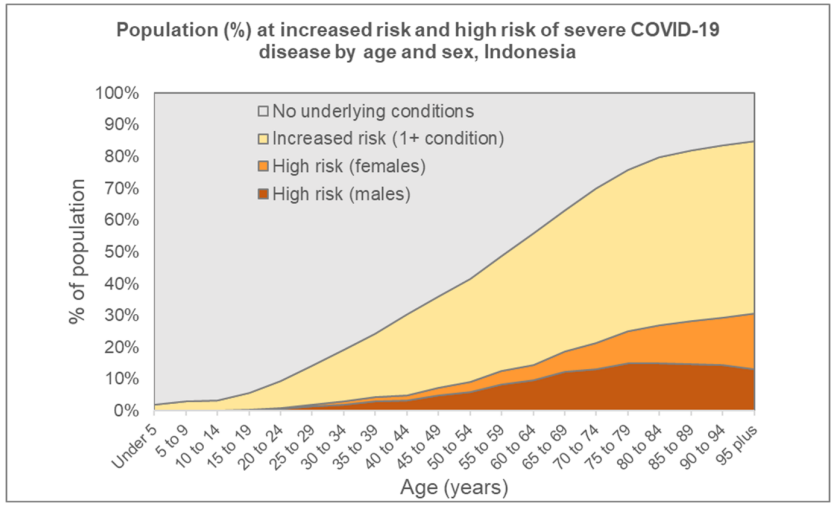


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

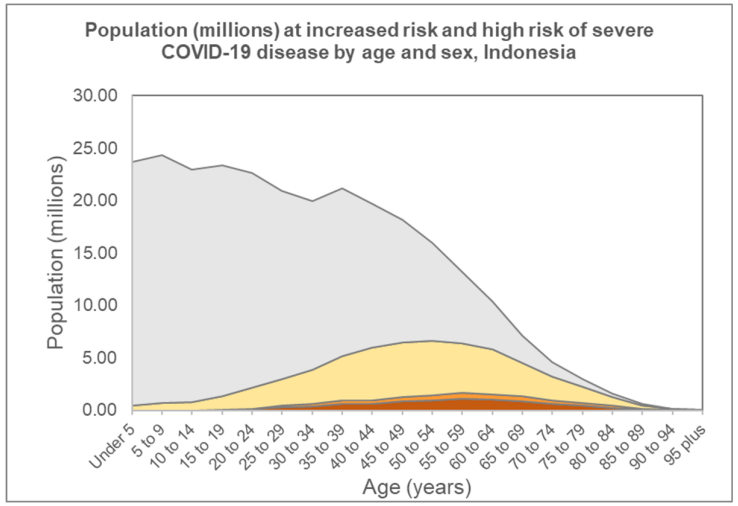


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers[2]	**100%**	574,027	1,148,054	5,740,268	11,480,535
Comorbidities at high risk[3], excluding HCW	**3%**	369,587	739,175	3,695,874	7,391,749
	20%	2,463,916	4,927,833	24,639,163	49,278,326
	40%	4,927,833	9,855,665	49,278,326	98,556,651
	60%	7,391,749	14,783,498	73,917,488	147,834,977
	80%	9,855,665	19,711,330	98,556,651	197,113,302
	100%	12,319,581	24,639,163	123,195,814	246,391,628
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	1,416,246	2,832,491	14,162,456	28,324,912
	20%	9,441,637	18,883,274	94,416,372	188,832,744
	40%	18,883,274	37,766,549	188,832,744	377,665,489
	60%	28,324,912	56,649,823	283,249,117	566,498,233
	80%	37,766,549	75,533,098	377,665,489	755,330,978
	100%	47,208,186	94,416,372	472,081,861	944,163,722
Adults ≥60 years, excluding those at increased or high risk	**3%**	293,899	587,799	2,938,995	5,877,990
	20%	1,959,330	3,918,660	19,593,300	39,186,600
	40%	3,918,660	7,837,320	39,186,600	78,373,200
	60%	5,877,990	11,755,980	58,779,900	117,559,799
	80%	7,837,320	15,674,640	78,373,200	156,746,399
	100%	9,796,650	19,593,300	97,966,499	195,932,999
Adults 18–59 years, excluding those HCW and those at increased or high risk	**3%**	3,609,429	7,218,857	36,094,286	72,188,573
	20%	24,062,858	48,125,715	240,628,576	481,257,151
	40%	48,125,715	96,251,430	481,257,151	962,514,302
	60%	72,188,573	144,377,145	721,885,727	1,443,771,453
	80%	96,251,430	192,502,860	962,514,302	1,925,028,604
	100%	120,314,288	240,628,576	1,203,142,878	2,406,285,755

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	2,464,885	4,929,770	24,648,851	49,297,701
	20%	16,432,567	32,865,134	164,325,671	328,651,342
	40%	32,865,134	65,730,268	328,651,342	657,302,684
	60%	49,297,701	98,595,403	492,977,013	985,954,026
	80%	65,730,268	131,460,537	657,302,684	1,314,605,368
	100%	82,162,835	164,325,671	821,628,355	1,643,256,710
Total population	**3%**	8,205,709	16,411,417	82,057,086	164,114,173
	20%	54,704,724	109,409,448	547,047,242	1,094,094,484
	40%	109,409,448	218,818,897	1,094,094,484	2,188,188,968
	60%	164,114,173	328,228,345	1,641,141,726	3,282,283,452
	80%	218,818,897	437,637,794	2,188,188,968	4,376,377,936
	100%	273,523,621	547,047,242	2,735,236,210	5,470,472,420

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th>Area of Analysis</th><th>Description</th><th colspan="3">Capability Assessment</th></tr>
<tr><th></th><th></th><th>Qualitative Assessment</th><th colspan="2">Traffic Light</th></tr>
<tr><td colspan="5">EPI Coverage and Mass Campaigns</td></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines</th></tr>
<tr><th>Official country estimates</th><th>WHO–UNICEF estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td></td><td></td></tr>
<tr><td>1 month</td><td>OPV</td><td></td><td></td></tr>
<tr><td>2 months</td><td>DTP-Hep B-Hib, OPV, PCV (in selected provinces)</td><td>90%</td><td>90%</td></tr>
<tr><td>3 months</td><td>DTP-Hep B-Hib, OPV, PCV</td><td></td><td></td></tr>
<tr><td>4 months</td><td>DTP-Hep B-Hib, OPV, IPV, PCV (in selected provinces)</td><td>85%</td><td>85%</td></tr>
<tr><td>9 months</td><td>MR</td><td>88%</td><td>88%</td></tr>
<tr><td>10 months</td><td>JE, Bali Province only</td><td></td><td></td></tr>
<tr><td>18 months</td><td>DTP-Hep B-Hib, MR</td><td>71%</td><td>71%</td></tr>
<tr><td>7 years</td><td>MR</td><td></td><td></td></tr>
<tr><td>11–12 years, females</td><td>HPV in selected provinces</td><td></td><td></td></tr>
<tr><td>15–49 years females and pregnant women</td><td>Td</td><td></td><td></td></tr>
</table>

Of the 514 national districts, 71% have coverage DPT3 >80% and 39% have measles coverage >95%.
Coverage varies throughout the country due to variable access to health services, lack of community awareness and knowledge of immunisations, and anti-vaccine groups.

</td><td>Indonesia is wealthier than Cambodia, the Philippines, and Vietnam, but has significantly lower coverage rates for DPT3 and measles immunisation. Immunisation coverage has plateaued in recent years, and there remains as much as a threefold difference in immunisation coverage rates across provinces.

The COVID-19 outbreak has significantly impacted routine immunisation service, which</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough info to rate.</td><td></td></tr>
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	• Measles and VPD (diphtheria) outbreaks suggest immunisation gaps in some areas, despite high national coverage reported. • Service readiness ranges from 69–99% by district and is lower in rural (80%) vs. urban (89%) *puskesmas* (Community Health Centres). *Impact of COVID-19 on Routine EPI* • In April 2020, MOH in Indonesia and UNICEF conducted a 'Rapid Assessment: Impact of COVID-19 Pandemic on Immunization Services in Indonesia'. • Results: in 84% of health facilities, immunisation services were significantly disrupted due to COVID-19 and consequent physical distancing measures. • Reasons cited were: inadequate understanding of the MOH guidance; high risk of local transmission of COVID-19; insufficient funds as a result of diverting support to the outbreak response plan; limited number of dedicated vaccinators who were diverted to tackle the COVID-19 pandemic; transport disruptions due to travel restrictions; closure of schools; and health workers afraid of being infected due to the limited availability of personal protective equipment (PPE). Anecdotal reports show concerns of increased risk of transmission from community members who have just returned from cities with a high prevalence of COVID-19, and an impression that caregivers do not reveal their exposure or comply with the national guideline of 14 days of self-isolation. • A recent immunisation perception survey in Indonesia conducted in July 2020 showed that there is a high demand for safe and timely vaccination services during the COVID-19 outbreak. Respondents strongly supported the government policy to continue immunisation services with safety precautions. • The national immunisation program data shows a decline in vaccination coverage; measles and rubella coverage decreased by 13% between January and March 2020, indicating that thousands of children will be at risk of increased morbidity and mortality from VPD outbreaks. • According to reports from WHO, there has been an increase in monthly vaccination coverage for all available VPDs, ranging from 3% to 41%, from May to June 2020. However, the overall coverage in June 2020 remained 10% to	leaves Indonesia at risk of outbreaks of VPDs. The government has taken measures to improve routine immunisations, which seem to have had some effect.		

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	20% lower than in June 2019 (with the exception of MCV2 and MCV3, which remained stable). • The MOH has issued guidelines based on WHO global guidance, emphasising continuing routine immunisation services while maintaining physical distancing and other infection prevention and control (IPC) measures. • In response to the Rapid Assessment survey and to mitigate the risks of VPDs, the government has identified strategies, such as: partnering with the community to collect data on vaccinations; restoring fixed and outreach sessions, and increasing the frequency of these services; harnessing social media for communication; and engaging local leaders in COVID-19 response efforts. Source: WHO VPD Monitoring: 2020 Global Summary: Indonesia; Indonesia National Immunization Program [Conference presentation] (Oct 2017); Gavi Joint Appraisal Report 2017 [Indonesia]; Assessing Supply-Side Readiness in Indonesia (Feb 2018); Gavi COVID-19 Situation Report #18 (24 Sep 2020); UNICEF Rapid Assessment: Immunization Services in Indonesia (May 2020).			
Experience with Mass Campaigns	• 2017–2018 MR for 6 months–<15 years, target population of almost 50 million children, phase 1 (half of the country's provinces) reported high coverage. • Gavi appraisal and EPI noted the need for technical assistance from partners for mass campaigns. • WHO provided technical support by deploying national and international consultants for a six-month period to provide technical assistance during the campaign. Source: Gavi Joint Appraisal Report 2017 [Indonesia].	Some experience with mass campaigns in children, no information available about mass campaigns in adults. Given the large population, any mass campaign will be very challenging and would require significant technical support.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough info to rate.	
Adult Vaccination Campaigns	• Data not readily available.			

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Governance				
Leadership and Governance	• On 13 March 2020, the Government of Indonesia formed a COVID-19 Operational Taskforce, led by the head of the National Board for Disaster Management (BNPB), with other relevant government agencies. • The Government of Indonesia is strengthening its multilateral cooperation with international partners, including Gavi, UNICEF, and WHO to meet the country's COVID-19 vaccine requirements. • Foreign Minister, Retno Marsudi, State-Owned Enterprises Minister, Erick Thohir, and a team from the Ministry of Health (MOH) undertook an official visit to the United Kingdom, United States, and Switzerland to explore potential cooperation for the procurement and supply of COVID-19 vaccines: ○ Indonesia emphasised the importance of collective support from all states to enable the international community to handle the COVID-19 pandemic. ○ The Indonesian delegates also shared their plans to obtain potential COVID-19 vaccine supplies bilaterally from China, the United Arab Emirates, the Republic of Korea, and the United Kingdom, while Indonesia attempts to develop its own vaccine called 'Merah Putih'. ○ The Indonesian delegates reported on Indonesia's vaccination plan and commitment to maintaining coordination and communication with WHO on all stages of vaccination. • Gavi appraisal noted the need for advocacy to decision-makers (national and sub-national) and parliament relating to budget allocation for immunisations and technical skills. • For the MR mass campaign, the entire government system mobilised from office of the President and Ministries of Education, Religious Affairs, Home Affairs, to provincial and district governments. • Political commitment from high-level officials for routine immunisations at national and sub-national levels was variable. Source: WHO Indonesia COVID-19 Situation Report – 1 (27 Mar 2020); Gavi Joint Appraisal Report 2017 [Indonesia].	Experience from the MR campaign has shown an intergovernmental approach to mass campaigns which would be of benefit to a COVID-19 vaccine campaign. It is clear the Government of Indonesia is very keen to access a COVID-19 vaccine ASAP and has already reached out to countries for support.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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COVID-19 Vaccine National Policy	• Indonesia has such a policy. On 6 October 2020, the Government of Indonesia issued Presidential Regulation No. 99/2020 on Procurement, Coordination and Management of COVID-19 Vaccines. • MOH has developed a National Vaccine Deployment Plan (NVDP), which outlines the planning, implementation, monitoring, and evaluation of vaccine operations: ○ It includes details on the target populations and vaccine deployment strategy. ○ It identifies resource needs for trained health workers, cold chain capacity, and funds to support deployment operations. ○ NVDP is a living document that will be updated as new information becomes available on vaccination. MOH, with support from WHO, has also developed technical guidance for provincial and district health offices, and *puskesmas*, as well as strategies to engage multiple sectors to support vaccination. This guidance outlines planning, implementation, surveillance of adverse events following immunisation (AEFI), and monitoring and evaluation. • National EPI Policy expired in 2019. • The Gavi appraisal noted the need to strengthen the national capacity to formulate evidence-based policies for introduction of new and underused vaccines. • WHO is actively participating in discussions with MOH, the Coordinating Ministry of Economic Affairs, Ministry of National Development Planning (BAPPENAS), Asian Development Bank (ADB), World Bank (WB), Ministry of Communication and Information Technology, and other relevant partners on preparations related to COVID-19 vaccine introduction to Indonesia. • WHO, the Clinton Health Access Initiative (CHAI), Indonesian Technical Advisory Group on Immunisation (ITAGI), UNICEF, US CDC, and other partners are supporting MOH to develop the NVDP, technical guidance and training modules, and also information, education and communication (IEC) materials for COVID-19 vaccination. MOH plans to conduct a simulation exercise for COVID-19 immunisation activities in two locations: Bogor city and Bandung	Indonesia has approved regulations for the approval and procurement of COVID-19 vaccine and has developed a detailed national deployment plan. It has also developed training materials and an IEC strategy for the COVID-19 vaccine. This advanced planning places Indonesia in a good position to roll out a COVID-19 vaccination campaign; however, the large population and geographic disparities still exist, and implementation of the policy will still be a challenge.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough info to rate.	

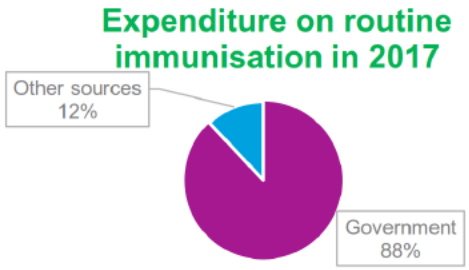
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	district. WHO is assisting with the preparation of the exercise to ensure health protocols are applied according to the immunisation SOP during the COVID-19 pandemic. Source: WHO Indonesia COVID-19 Situation Report – 30 (21 Oct 2020); WHO VPD Monitoring: 2020 Global Summary: Indonesia; Gavi Joint Appraisal Report 2017 [Indonesia].			
National Immunisation Technical Advisory Group (NITAG)	• NITAG in place; role and capacity includes: ○ Conducts comprehensive policy analysis and determines the optimal national immunisation policy. ○ Provides recommendations for new vaccine introduction. ○ Advises national government on the strategy formulation for VPD control. ○ Assists national government to monitor and review the NIP performance and advises on how to strengthen. Source: WHO VPD Monitoring: 2020 Global Summary: Indonesia; Gavi Joint Appraisal Report 2017 [Indonesia].	NITAG in place with responsibilities outlined; however, there is no information on effectiveness.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet established; White = not enough info to rate.	
Healthcare Workforce (vaccine providers)	• Medical doctors, nurses, and midwives provide immunisation services. • Human resources for health have also grown in the last two decades, with increases in health worker to population ratios. However, the ratio of physician or nurse/midwife to population is still lower than the WHO-recommended figure, and ongoing geographic disparities exist. • Indonesia has 15 nurses per 10,000 population, which is lower than the average for upper-middle-income countries in the Asia–Pacific region (28 nurses per 10,000 population). Source: APO Indonesia Health System Review (2017); Gavi Joint Appraisal Report 2017 [Indonesia]; WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Availability and capacity of service providers are major limitations to reaching high vaccine coverage, particularly in hard to reach and peri-urban areas.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough info to rate.	

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HCW EPI Training	• High turnover of staff related to government policy results in variation in HCW training. • Shortages of trained staff continue to limit the service readiness at health facilities of all types. • Strengthening Technical Assistance for Routine Immunisation Training (START) project in partnership with WHO and CDC, to build capacity of district-level EPI officers and health centre staff. • Lack of service guidelines at many facilities. • One of the frustrations often voiced by MOH central-level staff is their inability to compel districts to provide services adhering to national standards. Source: Gavi Joint Appraisal Report 2017 [Indonesia]; Assessing Supply-Side Readiness in Indonesia (Feb 2018).	HCW shortages are significant, quality of training is variable, and EPI training is in place with technical support from partners.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out of date; White = Not enough info to rate.	
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• National Regulatory Authority: ○ Assesses and evaluates vaccine safety, efficacy, and qualification, prior to national marketing authorisation. ○ Conducts comprehensive pre- and post-marketing control on vaccine safety, in collaboration with the National Committee of AEFI. ○ Develops and implements pharmacovigilance for vaccine use in both the public and private services. ○ Involved in preventing counterfeit vaccine. ○ Indonesia manufactures vaccines, including: pentavalent vaccine, and now developing IPV by Bio Farma in partnership with Sanofi. Source: Gavi Joint Appraisal Report 2017 [Indonesia].	Regulatory authority exists and appears functional; Indonesia has the ability to manufacture its own vaccines.	Vaccine regulatory pathways are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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Systems in Place for Procurement	• Indonesia procures vaccines through the UNICEF supply division. • The Pharmaceutical Unit of MOH procures vaccines and bundled consumables through an e-purchasing mechanism. Source: Indonesia National Immunization Program [Conference presentation] (Oct 2017); Gavi Joint Appraisal Report 2017 [Indonesia]	There appear to be effective systems in place for procurement through UNICEF.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
EPI Funding	• Proportion of government funding has steadily increased since 2014. In 2017, the government financed 88% of EPI services. • Pentavalent vaccine is fully funded by government and manufactured locally (Bio Farma). • Indonesia was Gavi-supported in 2019.  Source: WHO VPD Monitoring: 2020 Global Summary: Indonesia, Gavi Joint Appraisal Report 2017 [Indonesia]; GAVI Indonesia.	The Government of Indonesia is funding the majority of EPI costs. In addition, the country has capacity to locally manufacture vaccines.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds <50%; White = not enough info to rate.	

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Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• In 2017, cold chain maintenance was carried throughout the country (34 provinces, 514 districts, and 9,705 health centres), which concluded that >90% of the cold chain system was functioning. • Cold chain equipment (CCE) has been procured via government and Gavi cost sharing; in 2017, 92% of health centres were using standard CCE with an expected target of 100% in 2018. • Due to high operational costs in remote areas, the government uses Sustained Outreach Services to provide immunisation services to these communities. Source: Indonesia National Immunization Program [Conference presentation] (Oct 2017); Gavi Joint Appraisal Report 2017 [Indonesia].	Recent cold chain assessment conducted with >92% of health centres using standardised CCE; outreach is available for remote areas that do not have adequate CCE. Ability of the cold chain to store COVID-19 vaccine cannot be assessed until the presentation of the vaccine is known. Data on vaccine storage at more extreme temperatures was not available.	Has capacity to store routine EPI vaccine at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	
Waste Management	• No data readily available.	No data available.	Has capacity to manage COVID-19 vaccine waste: Green = good capacity; Amber = some capacity;	Not enough info to rate.

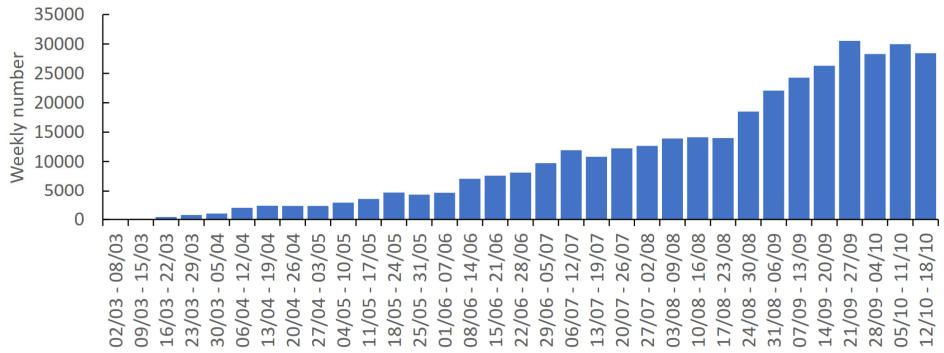
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			Red = requires increased capacity; White = not enough info to rate.	
Security Arrangements	• No data readily available	No data available.	Has capacity for security surrounding COVID-19 vaccine: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	Not enough info to rate.
Immunisation Information Systems				
Individual Immunisation Records	• No data readily available.	Indonesia has an electronic web-based recording system; however, a decentralised system is noted to be challenging. There are disparities	Individual immunisation record captured by the service provider: Green = electronic centralised individual	
National Immunisation Register	• The health information system was a priority for a HSS Gavi grant. • A Web Immunisation Recording and Reporting System is being developed (2017). The country's decentralised health system poses challenges for the proposed web-based immunisation record. Source: Gavi Joint Appraisal Report 2017 [Indonesia].			

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Monitoring Vaccine Coverage	• Disparities between administrative data and coverage surveys. • Reporting systems are being strengthened to improve discrepancies. • Private sector reporting is poor and often use vaccines in single dose presentation e.g. IPV and hexavalent vaccines. Source: Gavi Joint Appraisal Report 2017 [Indonesia].	between administrative data and immunisation coverage surveys. It is not clear how easily the electronic reporting system could be adapted to record a COVID-19 vaccination.	immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough info to rate.	
AEFI Reporting and Management	• Has a passive AEFI surveillance system. • Has an AEFI review committee, whose role is to audit the causality assessment of AEFI reports, build national capacity for AEFI monitoring, and strengthen AEFI surveillance. • WHO supported the National Committee of AEFI to develop supplementary guidance on potential adverse events of special interest (AESI) for the COVID-19 vaccine, and will provide capacity building to the national committee, provincial committees, and AEFI taskforces in all 34 provinces. • WHO to strengthen and train national and sub-national AEFI committee in preparation for the next MR campaign. Source: WHO VPD Monitoring: 2020 Global Summary: Indonesia; Gavi Joint Appraisal Report 2017 [Indonesia].	An AEFI surveillance and review committee exists, which creates a two-level review of AEFI, however no data on how well these systems are functioning.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
COVID-19 Surveillance Systems	• As of 18 November 2020, there have been 493,308 confirmed cases of COVID-19, and 15,774 deaths in Indonesia.	COVID-19 taskforce was initiated in March 2020, when the first few cases were reported.	COVID-19 surveillance system is established: Green = well established;	

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	 Figure 3: Weekly number of cases reported in Indonesia as of 18 October 2020. *Source of data* • On 13 March 2020, the Government formed a COVID-19 Operational Taskforce, led by the head of the National Board for Disaster Management (BNPB), and with other relevant government agencies. • A COVID-19 surveillance system is operating; however, the minimum case detection benchmark (one test per 1,000 population) was only achieved in three provinces (DKI Jakarta, West Sumatra and West Papua) for the last three weeks of October 2020; and one province (Yogyakarta) for the last two weeks of October 2020. Source: WHO Indonesia COVID-19 Situation Report – 30 (21 Oct 2020); WHO COVID-19 Western Pacific Situation Report #29 (18 Nov 2020).	There is very little data on how well the surveillance systems is functioning. However, Indonesia is testing below case detection benchmarks, which suggests the reported case numbers are an underestimate of the true burden. No information available on case definitions, data management, training, or reporting.	Amber = somewhat established; Red = being established; White = not enough info to rate.	

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Risk Communication				
Risk Communication Plan	• WHO is regularly translating and sharing important health messages on its website and social media platforms (Twitter and Instagram). • WHO supported the National Committee of AEFI to develop supplementary guidance on potential adverse events of special interest (AESI) for COVID-19 vaccine – as well as videos on: ○ Routine immunisation. ○ Guidance to prevent COVID-19 in the food sector. Source: WHO Indonesia COVID-19 Situation Report – 30 (21 Oct 2020).	Risk communication is supported by partners; however, there was no data available to evaluate the effectiveness of the campaign.	Risk communication plan is established: Green =well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
Community Mobilisation/ NGO	• MOH has developed 'Reaching Every Community (REC)', which is an evidence-based strategy to improve coverage in high-risk communities. • Health Promotion Unit of MOH: ○ Develops appropriate communication strategy to enhance demand. ○ Develops IEC materials. ○ Conducts promotions and advocacy on sensitisation of the importance of immunisation. • A critical success factor for phase 1 of the 2017–2018 MR campaign was active engagement of communities. Source: Gavi Joint Appraisal Report 2017 [Indonesia].	Gavi noted this was an area that could be strengthened and there was some use of the NGO/CSO community to promote EPI that could also be utilised for a COVID-19 vaccine.	Community Mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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Vaccine Hesitancy	• Growing anti-vaccination groups mean there is a need to improve community awareness delivered by HCW on the benefits and risks of immunisation. Source: Gavi Joint Appraisal Report 2017 [Indonesia].	There is very little data available on vaccine hesitancy in Indonesia.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough info to rate.	Not enough info to rate.
Vaccine Enablers	• Political commitment from high officials for routine immunisation at national and sub-national levels is variable. • CSO, religious, and community leader cadres implement activities to promote the importance of immunisation programs at grassroots level. Source: Gavi Joint Appraisal Report 2017 [Indonesia].	Community mobilisation is being used as a vaccine enabler; however, there was no information on its effectiveness and Gavi noted this could be strengthened.	Vaccine enablers: Green = numerous; Amber = some; Red = cause for concern; White = not enough info to rate.	

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Summary Analysis – Indonesia

Indonesia has a large population (approximately 270 million) dispersed over multiple islands, with variation in ethnic groups and topography. The population at risk for COVID-19 is similar to that across Southeast Asia and globally, with 5% at high risk and 22% at increased risk. Indonesia is currently experiencing a significant COVID-19 outbreak, with 493,308 confirmed cases (>1% of the total population) as of 18 November 2020.

Routine EPI coverage is lower than that of other countries in the region, despite the relative wealth of Indonesia. The COVID-19 outbreak has disrupted routine EPI, which means Indonesia is vulnerable to VPD outbreaks. However, the government has taken measures to improve routine EPI. Indonesia has some experience with mass campaigns, which are challenging due to the size of the population and geography.

Leadership is strong at national level; however, variable at sub-national levels. Indonesia would benefit from an intergovernmental approach for a mass COVID-19 vaccination campaign.

Good regulatory pathways are in place, with capacity to manufacture vaccines locally. Indonesia has proven capacity to introduce new vaccines, which are usually phased through provinces. Indonesia has advanced planning for the COVID-19 vaccine, with a detailed national deployment plan and training materials. There is a NITAG in place. Indonesia has a shortage of trained HCW, which will be a challenge for a large-scale COVID-19 vaccine campaign.

Cold chain capacity for routine EPI appears to be sufficient; however, may be challenged for a large-scale mass campaign. The Government of Indonesia funds the majority of the country's routine EPI costs. Indonesia is eligible for Gavi COVAX AMC.

There appears to be a decentralised web-based immunisation register, but there are disparities between administrative and coverage surveys. The immunisation registry will likely require strengthening for a COVID-19 vaccination campaign. AEFI surveillance is in place, but there is little information available on capacity. There is limited information on COVID-19 surveillance systems; however, the current systems have clearly identified a large burden of COVID-19 cases.

The diversity of Indonesia's population results in varying levels of vaccine demand. Risk communication is supported by partners.

Indonesia appears well-placed to roll out a COVID-19 vaccination campaign, given its strong central-level government leadership, and that advanced planning for a COVID-19 vaccine is underway, despite its large population, geographic issues, diversity in EPI health services delivery, and limited experience with adult mass vaccination campaigns. However, Indonesia may seek partner and technical support, especially at the sub-national level.

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3. LAO PDR

Country and Healthcare System Background

Geography

- Lao PDR is a land-locked country, with a total land area of 236,800 square kilometres.
- The topography is three-quarters mountainous and plateau, and forests cover 47% of the land, with only 33% of rural areas having road access.
- Lao PDR has 160 distinct ethnic groups, speaking 80 distinct languages.

Service Delivery

- The EPI in Lao PDR sits under the Centre for Maternal and Child Health within the Ministry of Health. Health services are mostly publicly-provided in Lao PDR, while private service provision has limited scope.
- Severe gaps exist in service availability and readiness across health facilities in Lao PDR, including the lack of basic amenities, limited diagnostic capacity, and non-availability of essential medicines.
- Private sector services are mainly provided by pharmacies and increasingly by private clinics and hospitals, which operate mainly in urban areas. About one-quarter of health centres and more than half of district hospitals have no access to a safe water supply. In addition, 60% of health centres and 70% of hospitals suffer from interruptions of power supply.
- Lao PDR has 22 HCW/10,000 population.

Health Financing

- Lao PDR is classified as a lower-middle-income country.
- The majority of the workforce is engaged in agriculture.
- The public health sector has transitioned from a centralised system under which the government provided free services, to a system of charging the users of government health services, followed by the slow reintroduction of user fee exemptions for some target populations, such as the poor.
- Out-of-pocket payments are high and are increasing.
- Publicly-financed free services are soon to be implemented for all antenatal care, delivery services, and postnatal care, as well as free health services (including inpatient treatment) for children under age five, to be financed by pooled government and donor funding.

COVID-19 Situation Summary

- As of 18 November 2020, there have been 25 confirmed cases of COVID-19 reported in Lao PDR.

Source: APO Lao PDR Health System Review (2014); Grey literature: Wikipedia for Laos geography and ethnic groups; WHO Global Health Workforce Statistics (Dec 2018); World Bank PID: Lao PDR COVID-19 Response Project (3 Apr 2020); WPRO Lao PDR COVID-19 Situation Report #16 (9 Oct 2020); WHO COVID-19 Western Pacific Situation Report #29 (18 Nov 2020).

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Population Data

- The total population of Lao PDR in 2020 is 7,275,556.
- A total of 36% live in urban areas and 64% live in rural areas.
- The population with high-risk comorbidities, who would require hospitalisation if infected, is 277,160, which equates to 4% of the total population.
- The population with increased risk, who have one or more underlying conditions that increase risk of severe COVID-19, is 1,362,570, which equates to 19% of the total population.
- These populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged between 30–69 years, as shown in Figures 1 and 2.

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

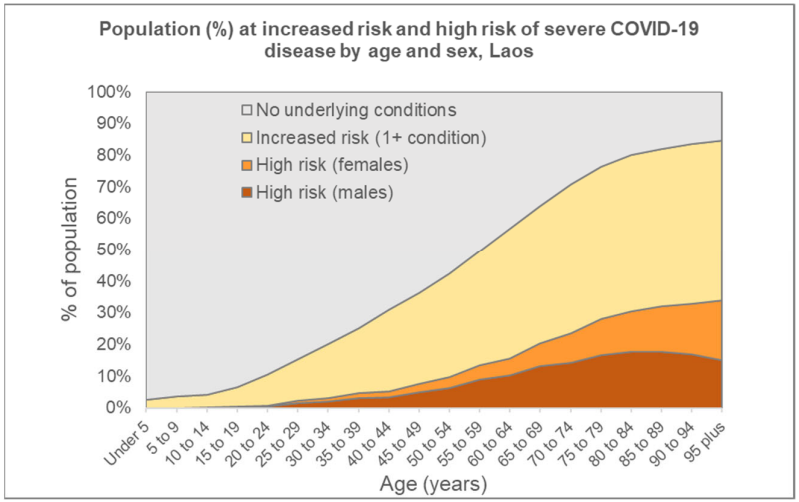


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

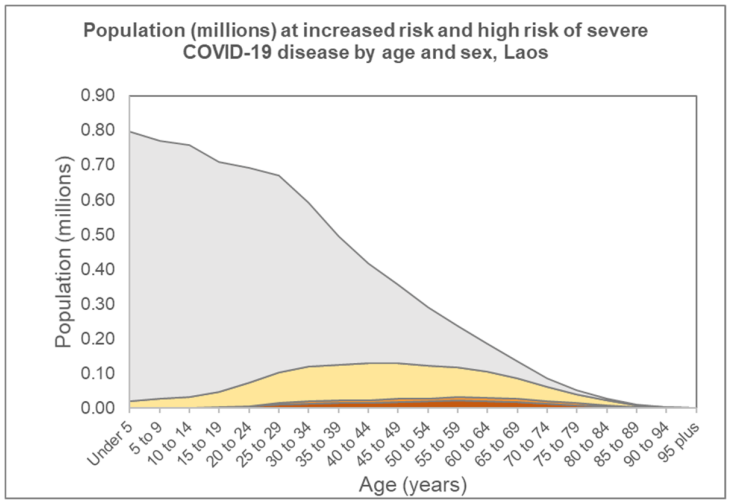


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers[2]	**100%**	15,799	31,598	157,990	315,980
Comorbidities at high risk[3], excluding HCW	**3%**	7,841	15,682	78,408	156,817
	20%	52,272	104,545	522,723	1,045,445
	40%	104,545	209,089	1,045,445	2,090,890
	60%	156,817	313,634	1,568,168	3,136,336
	80%	209,089	418,178	2,090,890	4,181,781
	100%	261,361	522,723	2,613,613	5,227,226
Comorbidities at increased risk[4], excluding HCW and those at high risk[2]	**3%**	32,088	64,177	320,883	641,766
	20%	213,922	427,844	2,139,221	4,278,441
	40%	427,844	855,688	4,278,441	8,556,882
	60%	641,766	1,283,532	6,417,662	12,835,323
	80%	855,688	1,711,376	8,556,882	17,113,764
	100%	1,069,610	2,139,221	10,696,103	21,392,205
Adults ≥60 years, excluding those at increased or high risk	**3%**	5179	10,359	51,793	103,586
	20%	34,529	69,057	345,286	690,571
	40%	69,057	138,114	690,571	1,381,142
	60%	103,586	207,171	1,035,857	2,071,713
	80%	138,114	276,228	1,381,142	2,762,285
	100%	172,643	345,286	1,726,428	3,452,856
Adults 18–59 years, excluding HCW and those at increased or high risk	**3%**	92,447	184,894	924,471	1,848,943
	20%	616,314	1,232,629	6,163,143	12,326,286
	40%	1,232,629	2,465,257	12,326,286	24,652,572
	60%	1,848,943	3,697,886	18,489,429	36,978,858
	80%	2,465,257	4,930,514	24,652,572	49,305,144
	100%	3,081,571	6,163,143	30,815,715	61,631,429

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	79,289	158,578	792,892	1,585,784
	20%	528,595	1,057,189	5,285,946	10,571,893
	40%	1,057,189	2,114,379	10,571,893	21,143,786
	60%	1,585,784	3,171,568	15,857,839	31,715,678
	80%	2,114,379	4,228,757	21,143,786	42,287,571
	100%	2,642,973	5,285,946	26,429,732	52,859,464
Total population	**3%**	218,267	436,533	2,182,667	4,365,334
	20%	1,455,111	2,910,222	14,551,112	29,102,224
	40%	2,910,222	5,820,445	29,102,224	58,204,448
	60%	4,365,334	8,730,667	43,653,336	87,306,672
	80%	5,820,445	11,640,890	58,204,448	116,408,896
	100%	7,275,556	14,551,112	72,755,560	145,511,120

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details.

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<table>
<tr><th>Area of Analysis</th><th>Description</th><th colspan="3">Capability Assessment</th></tr>
<tr><th></th><th></th><th>Qualitative Assessment</th><th colspan="2">Traffic Light</th></tr>
<tr><th colspan="5">EPI Coverage and Mass Campaigns</th></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines</th></tr>
<tr><th>Country Estimates</th><th>WHO/ UNICEF Estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td>86%</td><td>79%</td></tr>
<tr><td>6 weeks</td><td>DTP-Hep B-Hib, OPV, PCV, RV (planned into 2021)</td><td>73%</td><td>73%</td></tr>
<tr><td>10 weeks</td><td>DTP-Hep B-Hib, IPV, PCV</td><td></td><td></td></tr>
<tr><td>14 weeks</td><td>DTP-Hep B-Hib, OPV, PCV, RV (planned intro 2021)</td><td>68%</td><td>68%</td></tr>
<tr><td>9 months</td><td>MR, JE</td><td>69%</td><td>69%</td></tr>
<tr><td>12 months</td><td>MR</td><td>57%</td><td>69%</td></tr>
<tr><td>10–15 years, females</td><td>HPV (from March 2020)</td><td></td><td></td></tr>
<tr><td>15–45 years females and pregnant women</td><td>Td</td><td></td><td></td></tr>
<tr><td>>65 years and adults with chronic conditions, pregnant women, healthcare workers</td><td>Influenza Adult</td><td>No coverage data available</td><td></td></tr>
<tr><td>Children with chronic conditions</td><td>Influenza Paediatric</td><td></td><td></td></tr>
</table>
</td><td>Lao PDR has made substantial progress in health in the past decade, but still faces challenges of remote access and limited resources. This results in inequities in immunisation coverage, with some pockets of extremely low coverage, which has resulted in outbreaks of VPDs, including measles, pertussis, diphtheria, and vaccine-derived poliomyelitis in the past 5 years.

The EPI has been strengthened and new antigens have</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough info to rate.</td><td></td></tr>
</table>

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	• Reaching the target population continues to be a challenge. MOH revised the target population based on new Statistics Bureau estimates in 2015. • There is a significant difference between the new estimate and previous estimates of the target population. In the previous estimate, the number of children under-one-year old for 2018 was 181,665 and in the new estimate it is 153,799. This affects coverage monitoring significantly. • Economic, urban-rural, geographic, and minority group-related inequalities in immunisation coverage rates are widespread. • New vaccines recently introduced: pentavalent vaccine; Japanese encephalitis (JE) vaccine; pneumococcal conjugate vaccine (PCV); inactivated polio vaccine (IPV); bivalent oral polio vaccine (bOPV); a second dose of measles rubella (MR) vaccine; and human papillomavirus vaccine (HPV) as a demonstration project. • Lao PDR has a comprehensive multi-year plan (cMYP) 2019–2023. • Disbursement Linked Indicators (DLIs), a results-based financing instrument, is effectively addressing the problem of inequity in Lao PDR's immunisation efforts by boosting vaccination rates in 50 remote districts. Immunisation rates in the 50 targeted districts have increased by an average of 22% for MCV (measles-containing vaccine) and 30% for Pentavalent-3 vaccine (diphtheria, tetanus, pertussis, hepatitis B, and *Haemophilus influenzae* type b) over the 2016–2017 baseline. *Impact of COVID-19 on Routine EPI* • The COVID-19 pandemic disrupted routine immunisation and other essential health services. Already-low immunisation coverage in Lao PDR has been exacerbated. The urgency of improving immunisation coverage was underlined after Lao PDR experienced a measles outbreak in its southern provinces in early 2020, coupled with a significant drop in MR1 from 69% to 45% due to the disruption in 2020. Source: Gavi Joint Appraisal Report 2019 [Lao PDR]; 2015 National Census, WHO VPD Monitoring: 2020 Global Summary: Lao PDR 2019; UNICEF Post-COVID-19 Immunization (5 Aug 2020); Policy Brief: Sustainable Financing for Immunization in	been introduced. Coverage is low for all antigens.		

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	Lao PDR; Gavi Application Form for Cold Chain Equipment Optimisation Platform Support in 2018 (Nov 2017); World Bank DLIs Lift Immunisation in Lao Districts.			
Experience with Mass Campaigns	• 2007 MR mass campaign. • 2011 MR mass campaign. • 2012 JE mass campaign in northern provinces. • 2013 Seasonal influenza. • 2015 Polio SIA in response to a polio outbreak. • 2020 MR-OPV campaign completed in 11 provinces. • No reliable coverage data available for mass campaigns. Source: WHO Circulating Vaccine-Derived Poliovirus – Lao PDR (25 Feb 2016).	Lao PDR has some experience with mass immunisation campaigns. However, many of the mass campaigns were sub-national, reaching only selected provinces. Lao PDR does have an influenza vaccine on the schedule that targets adult populations; however, coverage is unknown. Mass campaigns are usually not national and are targeted at sub-national level, often as outbreak response.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough info to rate.	
Adult Vaccination Campaigns	• Seasonal influenza campaign (supported by US CDC): the routine immunisation schedule reports seasonal influenza in target populations (>65 years and adults with chronic conditions, pregnant women, healthcare workers); however, we were unable to verify the effectiveness of this campaign. • The target population coverage for H1N1 vaccine was ~60% and H1N1 coverage for the entire population was 15% in 2010; no other data was available. Source: WHO H1N1 Vaccine Deployment and Update; CDC Lao PDR Seasonal Flu Vaccination Lao Program (2012).			

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Governance				
Leadership and Governance	• COVID-19 response is led by the Task Force Committee for Prevention, Control and Response to the COVID-19 Pandemic to focus on the following: ○ Response coordination. ○ Infection prevention and control. ○ Case detection, confirmation and contact tracing. ○ Case management. ○ Risk communication and community engagement. • National Emergency Operations Centre continues to meet daily. • National COVID-19 Preparedness and Response Strategic Plan under development. • A central level intra-action review is underway. Source: WPRO Lao PDR COVID-19 Situation Report #16 (9 Oct 2020).	Lao PDR appears to have strong national leadership to respond to COVID-19 that meets regularly. There have been limited cases of COVID-19.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
COVID-19 Vaccine National Policy	• No data readily available.	No data available.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough info to rate.	Not enough info to rate.

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National Immunisation Technical Advisory Group (NITAG)	• The National Immunisation Technical Advisory Group (NITAG) was reformed in 2017. The reporting structure is unclear and it is not clear whether it is an independent body: ○ Expertise from a wide range of disciplines represented. ○ NITAG mission aims to promote best practice. ○ Meets twice per year (dates not available). ○ There are no meeting minutes available to document the outcomes of the meetings. Source: Gavi Joint Appraisal Report 2019 [Lao PDR]; NITAG (2015).	NITAG has been reinvigorated over the past three years and meets twice a year.	NITAG established: Green = well established; Amber = somewhat established and somewhat effective; Red = not yet established; White = not enough info to rate.	
Healthcare Workforce (vaccine providers)	• Comprehensive National Strategy for Human Resources for Health 2010–2020 established. • Lao PDR has 10 nurses per 10,000 population, which is lower than the average for lower-middle-income countries in the Asia–Pacific region (19 nurses per 10,000 population). Source: APO Lao PDR Health System Review (2014); WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Nursing workforce is half the average for LMICs in WPRO. This will pose a significant challenge for the roll out of a mass COVID-19 vaccination campaign.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough info to rate.	
HCW EPI Training	• There is an EPI training module (developed in response to the polio outbreak 2015) for frontline health workers in technical, planning and management aspects. As of 2019, 267 district and health facility level staff across 13 provinces and 50 districts have been trained in this module. Source: Gavi Joint Appraisal Report 2019 [Lao PDR].	Lao PDR appears to have systems in place to train HCW in EPI that were strengthened recently by a polio outbreak. This training has	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out of	

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		reached 3.5% of nurses nationally. These training materials could be easily updated to include COVID-19 vaccine with technical support.	date; White = not enough info to rate.	
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• Laws on Drugs and Medical Products were adopted in 2000. These laws determine the principles, rules, and measures relating to the manufacture, import, export, distribution, sale, possession, and use of drugs and medical products. They ensure the quality, safety, and affordability of drugs and medical products. Source: APO Lao PDR Health System Review (2014), Lao PDR Law on Drugs and Medical Products (2000).	Laws appear to be in place; however, there is no information on the enforcement of these laws.	Vaccine regulatory pathways are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
Systems in Place for Procurement	• Lao PDR procures vaccines via UNICEF and has not experienced stock outs. Source: Gavi Joint Appraisal Report 2019 [Lao PDR].	Procurement systems in place through UNICEF.	Vaccine procurement systems are established: Green = well established; Amber = somewhat	

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			established; Red = being established; White = not enough info to rate.	
EPI Funding	• Proportion of government funding for EPI: 2019 = no data; 2018 = 32%; 2017 = no data; 2016 = 37%; 2015 = 48%. • Gavi transition in 2022 based on 2019 economic data. • Lao PDR has consistently budgeted for vaccine co-financing. • There have been no co-financing defaults in the last three years (2017–2019). • A USD 4 million grant from the Australian Department of Foreign Affairs and Trade (DFAT) via the Multi-Donor Trust Fund (MDTF) has improved immunisation rates in low-coverage provinces (further details in routine immunisation schedule and coverage area of analysis above). The grant complements a broader project supported with funds from Gavi and the World Bank's International Development Association (IDA). **Expenditure on routine immunisation in 2017**  Source: WHO VPD Monitoring: 2020 Global Summary: Lao PDR, Gavi Lao PDR Co-Financing Information Sheet (28 Jan 2019); UNICEF Supply Annual Report 2019: Annex 1; World Bank DLIs Lift Immunisation in Lao Districts.	Lao PDR has consistently budgeted for and has met its obligations to Gavi in a timely manner. Routine EPI relies on donor funding and transition from Gavi is planned for 2022. However, Lao PDR is heavily donor dependent for routine immunisation.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds <50%; White = not enough info to rate.	

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Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• 90% of cold chain equipment in health facilities were functional target in 2018. • Cold chain capacity has been reinforced following the training of 20 cold chain equipment and maintenance technicians, and new cold chain equipment deployed to health centres. • Supply chain systems are in place to improve stock management and availability of all antigens at national, regional, and target district levels; ongoing and nearly complete. • Effective Vaccine Management Improvement (EVMI) plan in place. • No data available on wastage rates. Source: Gavi Joint Appraisal Report 2019 [Lao PDR].	Lao PDR appears to have a functioning cold chain system to store vaccines at +2 to +8°C. Data on vaccine storage at more extreme temperatures was not available. Much of the cold chain improvement has come from GAVI support. There is an EVM plan in place. The cold chain could be used to store COVID-19 vaccine depending on its presentation; phased shipments may be required.	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	
Waste Management	• Number of health facilities where incinerator installed and functioning was 10 of the targeted 20 in 2018 (not meeting target), but progress made since 2017. Source: Gavi Joint Appraisal Report 2019 [Lao PDR].	Laos has some functioning incinerators; however, it did not meet targets set by Gavi in 2018.	Has capacity to manage routine EPI vaccine waste: Green = good capacity;	

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		Functioning, readily available incinerators are essential for mass immunisation campaigns. If they are not available EPI consumables risk being burned and buried.	Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	
Security Arrangements	• No data readily available; news reports police are involved in enforcement of lockdowns.	No data available.	Has capacity for security surrounding COVID-19 vaccine: Green = has capacity; Amber = limited capacity; Red = poor capacity; White = not enough info to rate.	Not enough info to rate.
Immunisation Information Systems				
Individual Immunisation Records	• Individually-held paper-based 'Child Health Record' or 'yellow card' (parent-held) captures all EPI and health milestones. Source: PLoS One: Diptheria in Lao PDR (24 Apr 2015).	Data systems appear very strong with ability to record, analyse, and identify areas	Individual immunisation record captured by the service provider:	

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National Immunisation Register	• Lao PDR uses the District Health Information Software (DHIS2) and includes EPI data. • Up until now, there have been nine programs that support both aggregate and individual-level data including immunisation status. • STOP Immunisation and Surveillance Data Specialists (ISDS) are deployed across Lao PDR. The overall aim is to improve immunisation and VPD surveillance data, as well as staff knowledge, skills, and practices for immunisation and VPD surveillance. Source: Gavi Joint Appraisal Report 2019 [Lao PDR].	that need improvement. This is further strengthened by ISDS positions. Immunisation status is available at both aggregate and individual level for routine EPI. However, there was no analysis of the quality of this data or how easily it could be converted to track doses of COVID-19 vaccines.	Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough info to rate.	
Monitoring Vaccine Coverage	• DHIS2 generates aggregate and individual-level data, including immunisation status, with ability to record, analyse, and identify areas that need improvement; this is further strengthened by ISDS positions. • In addition, routine vaccine coverage is calculated at the primary health facility level and sent up the administrative levels to the central level. • Mass campaign coverage reports vary depending on the denominator and method, a common issue in most countries (i.e. government official coverage estimate vs. WHO–UNICEF coverage estimate). Source: Gavi Joint Appraisal Report 2019 [Lao PDR].			
AEFI Reporting and Management	• Gavi recommends strengthening AEFI reporting and management, including re-establishment of AEFI committee. • No data available on number of reports or outcomes. • Passive AEFI reporting system exists; however, investigation only initiated for severe AEFIs. Source: Gavi Joint Appraisal Report 2019 [Lao PDR]; Introducing Seasonal Influenza Vaccine in Low-Income Countries: AEFI Survey in Lao PDR (17 Jan 2015).	Lao PDR has a passive AEFI surveillance system and Gavi has identified that the AEFI committee should be re-established and strengthened prior to the roll	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established.	

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		out of a mass COVID-19 vaccine campaign.		
COVID-19 Surveillance Systems	• The SOP for multi-source surveillance is approved, and each department has identified plans to improve data collection and reporting on agreed-upon indicators. • Plans are underway for the roll-out of SARS-CoV-2 testing using GeneXpert. • Plans are underway for mobile PCR capacity to all provinces. • Department of Communicable Disease Control coordinated a workshop to review the implementation of multi-source surveillance for decision-making at the central level, from 30 September to 1 October 2020. • A multi-source surveillance technical working group meeting was held on 5 October 2020 to review the transmission status of COVID-19 in the country, the risk of COVID-19 from neighbouring countries, and also the risk posed from the relaxation of travel restrictions and quarantine measures in the country. • Development of a national specimen transportation guideline is occurring for specimens, including COVID-19. • A mobile specimen collection unit has arrived in-country to support specimen collection for COVID-19 testing. • Tablet devices have been distributed to all central hospitals for the collection of healthcare capacity indicators in hospitals using the District Health Information Software (DHIS-2). Daily data submission has started. • District health offices are conducting community engagement activities to support event detection and contact monitoring at the village level. Vientiane the capital, and Xieng Khouang and Savannakhet Provinces have started reporting to the central level. • No information could be obtained on case definitions, data management, training available, or reporting. Source: WPRO Lao PDR COVID-19 Situation Report #16 (9 Oct 2020).	Surveillance systems appear to be in place. However there have only been a few cases of COVID-19 in Lao PDR, therefore surveillance systems have not been challenged. It is unclear how they would function if there was a high disease burden.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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Risk Communication				
Risk Communication Plan	• The Centre of Communication and Education on Health has requested WHO technical support in risk communication training for provincial and district levels. • Risk communication taskforces in provinces are being established and they will have a team of trained risk communicators who can be deployed to respond to outbreaks. Source: WPRO Lao PDR COVID-19 Situation Report #16 (9 Oct 2020).	Risk communication appears to be well supported with technical assistance from WHO, and has reach into provincial and district levels.	Risk communication plan is established: Green =well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
Community Mobilisation/ NGO	• A nationwide review of IEC materials was held on 21–23 October 2020. Representatives from the provinces were invited to present on their experiences for the past eight months, including use of IEC materials, and gaps and needs. • Training in community engagement to support event detection and contact monitoring at the village level is being rolled out to all provinces. • A survey to understand risk perception, knowledge, attitudes, and behavioural change in relation to COVID-19 and COVID-19 vaccines was scheduled to be conducted in November 2020. • Workshops on sensitisation of monks for five districts is planned. Source: WPRO Lao PDR COVID-19 Situation Report #16 (9 Oct 2020).	Lao PDR appears to be mobilising community and religious groups and NGOs to support COVID-19 response.	Community Mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate	

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Vaccine Hesitancy	• Some families feel that vaccines cause their children to become sick, so they are reluctant to take their children back for another vaccination. Source: Gavi Lao PDR: Q&A with Manager for the National EPI.	There was little information available on vaccine hesitancy in Lao PDR.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough info to rate.	Not enough info to rate.
Vaccine Enablers	• Implementation of Quarterly Community Meetings is underway to empower local leaders and generate more demand for health services, including immunisation. • Known high-risk villages (no definition available) have been targeted; community leaders and village health volunteers completed a house-to-house review of immunisation cards and engaged mothers to understand their views and potential hesitancy about vaccines. • Traditional leaders of ethnic groups and members of the Lao PDR Front for National Development have been trained in infection prevention and control and community mobilisation for immunisation. • No information is available on vaccine enabler policies. Source: Gavi Joint Appraisal Report 2019 [Lao PDR].	Lao PDR appears to have strong community engagement to improve vaccine coverage.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough info to rate.	

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Summary Analysis – Lao PDR

Lao PDR has had very few COVID-19 cases; as of 18 November 2020, a total of 25 confirmed cases of COVID-19 have been reported.

Lao PDR has a relatively young population. Across all age groups the proportion of individuals who are at increased (19%) or high risk (4%) of severe COVID-19 is similar to the rates for Asia and the global estimate for population at increased risk (22%) and high risk (4%).

Despite major improvements in the past decade, the country's EPI still faces challenges in maximising the equity of coverage due to geographical, ethno-linguistic, and wealth disparities. To elaborate, Lao PDR has a relatively small population (7.3 million in 2020) spread over a large geographical area, with a limited health workforce distributed unevenly between rural and urban areas, where most of the well-trained health professionals live and work in urban areas. The majority of the population lives in rural areas (64%) that are often difficult to access, particularly in the rainy season (May–September). The health care system has limited capacity, especially at lower levels, which results in low routine immunisation coverage for all antigens, and pockets of very low coverage, which results in VPD outbreaks.

Lao PDR has some experience with mass immunisation campaigns, although many are targeted sub-national campaigns in response to VPD outbreaks. Lao PDR has influenza vaccination for adults on the national immunisation schedule; however, it is unclear if this is delivered routinely by the NIP.

Lao PDR has strong national leadership and community mobilisation in response to COVID-19. A COVID-19 vaccine policy is being developed with the support of WHO. A NITAG is in place, which meets twice per year. Lao PDR has challenges of HCW shortages and an ageing health workforce, with limited capacity at the primary level facilities. There have been recent training activities for SIAs, which would mean there are training materials to draw on.

There appear to be laws in place for regulatory pathways. Procurement is strong via UNICEF. EPI funding is majority donor-supported.

The government has strengthened its cold chain system. Waste management systems require further support and did not meet Gavi targets in 2018. There were no data available on security arrangements.

Data systems appear to be strong with DHIS2 capturing individual immunisation data, which is then available at a national level; in addition, there are STOP Immunisation and Surveillance Data Specialists (ISDS) deployed across Lao PDR to support data quality. However, there were no data to assess how well these data systems are functioning. Lao PDR has a passive AEFI surveillance system that requires strengthening. COVID-19 surveillance systems are in place, but minimal data were available on the systems' capacity. Risk communication appears to be well supported with technical support from WHO.

Lao PDR has a good vaccine governance structure in place, but may face challenges in implementing a mass COVID-19 vaccine campaign that achieves high coverage among the target population in rural areas. Partner technical support may be requested.

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4. MYANMAR

Country and Healthcare System Background

Geography

- Myanmar has a total land area of 676,578 square kilometres, and a coastline that stretches over 2,228 km. The terrain is characterised by central lowland, with some the small mountain ranges.
- Myanmar is an ethnically-diverse nation with 135 distinct ethnic groups officially recognised by the government. These are grouped into eight 'major national ethnic races'.

Service Delivery

- Chronic underinvestment in the health sector has left health facilities in a poor state of readiness to deliver essential health services, and Myanmar fares poorly on many key health indicators. In the public sector, shortages in medicines and commodities, poor availability of basic amenities, and low diagnostic capacity have led to ineffective and inefficient service delivery. This, in turn, contributes to low immunisation coverage rates and poor health outcomes.
- There are vast disparities in health outcomes and coverage across geographic areas and across social strata, and conflict and security concerns exacerbate inequity of access to care.
- Myanmar has 20 HCW/10,000 population.
- There continues to be frequent armed conflict between ethnic groups and the Myanmar military, which can trigger internal displacements. Currently there are thousands of internally-displaced person camps in government-controlled areas and beyond. Immunisation services are provided to internally-displaced persons by local health volunteers, who have been trained in vaccine delivery in partnership with international NGOs.
- There are geographically and socially hard-to-reach populations, as well as conflict-affected regions, which pose significant challenges to health care service delivery.

Health Financing

- Myanmar is classified as a lower-middle-income country.
- Myanmar is undergoing a period of significant change politically, economically, and socially.
- In the health sector, a new National Health Plan (NHP) for 2017–2021 has laid out the vision of achieving Universal Health Coverage (UHC) by 2030.
- Out-of-pocket (OOP) spending by households remains the dominant source of financing for health, comprising 74% of total health spending in 2015. OOP spending on health is a major cause of catastrophic expenditure by households, and can push households into poverty or keep them there. Households are expected to have 'cash in hand' when seeking care, regardless of whether they are seeking care from a private or public provider. Poorer households and those in rural areas spend significantly less on every component of health, signalling their lower capacity to seek care.

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COVID-19 Situation Summary

- As of 18 November 2020, a total of 77,848 cases, including 1,722 fatalities, have been reported in Myanmar.

Source: World Bank Myanmar Health Financing System Assessment (Oct 2018); Grey literature: Wikipedia for Myanmar geography and ethnic groups; WHO Global Health Workforce Statistics (Dec 2018); Gavi Joint Appraisal Update Report 2019 [Myanmar]; OCHA Myanmar: COVID-19 Humanitarian Situation Report No. 11 (23 Oct 2011); WHO COVID-19 Western Pacific Situation Report #29 (18 Nov 2020).

Population Data

- Total population in 2020 is 54,409,794.
- A total of 31% live in urban areas and 69% live in rural areas.
- Population with high-risk comorbidities, requiring hospitalisation if infected, is 2,752,079, which equates to 5% of the total population.
- Population with increased risk, with one or more underlying conditions that increase risk for severe COVID-19, is 12,415,076, which equates to 23% of the total population.
- Populations at risk of severe COVID-19 are distributed across age groups, with the majority aged between 35–70 years, as shown in Figure 1 and 2.

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

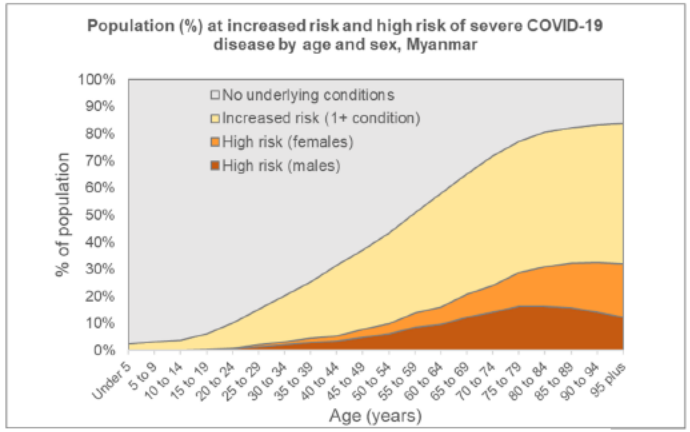


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

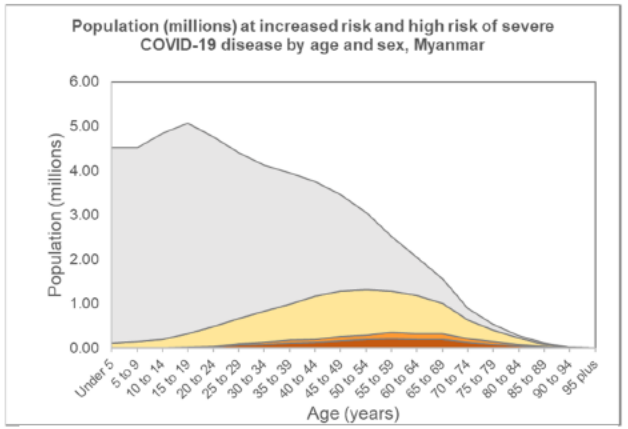


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers[2]	**100%**	110,254	220,507	1,102,536	2,205,071
Comorbidities at high risk[3], excluding HCW	**3%**	79,255	158,510	792,548	1,585,095
	20%	528,365	1,056,730	5,283,651	10,567,302
	40%	1,056,730	2,113,460	10,567,302	21,134,603
	60%	1,585,095	3,170,190	15,850,952	31,701,905
	80%	2,113,460	4,226,921	21,134,603	42,269,206
	100%	2,641,825	5,283,651	26,418,254	52,836,508
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	286,582	573,165	2,865,823	5,731,646
	20%	1,910,549	3,821,097	19,105,486	38,210,973
	40%	3,821,097	7,642,195	38,210,973	76,421,946
	60%	5,731,646	11,463,292	57,316,459	114,632,919
	80%	7,642,195	15,284,389	76,421,946	152,843,892
	100%	9,552,743	19,105,486	95,527,432	191,054,864
Adults ≥60 years, excluding those at increased or high risk	**3%**	55,561	111,122	555,609	1,111,217
	20%	370,406	740,812	3,704,058	7,408,115
	40%	740,812	1,481,623	7,408,115	14,816,230
	60%	1,111,217	2,222,435	11,112,173	22,224,345
	80%	1,481,623	2,963,246	14,816,230	29,632,460
	100%	1,852,029	3,704,058	18,520,288	37,040,575
Adults 18–59 years, excluding those HCW and those at increased or high risk	**3%**	712,912	1,425,824	7,129,119	14,258,239
	20%	4,752,746	9,505,493	47,527,463	95,054,926
	40%	9,505,493	19,010,985	95,054,926	190,109,851
	60%	14,258,239	28,516,478	142,582,389	285,164,777
	80%	19,010,985	38,021,970	190,109,851	380,219,703
	100%	23,763,731	47,527,463	237,637,314	475,274,628

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	488,061	976,122	4,880,611	9,761,223
	20%	3,253,741	6,507,482	32,537,409	65,074,818
	40%	6,507,482	13,014,964	65,074,818	130,149,636
	60%	9,761,223	19,522,445	97,612,227	195,224,454
	80%	13,014,964	26,029,927	130,149,636	260,299,272
	100%	16,268,705	32,537,409	162,687,045	325,374,091
Total population	**3%**	1,632,294	3,264,588	16,322,938	32,645,876
	20%	10,881,959	21,763,918	108,819,588	217,639,176
	40%	21,763,918	43,527,835	217,639,176	435,278,352
	60%	32,645,876	65,291,753	326,458,764	652,917,528
	80%	43,527,835	87,055,670	435,278,352	870,556,704
	100%	54,409,794	108,819,588	544,097,940	1,088,195,880

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th>Area of Analysis</th><th>Description</th><th colspan="3">Capability Assessment</th></tr>
<tr><th></th><th></th><th>Qualitative Assessment</th><th>Traffic Light</th><th></th></tr>
<tr><td colspan="5">EPI Coverage and Mass Campaigns</td></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage 2019
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines</th></tr>
<tr><th>Official country estimates</th><th>WHO–UNICEF estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td></td><td></td></tr>
<tr><td>+2 weeks</td><td>JE</td><td></td><td></td></tr>
<tr><td>2 months</td><td>DTP-Hep B-Hib, OPV, PCV</td><td>93%</td><td>93%</td></tr>
<tr><td>4 months</td><td>DTP-Hep B-Hib, OPV, IPV, PCV</td><td></td><td></td></tr>
<tr><td>6 months</td><td>DTP-Hep B-Hib, OPV, PCV</td><td>90%</td><td>90%</td></tr>
<tr><td>9 months</td><td>MR, JE</td><td>84%</td><td>84%</td></tr>
<tr><td>18 months</td><td>MR</td><td>80%</td><td>80%</td></tr>
<tr><td>Girls 9–10 years</td><td>HPV (launched Oct 2020)</td><td></td><td></td></tr>
<tr><td>Pregnant women</td><td>Td</td><td></td><td></td></tr>
<tr><td>Influenza</td><td>Older persons, adults with chronic conditions, pregnant women, healthcare workers, children with chronic conditions</td><td></td><td></td></tr>
</table>

The immunisation program is the only national program to have increased its reach to people living in Non-Government-Controlled Areas year-on-year.
In Yangon, the denominator for immunisation coverage does not include migrant populations (roughly 24% of the Yangon population). Therefore, in Yangon the actual coverage of MCV1 and MCV2 in 2018 is expected to be equal

</td><td>Coverage rates are higher than expected, considering the descriptions of the poor routine EPI services and coverage given in the Gavi joint appraisals. Coverage is variable depending on geography and sub-population. COVID-19 has led the government to suspend routine EPI services.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough info to rate.</td><td></td></tr>
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	to or lower than 80%, although reported coverage of MCV1 and MCV2 is 98% and 92% respectively. • In 2012, Rural Health Centre analysis showed the main reasons for under-vaccination of children to be: (1) Urban/peri-urban location, mobile/migrant populations, conflict-affected areas (socially hard-to-reach populations) (25%); (2) Midwife vacancy/absence/insufficient staff to meet local demand for midwifery services (19%); and (3) Geographically hard-to-reach areas (16%). • Myanmar introduced IPV in 2015. Nationwide reported coverage for IPV was 72% in 2016. • Myanmar introduced the HPV vaccine for girls on 20 October 2020. *Impact of COVID-19 on Routine EPI* • Most routine immunisation (RI) in fixed sites is continuing in nearly all Gavi-eligible countries, with adapted protocols and updated standard operating procedures, based on the WHO guidelines for maintaining RI (except in Honduras, Kyrgyzstan, Moldova, and Myanmar, which have suspended RI activities). • Immunisation services resumed in Kayin state in June 2020, with SOP implemented for safety during COVID-19. • Myanmar's Gavi flexibilities for COVID-19 response were already beginning to see an impact in May 2020. A social media post by the United Nations Myanmar office noted: 'The first plane landing today at the Yangon International Airport brought 10,000 COVID19 test kits procured by the United Nations Children's Fund, UNICEF Myanmar, with support of Gavi, the Vaccine Alliance.' Source: WHO VPD Monitoring: 2020 Global Summary: Myanmar; Gavi Joint Appraisal (2018) [Myanmar]; Gavi Joint Appraisal Update Report 2019 [Myanmar]; Gavi COVID-19 Situation Report #5 (14 Apr 2020); Gavi COVID-19 Situation Report #7 (28 Apr 2020); Gavi COVID-19 Situation Report #9 (19 May 2020); Gavi Myanmar HPV Vaccine Launch (28 Oct 2020); UNICEF Resuming Immunizations in Kayin State (18 Sep 2020); UN Myanmar Facebook post (10 May 2020).			

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Experience with Mass Campaigns	• In 2017, SIAs were conducted to address vaccine-specific coverage deficits. • A measles SIA focused on Yangon, with its increased population density, and polio SIAs in Rakhine State in 2017 achieved close to or over 90% coverage. • The case numbers of measles declined in 2015 after an MR catch-up campaign but are on the rise again, reflecting the low MCV1/MCV2 coverage in the country. • A JE campaign conducted during November and December 2017 was the second-largest public health intervention in Myanmar after the measles campaign in 2015, and achieved coverage of 92.5%. • The Rapid Coverage Assessment (RCA) results showed coverage to be 88% during this JE campaign. • Among the missed children, more than 50% were not vaccinated at the time of the campaign, because they were identified as sick by health workers during screening. Though missed children were identified through administrative reports and the RCA, mop-up activities to vaccinate the missed children were not conducted immediately after the campaign because these activities were not adequately planned and costed. • An MR campaign targeting 4,731,730 children between 9 and 59 months was planned to be implemented in the last quarter of 2019, but there was no information available on the success of this campaign. Source: Gavi Joint Appraisal (2018) [Myanmar]; Gavi Joint Appraisal Update Report 2019 [Myanmar].	Some experience with mass campaigns; three large campaigns in 2017 with substantial technical assistance from partners. Good coverage was achieved; however, several challenges are documented from which valuable lessons can be drawn for a COVID-19 vaccination campaign.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough info to rate.	
Adult Vaccination Campaigns	• Influenza listed as part of the routine EPI for older persons, adults with chronic conditions, pregnant women and healthcare workers, but no further data available. Source: WHO VPD Monitoring: 2020 Global Summary: Myanmar.			

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Governance				
Leadership and Governance	• Country contexts directly affect the performance of the immunisation program, and therefore effectiveness of Gavi grants. • The Government of Myanmar has made the peace process a top priority since 2016; however, the persistent armed conflicts with ethnic groups remain a significant challenge to the political stability of the country. • Myanmar has a complex administrative structure, the result of the governance and political context preceding the democratic transition in 2011. Out of 330 Townships, 27 are considered Non-Government Controlled Areas, out of which 12 are Self-Administered Regions, and 15 are controlled by armed ethnic groups. A total of 4% of the population resides in these 27 areas. • EPI is the only national program to have increased its reach to people living in Non-Government Controlled Areas year-by-year. • Gavi grants for new vaccine introductions and campaigns have been instrumental for these outcomes. However, during implementation, there have been significant barriers, including sporadic conflict between government and armed ethnic groups, and between different armed ethnic groups. • Service delivery and access to health services in Non-Government Controlled Areas is fragile. • Ministry of Health and Sports (MOHS) is constantly trying to identify possible ways to reach the unreached, in parallel to the peace efforts of the Government of Myanmar. • In addition, there are areas that are hard-to-reach due to limited road networks and difficult terrain, resulting in isolated parts within nearly all States and Regions. • Low government budget for health, specifically operational costs. Source: Gavi Joint Appraisal (2018) [Myanmar]; Gavi Joint Appraisal Update Report 2019 [Myanmar].	Governance for immunisations is challenging, particularly in areas where there is armed conflict. A total of 4% of the population reside in 27 Non-Government Controlled Areas. There is little data on the governance of immunisations for the remaining 96% of population in the Government-Controlled Areas.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established Red = being established; White = not enough info to rate.	

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COVID-19 Vaccine National Policy	• The cMYP for immunisation 2017–2021 remains the guiding strategy for EPI. Source: WHO VPD Monitoring: 2020 Global Summary: Myanmar.	No information available.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough info to rate.	Not enough info to rate.
National Immunisation Technical Advisory Group (NITAG)	• NITAG in place. Source: WHO VPD Monitoring: 2020 Global Summary: Myanmar.	NITAG is in place, but no information on who participates or the group's functionality that would allow for further evaluation.	NITAG established: Green = well established and effective; Amber = established and somewhat effective; Red = unestablished or ineffective.	Not enough info to rate.
Healthcare Workforce (vaccine providers)	• Service delivery: regular outreach sessions are often constrained by lack of funds for HCW to travel, especially when the target areas are more remote. • Myanmar's human resource limitations in health include understaffing in urban areas, difficulty of retaining HCW in hard-to-reach regions, and limited numbers of specialist staff in supply chain, cold chain, and data.	Staff shortages are an issue, with very low rates of nurses to population compared with similar countries.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than	

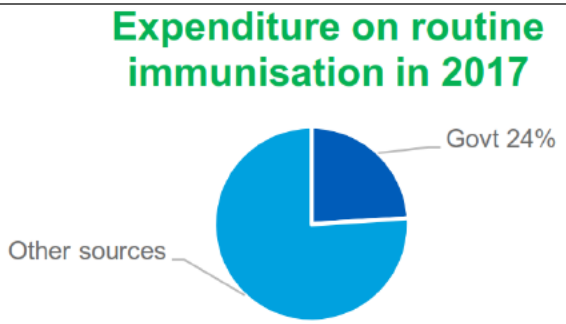
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	• The issue of HCW being distributed in line with population has been discussed at higher-level meetings among policy-makers, in addition to the overburden of Basic Health Staff across all public health programs. • Myanmar has 7 nurses per 10,000 population, which is lower than the average for lower-middle-income countries in the Asia–Pacific region (19 nurses per 10,000 population). Source: Gavi Joint Appraisal Update Report 2019 [Myanmar]; Gavi Joint Appraisal (2018) [Myanmar]; WHO Global Health Workforce Statistics (Dec 2018), Health at a Glance: Asia/Pacific 2020.		average; White = not enough info to rate.	
HCW EPI Training	• Frequent turnover of healthcare workers has been reported. • Training activities were conducted for all 330 Township budget focal-persons during JE campaign in 2017. • Cold Chain Key Person and Vaccine Logistics Management Information System (vLMIS) training complete. Source: Gavi Joint Appraisal Update Report 2019 [Myanmar].	High staff turnover. There has been some training for recent mass campaigns. However, not enough specific information on vaccine delivery training to rate.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out of date; White = not enough info to rate.	Not enough info to rate.
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• Data not readily available. • In Myanmar, the primary legislation for pharmaceuticals is the *National Drug Law 1992* (amended in 2014), and its subsidiary regulations. • The Food and Drug Administration (FDA) is the main regulatory authority for pharmaceuticals in Myanmar, established in 1995. The FDA is empowered to set policies relating to (among other things): ○ Registration and use of pharmaceuticals.	Myanmar has regulatory pathways and legislation in place for vaccine approvals, but no information	Vaccine regulatory pathways are established: Green = well established; Amber =	

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	○ Requirements for licences necessary to dispense pharmaceuticals. ○ Pharmaceutical labelling and advertising rules. Source: Medicinal Product Regulation and Product Liability in Myanmar (1 Dec 2010).	available on how well these systems are functioning.	somewhat established; Red = being established; White = not enough info to rate.	
Systems in Place for Procurement	• MOHS, Gavi, and UNICEF take on the tasks of vaccine procurement. Source: Gavi Joint Appraisal (2018) [Myanmar]	Very little data, but support from partners, Gavi, and UNICEF suggest this is somewhat effective.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.
EPI Funding	• Proportion of government funding for EPI: 2019 = 44%; 2018 = no data; 2017 = 24%; 2016 = 31%; 2015 = no data.	EPI is mostly financed by donors, with little evidence of increases in government funding. In addition, annual government funding is variable, which makes	EPI funding: Green = fully government funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded <50%;	

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	 • There can be delays in financial management processes at State/Region and Township levels. Low capacity in financial and risk management often acts as a bottleneck for effective fund utilisation (e.g. World Bank or 3MDG funds). • Capacity building in financial management initiated during JE campaign in 2017. • An SOP for budget management of the JE campaign was developed during this campaign. Source: WHO VPD Monitoring: 2020 Global Summary: Myanmar; Gavi Myanmar Co-Financing Information Sheet (1 Feb 2019).	planning challenging.	White = not enough info to rate.	
Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• Cold chain repair and maintenance services in place. • Cold chain inventory in web-based app developed and update is initiated. • vLMIS pilot project completed in three Townships and two Regions. • Cold Chain Equipment Optimization Platform Year One distribution and installation is in progress. • Site identification and design of Central Cold Room, at Magway and Monywa sub-depots. • Vaccine management and cold chain: limited number of immunisation days (first few days of each month) due to cold chain deficits; e.g. storage capacity below Township level and inadequate inventory management.	Data suggested there are gaps in cold chain, which was strengthened in 2017. Data for 2019–2020 not available. Data on vaccine storage at more extreme	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased	

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	• Improvements in cold chain capacity, vaccine supply, and management of logistics systems have been developed to include session planning, vaccine forecasting, storage, and wastage monitoring. Regular vaccine supplies and correct vaccine stock management with other immunisation supplies are key factors in the immunisation program, and contribute to achieving coverage objectives and reducing potential vaccine wastage. • Cold chain systems strengthened through provision of additional cold chain equipment during JE campaign in 2017. Source: Gavi Joint Appraisal Update Report 2019 [Myanmar].	temperatures not available.	capacity; White = not enough info to rate.	
Waste Management	• No data readily available.	Data not available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	Not enough info to rate.
Security Arrangements	Ongoing insecurity in conflict-affected areas is noted as a challenge in the current COVID-19 outbreak response. Source: OCHA Myanmar: COVID-19 Humanitarian Situation Report No. 11 (23 Oct 2011).	Not enough data to assess.	Has capacity for security surrounding COVID-19 vaccine: Green = good capacity;	Not enough info to rate.

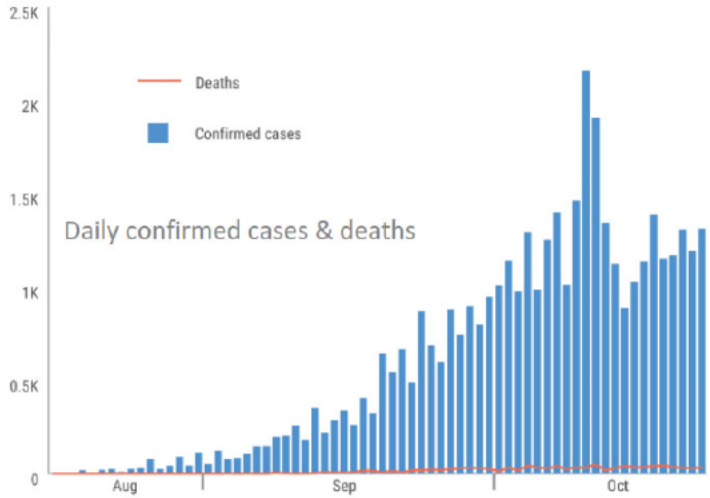
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			Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	
Immunisation Information Systems				
Individual Immunisation Records	• No data readily available.	No data on individual immunisation records. In 2017 there were plans to link EPI with DHIS. Monitoring vaccination coverage has a number of challenges	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough info to rate.	
National Immunisation Register	• EPI information system will be linked with DHIS2 (HMIS) as part of the Data Quality Improvement Plan (DQIP). Source: Gavi Joint Appraisal Update Report 2019 [Myanmar].			
Monitoring Vaccine Coverage	• Data quality and denominator issues because of outdated census data, and difficulties of head count at Township level and below. • Data management and use: insufficient analysis and use of data at sub-regional level. • Overall challenges of recording, reporting, denominator, data analysis and use during data quality self-assessment and improvement planning (August 2017): ○ Challenges related to recording immunisation of migrant or temporary populations – resulting in under-reporting. ○ Sometimes inconsistent or discrepant data reporting through HMIS and EPI, as well as differences in data flows and timelines between the two systems. ○ Overall, assessment highlighted challenges related to denominators and target setting in all States or Regions for migrant or guest populations. ○ Micro-planning based on registered residents only.			

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	○ Required further training on data management, analysis, and use across levels. ○ Weak review or feedback mechanisms across levels. ○ Some States challenged by lack of sufficient HR (e.g. Shan State). Not all States demonstrating use of data to inform prioritisation/sufficient feedback into planning. • Data improvement plan workshop, April 2018. The main objectives of this workshop were to: ○ Analyse findings of the Data Quality Self-Assessment (November 2017) and gain consensus on recommendations to be taken forward. ○ Develop a national Data Improvement Plan (activities, responsibilities, deliverables, budgets, timelines). ○ Agree on mechanism to monitor the plan's progress and fine-tune as needed. Source: Gavi Joint Appraisal Update Report 2019 [Myanmar].			
AEFI Reporting and Management	AEFI surveillance and review committee in place. Source: WHO VPD Monitoring: 2020 Global Summary: Myanmar.	AEFI surveillance and review committee in place, but there is no information on its capacity.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.

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COVID-19 Surveillance Systems	• As of 18 November 2020, a total of 77,848 cases, including 1,722 fatalities have been reported in Myanmar. • The number continues to rise of locally-transmitted cases and fatalities throughout the country, with the largest number of cases reported in Yangon Region (30,807), followed by Rakhine State (2,605), and Bago Region (1,779) since 16 August 2020. • The total number of people tested is not available. The government, with national and international support, continues to expand testing capacity. The average daily number of tests performed nationally as of 18 November 2020 was 13,726, through the COBAS, RT-PCR, GeneXpert platforms, and Antigen Rapid Diagnostic Test (Ag RDT) kits, according to the regular updates by the MOHS.  Source: OCHA Myanmar: COVID-19 Humanitarian Situation Report No. 11 (23 Oct 2011); WHO COVID-19 Western Pacific Situation Report #29 (18 Nov 2020).	Myanmar is facing a significant and ongoing COVID-19 outbreak. Surveillance is in place with testing capacity, but there is little data available on the effectiveness of the surveillance system. No information available on case definitions, data management, training, or reporting.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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Risk Communication				
Risk Communication Plan	• No data readily available.	No data available.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.
Community Mobilisation/ NGO	• Identified prioritised Townships (69/84 Townships, 44 Townships for urban immunisation strategy) with hard-to-reach populations, including migrant populations, ethnic minorities, peri-urban Townships, internally-displaced populations. • Service delivery and demand generation: o To assure community acceptance of immunisation, effective advocacy, communication and social mobilisation activities and mass media campaigns will be implemented to achieve greater cooperation and coordination. o Urban immunisation activities, immunisation clinics in 98 hospitals and activities to catch-up immunisation coverage have been established. o The social mobilisation corners at immunisation clinics were created to promote community awareness of immunisation and its benefits. o Interpersonal skills training for Basic Health Staff was designed and developed to equip the vaccinator with the skills to address the fear of AEFI, concerns regarding the administration of multiple injections at a	Several activities have been initiated for community mobilisation, which should have led to improved community engagement. There is no effectiveness data available.	Community Mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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	single visit, and to increase the level of knowledge and awareness about vaccination among mothers and caregivers. Source: Gavi Joint Appraisal Update Report 2019 [Myanmar]; Gavi Joint Appraisal (2018) [Myanmar].			
Vaccine Hesitancy	• No data readily available.	No data available.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough info to rate.	Not enough info to rate.
Vaccine Enablers	• Collaboration with Ethnic Health Organisations in Shan North and Kayin States during the JE campaign in 2017. • Kayin Ethnic Health Organisation received, for the first time, direct support for supplies, as well as financial and technical assistance during the JE campaign in 2017. Source: Gavi Joint Appraisal Update Report 2019 [Myanmar]; Gavi Joint Appraisal (2018) [Myanmar].	There is some evidence of engagement with minority groups for immunisations; these channels may be accessed again for a COVID-19 vaccine campaign.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough info to rate.	

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Summary Analysis – Myanmar

The population of Myanmar is >54 million, with 31% living in urban areas and 69% living in rural areas. The population at high risk of COVID-19 is 5%, which is slightly higher than the global average of 4%. The population at increased risk of COVID-19 is 23% which is, again, slightly higher than the global average of 22%.

Myanmar is facing a significant COVID-19 outbreak. As of 18 November 2020, a total of 77,848 cases, including 1,722 deaths, have been reported.

Routine immunisation coverage rates nationally are reasonable, despite challenges in service delivery; however, there is significant sub-national variation, with pockets of low coverage particularly in hard-to-reach populations in the Non-Government Controlled Areas. EPI has shown commitment to reaching all populations. Myanmar has some experience with mass immunisation: 5 million children were targeted in MR and JE campaigns in 2019. Adult influenza vaccine is included in the routine schedule; however, it is not clear whether this is EPI-funded or private, or what coverage rates are among the target population.

Myanmar faces a number of challenges, including political instability. EPI financing is heavily donor-supported, with 44% of EPI government-financed in 2019. There is no data available on a COVID-19 vaccine policy. A NITAG is reported to be in place, but no details on participants or meeting frequency are available.

Recent mass immunisation campaigns will have boosted national technical capacity through training activities targeted at cold chain, financing, and vaccine delivery.

There is some data on vaccine regulatory pathways and limited data on procurement systems. Cold chain capacity has been somewhat strengthened in recent years. There is limited information on waste management or security arrangements.

There is no evidence of individual or national immunisation registers in use, and there are issues with accurate denominators to calculate vaccine coverage.

Community mobilisation is challenging, particularly in Non-Government Controlled Areas.

Myanmar may face challenges in implementing a COVID-19 mass vaccination campaign. Partner and technical assistance may be requested.

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5. PHILIPPINES

Country and Healthcare System Background

Geography

- The Philippines is an archipelago of 7,107 islands, in the Southeast Asia region, with a total land area of 298,170 square kilometres, and a coastline that stretches over 36,289 km.
- The terrain is mostly mountainous, with narrow to extensive coastal lowlands.

Service Delivery

- There have been widespread efforts to improve health service delivery in the country, but regional and socioeconomic disparities in availability and accessibility of resources are prominent. There is uneven distribution of health infrastructure and human resources across and within regions.
- Philippines is a major exporter of healthcare professionals, but finds it challenging to ensure adequate availability within the country.
- Philippines has 76 HCW/10,000 population, which is above average for an LMIC in the Asia–Pacific region. The central-level Department of Health sets policies, standards, and guidelines for immunisation that are implemented at the local government level, which has administrative authority over its own health services.
- While the Philippines continues to combat pneumonia and tuberculosis (TB) as leading causes of death, the country also faces a growing incidence of diseases of the heart and vascular system, malignant neoplasms, and diabetes.
- Philippines ranks third in the world in terms of exposure to disaster risk, with strong typhoons occurring with high regularity.

Health Financing

- Philippines is classified as an LMIC.
- Use of the health budget has improved, but governance and implementation challenges persist, due to the fragmented nature of the system.
- The country has a mixed health system, with an expanding private sector. There is no effective mechanism to regulate private for-profit healthcare providers.
- More than 50% of total health spending is out-of-pocket.
- Coverage by the Philippine Health Insurance Corporation (PhilHealth) has increased over the years, but not all eligible members are aware of the benefits of the program.
- The government has a medicine access program, but vaccines are not specifically mentioned. Routine EPI is provided free of charge.
- There is no effective mechanism in place to monitor the accreditation of health facilities and regulate the cost and quality of services.
- The provision of routine childhood vaccination is predominantly public; about 95% of vaccinated children obtain their vaccines from public facilities, despite the large and increasing number of private facilities.

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COVID-19 Situation Summary

- As of 18 November 2020, a total of 416,852 confirmed COVID-19 cases had been reported in the Philippines. The most affected age group is 20–29 years (27%), followed by 30–39 years (24%).
- A total of 8,080 confirmed deaths have been reported, with the most affected age group being over 70 (34.6%), followed by 60–69 years (27.6%).

Source: APO The Philippines Health System Review (2018); WHO Philippines COVID-19 Situation Report #58 (20 Oct 2020); Too Early, Too Late: Timeliness of Child Vaccination in the Philippines (Dec 2019); WHO Global Health Workforce Statistics (Dec 2018); Medicines Access Program (MAP) Situational Analysis; WHO COVID-19 Western Pacific Situation Report #29 (18 Nov 2020).

Population Data

- The total population in 2020 is 109,581,085.
- A total of 47% live in urban areas and 53% live in rural areas.
- The population with high-risk comorbidities, who would require hospitalisation if infected, is 4,310,501, which equates to 4% of the total population.
- The population with increased risk, who have one or more underlying conditions that increase risk for severe COVID-19, is 22,538,480, which equates to 21% of the total population.
- Populations at risk of severe COVID-19 are distributed across the age groups, with the majority aged 25–69 years, as shown in Figure 1 and 2.

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

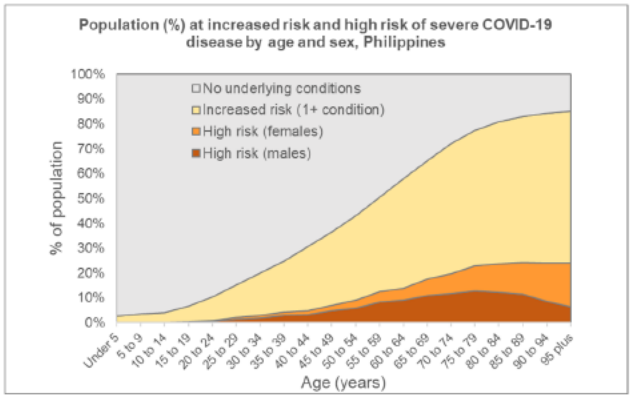


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

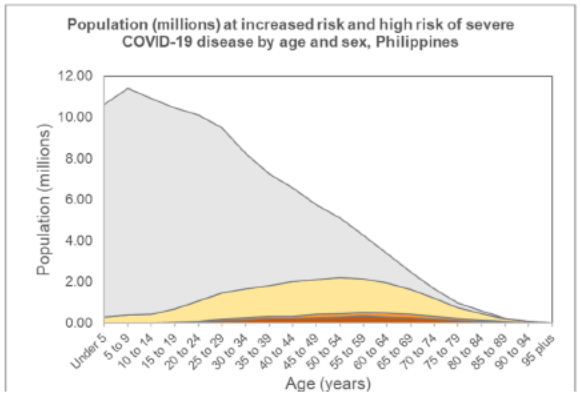


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers[2]	**100%**	829,941	1,659,883	8,299,413	16,598,826
Comorbidities at high risk[3], excluding HCW	**3%**	104,417	208,834	1,044,168	2,088,336
	20%	696,112	1,392,224	6,961,119	13,922,238
	40%	1,392,224	2,784,448	13,922,238	27,844,476
	60%	2,088,336	4,176,671	20,883,357	41,766,713
	80%	2,784,448	5,568,895	27,844,476	55,688,951
	100%	3,480,559	6,961,119	34,805,594	69,611,189
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	521,941	1,043,882	5,219,411	10,438,823
	20%	3,479,608	6,959,215	34,796,076	69,592,152
	40%	6,959,215	13,918,430	69,592,152	139,184,304
	60%	10,438,823	20,877,646	104,388,228	208,776,457
	80%	13,918,430	27,836,861	139,184,304	278,368,609
	100%	17,398,038	34,796,076	173,980,381	347,960,761
Adults ≥60 years, excluding those at increased or high risk	**3%**	94,470	188,941	944,703	1,889,405
	20%	629,802	1,259,603	6,298,017	12,596,034
	40%	1,259,603	2,519,207	12,596,034	25,192,069
	60%	1,889,405	3,778,810	18,894,052	37,788,103
	80%	2,519,207	5,038,414	25,192,069	50,384,137
	100%	3,149,009	6,298,017	31,490,086	62,980,172
Adults 18–59 years, excluding those HCW and those at increased or high risk	**3%**	1,362,052	2,724,105	13,620,523	27,241,047
	20%	9,080,349	18,160,698	90,803,489	181,606,978
	40%	18,160,698	36,321,396	181,606,978	363,213,956
	60%	27,241,047	54,482,093	272,410,467	544,820,934
	80%	36,321,396	72,642,791	363,213,956	726,427,912
	100%	45,401,744	90,803,489	454,017,445	908,034,890

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	**3%**	1,129,857	2,259,715	11,298,573	22,597,146
	20%	7,532,382	15,064,764	75,323,821	150,647,642
	40%	15,064,764	30,129,528	150,647,642	301,295,285
	60%	22,597,146	45,194,293	225,971,463	451,942,927
	80%	30,129,528	60,259,057	301,295,285	602,590,569
	100%	37,661,911	75,323,821	376,619,106	753,238,212
Total population	**3%**	3,287,433	6,574,865	32,874,326	65,748,651
	20%	21,916,217	43,832,434	219,162,170	438,324,340
	40%	43,832,434	87,664,868	438,324,340	876,648,680
	60%	65,748,651	131,497,302	657,486,510	1,314,973,020
	80%	87,664,868	175,329,736	876,648,680	1,753,297,360
	100%	109,581,085	219,162,170	1,095,810,850	2,191,621,700

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected, and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<tr><td>10 weeks</td><td>DTP-Hep B-Hib, OPV, PCV</td><td>77%</td><td>65%</td></tr>
<tr><td>14 weeks</td><td>DTP-Hep B-Hib, OPV, IPV, PCV</td><td></td><td></td></tr>
<tr><td>9 months</td><td>MMR</td><td>73%</td><td>67%</td></tr>
<tr><td>12–15 months</td><td>MMR</td><td>68%</td><td>40%</td></tr>
<tr><td>6 years</td><td>MR, Td</td><td></td><td></td></tr>
<tr><td>9–14 years, females</td><td>HPV</td><td></td><td></td></tr>
<tr><td>10 years</td><td>Td</td><td></td><td></td></tr>
<tr><td>Adults >60years</td><td>Influenza, PCV23</td><td></td><td></td></tr>
</table>

11% (20/179) of districts with DPT3 coverage >80%.
2% (3/179) of districts with MR2 coverage >95%.

Impact of COVID-19 on Routine EPI

Mass campaign for polio disrupted due to COVID-19 outbreak and started again in July 2020.
COVID-19 pandemic has prevented three out of four children from receiving routine immunisation.

</td><td>National routine immunisation coverage is low, with pockets of even lower coverage; few districts have reached the target coverage. Official country estimates are higher than WHO–UNICEF estimates.

COVID-19 has severely impacted routine immunisations, with three out of four children not receiving EPI services. Mass campaigns have also been impacted.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough info to rate</td><td></td></tr>
</table>

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	Source: WHO VPD Monitoring: 2020 Global Summary: Philippines; WHO Philippines COVID-19 Situation Report #58 (20 Oct 2020).			
Experience with Mass Campaigns	• Polio vaccination campaign started in October 2019. Target was 1.8 million children <5yrs in the three areas covered (not documented which areas these are) in two weeks, as well as in Davao del Sur and Lanao del Sur. Campaign was phased across geographical areas, and disrupted due to COVID-19 outbreak, but started again in July 2020. • The World Health Organization and the Department of Health planned to hold the first phase of the measles, rubella, and polio vaccination campaign in the Ilocos Region from 26 October to 25 November 2020, amid the COVID-19 pandemic. • The Philippines is currently fighting three disease outbreaks, namely COVID-19, polio, and measles, and the pandemic has prevented three out of four children from receiving routine immunisations. • The target is to immunise 95% of eligible children, 0–59 months old, for polio, and children 9–59 months old, for measles. Polio and measles do not have specific treatment, but can be prevented with a very effective vaccine. • The Philippines has been free of polio since the year 2000 and the country was certified as a polio-free country by WHO that year. • A vaccine-derived poliovirus type 2 (VDPV2) outbreak was declared in September 2019. Source: WHO/UNICEF Back DOH Polio Vaccinations (14 Oct 2019); WHO Philippines COVID-19 Situation Report #58 (20 Oct 2020).	Philippines is currently delivering mass campaigns for measles and polio, in a phased approach. Campaigns for polio started at the end of 2019 and have been disrupted due to COVID-19, but started again in July 2020. Due to the phased approach, the Philippines has been assessed as 'somewhat experienced'; however, recent campaign experience will mean the country is in a good position for a potential COVID-19 vaccination campaign.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough info to rate.	
Adult Vaccination Campaigns	• Seasonal Influenza for adults >60 years is part of the routine immunisation schedule, but not clear if provided nationally free of charge. No information on coverage. • The target population coverage for H1N1 vaccine coverage was ~40%, and H1N1 coverage for the entire population was ~3%; no other data available.			

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	Source: WHO VPD Monitoring: 2020 Global Summary: Philippines; WHO H1N1 Vaccine Deployment and Update.	There is the potential to combine COVID-19 vaccination with the measles and polio campaign if there are enough cold chain and staff resources available; however, these are likely to be stretched under the current campaign. An H1N1 vaccination campaign was delivered with low coverage, but it is unclear why it was low.		
Governance				
Leadership and Governance	• As the national technical authority on health, DOH provides national policy direction and strategic plans, regulatory services, standards and guidelines for health, and highly specialised and specific tertiary-level hospital services. It provides leadership, technical assistance, capacity building, linkages and coordination with other national government agencies, Local Government Units (LGUs), and private entities in implementing health policies. • Alongside its national insurance mechanism, the Philippines is a highly decentralised state with the DOH and LGUs sharing often-undefined	The President is showing much interest in accessing the COVID-19 vaccine urgently, which suggests that governance will be	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat	

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	responsibilities. The health landscape thus consists of three major players, DOH, LGUs, and a third, which is not described in the online sources. These three players often do not collaborate, and this has resulted in some poor health outcomes, including low immunisation coverage rates. *COVID-19* • As of 9 March 2020, DOH activated the Incident Management Team (IMT) as well as its Emergency Operating Centre. Key decisions are made by the Inter Agency Task Force (IATF), and the Inter Agency Technical Working Group (IATWG) for the Management of Emerging Infectious Diseases, consisting of key government agencies, such as the Department of Foreign Affairs (DFA), Department of Tourism (DOT), and Department of the Interior and Local Government (DILG). • The President has said he hopes the vaccine will be available by December 2020, so people can start returning to their normal lives. He intends to purchase the vaccines and provide free COVID-19 medicines to the poor, middle income earners, soldiers, and policemen. Source: APO The Philippines Health System Review (2018); WHO COVID-19 Situation Report-1-Mar 2020; ThinkWell Sustainable Immunization Financing in Asia Pacific (Aug 2017); Manila Bulletin COVID-19 Road Map article (31 Jul 2020).	strong at the central level. The IMT and its emergency operating centre include multiple government agencies, which is an asset for a successful mass vaccination campaign. However, the decentralised state with three major players involved in service delivery for immunisations may pose challenges.	established; Red = being established; White = not enough info to rate.	
COVID-19 Vaccine National Policy	• National EPI Policy in place 2016–2022. Source: WHO VPD Monitoring: 2020 Global Summary: Philippines.	National EPI policy in place, but no information on a COVID-19 Vaccine National Policy**.**	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop;	Not enough info to rate.

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			White = not enough info to rate.	
National Immunisation Technical Advisory Group (NITAG)	• According to 'Sustainable Immunization Financing in Asia Pacific 2017', the Philippines does not currently have a NITAG to make recommendations for the immunisation program, or a formal Health Technology Assessment (HTA) body to produce the evidence to support recommendations. The development of either would have great benefits for evidence-based decision-making in the immunisation program. • According to data on the WHO VPD Monitoring System, which is generated from the National EPI Joint Reporting Form, there has been a NITAG since 2013. Source: ThinkWell Sustainable Immunization Financing in Asia Pacific (Aug 2017); WHO VPD Monitoring: 2020 Global Summary: Philippines.	There is contradictory evidence on the presence of a NITAG. If it does exist, there is no information on participants or functionality.	NITAG established: Green = well established; Amber = somewhat established; Red = not yet established; White = not enough info to rate.	Not enough info to rate.
Healthcare Workforce (vaccine providers)	• There is uneven distribution of infrastructure and human resources across and within regions. • Philippines is a major exporter of healthcare professionals, but finds it challenging to ensure adequate availability within the country. • Government recently lifted the ban on healthcare workers travelling overseas. • The Philippines has 49 nurses per 10,000 population, which is much higher than the average for lower-middle-income countries in the Asia–Pacific region (19 nurses per 10,000 population). Source: US News Nurses Leave Philippines article (21 Sep 2020); WHO Global Health Workforce Statistics (Dec 2018); APO The Philippines Health System Review (2018); Health at a Glance: Asia/Pacific 2020.	High rate of nurses to population; however, there is uneven distribution of HCW with many emigrating overseas. The government has recently lifted the ban on healthcare workers travelling overseas.	HCW available to deliver EPI: Green = above average; Amber = average; Red =less than average; White = not enough info to rate.	

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HCW EPI Training	• There are four training activities being conducted under the Immunisation Program: (1) Immunisation in Practice: health workers are trained on basic principles of immunisation. (2) Cold Chain and Logistics Management Training: health workers are trained in logistics management and proper storage of vaccines. (3) Reaching Every Barangay Strategy: health workers are trained in how to use their data and address gaps in the immunisation program. (4) Adverse Events Following Immunisation Training under the Epidemiology and Surveillance Unit: health workers are trained on proper reporting of AEFIs, as well as how to properly manage these cases. • Some health workers have no training in Basic EPI Skills and Cold Chain and Logistics Management. These two training activities are needed by health workers to effectively deliver the services. • Some regional medical and nurse coordinators are also untrained in Basic EPI Skills and Cold Chain Management. Source: Philippines Department of Health EPI.	Data from the National EPI program describes the need for more training in EPI. Recent polio and MR campaigns will have boosted training.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out of date; White = not enough info to rate.	
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• No data from reliable sources on regulatory pathways.	No data available.	Vaccine regulatory pathways are established: Green = well established; Amber = somewhat established; Red = being established; White = not	Not enough info to rate.

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			enough info to rate.	
Systems in Place for Procurement	• No data readily available.	No data available.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.
EPI Funding	• From 2015–2020, 100% of immunisation expenditure was financed from government funds, apart from 2016, when 91% of EPI costs were government-funded. • The budget for health flows into the immunisation program through three channels. The DOH is responsible for procurement of vaccines for the NIP, finances immunisation campaigns, updates the cold chain, and trains health workers as needed. LGUs cover all operational expenses for local facilities to deliver immunisation services. The national immunisation schedule is variable, as some vaccines have been removed due to poor coverage performance. • In July 2020, the Gavi Board agreed that a total of 92 low- and middle-income-countries (including the Philippines) and economies will be able to access COVID-19 vaccines via the COVAX initiative. The Board also agreed that the Gavi Secretariat will host and administer the COVAX Facility, the umbrella mechanism to which 78 countries, including the Philippines, have already submitted written expressions of interest.	Philippines has fully funded its own routine EPI for the past five years. Eligible for Gavi COVAX AMC.	EPI funding: Green = fully government funded for vaccines and program; Amber = mainly government funded >50%; Red = mainly donor funded, government funds <50%; White = not enough info to rate.	

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	Source: WHO VPD Monitoring: 2020 Global Summary: Philippines; ThinkWell Sustainable Immunization Financing in Asia Pacific (Aug 2017); GAVI 92 Economies Eligible to Get COVID-19 Vaccines (31 July 2020).			
Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• A cross-sectional study in Cebu in September 2017 showed that: ○ Most primary health centres that store vaccines have at least one functional refrigerator and freezer and alternative power sources. ○ Contingency plans are needed in the event of mechanical and power failure, as well as proper temperature monitoring. ○ Personnel handling vaccines must be updated on proper storage and transport, such as the use of cold boxes and ice packs to maintain cold chain. Improvement of cold-chain management for vaccines in Cebu City's PHCs is necessary. • Vaccines are provided to Provincial Health Offices on a quarterly basis. Aside from vaccines, vaccination supplies such as auto-disable syringes, safety boxes, mixing syringes, cotton, alcohol, needle removers, vaccine carriers, transport boxes, and AEFI kits are provided. • Most of the issues observed during on-site monitoring of EPI systems are related to cold chain and logistics management. Source: Survey on Cold Chain Management of Vaccines in Cebu (22 Jun 2018); Philippines Department of Health EPI.	The data on cold chain capacity is from a single study in Cebu, and the generalisability of the results across the Philippines is not clear. Data on vaccine storage at more extreme temperatures was not available.	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	Not enough info to rate.
Waste Management	• No data readily available.	No data available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity;	Not enough info to rate.

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			Red = requires increased capacity; White = not enough info to rate.	
Security Arrangements	• No data readily available.	No data available.	Has capacity for security surrounding COVID-19 vaccine: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	Not enough info to rate.
Immunisation Information Systems				
Individual Immunisation Records	• Appear to have individually-held child immunisation cards. Source: Grey literature: Google Images Immunization Card Philippines.	No data available.	Individual immunisation record captured by the service provider:	Not enough info to rate.
National Immunisation Register	• No data readily available.			

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Monitoring Vaccine Coverage	• No data readily available.		Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough info to rate.	
AEFI Reporting and Management	• AEFI surveillance and review committee in place. Source: WHO VPD Monitoring: 2020 Global Summary: Philippines.	There appears to be some surveillance and a review committee in place, however the effectiveness of these mechanisms is unclear.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.

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COVID-19 Surveillance Systems	• As of 18 November 2020, a total of 416,852 confirmed COVID-19 cases had been reported in the Philippines. The most affected age group is 20–29 years (27%), followed by 30–39 years (24%). A total of 8,080 confirmed deaths have been reported. Source: WHO Philippines COVID-19 Situation Report #58 (20 Oct 2020).	The Philippines is experiencing a significant outbreak of COVID-19. No information available on case definitions, data management, training, or reporting.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.
Risk Communication				
Risk Communication Plan	• No data readily available.	No data available.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.

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Community Mobilisation/ NGO	• The polio communication team at the national level of DOH conducted TOT on 18 February 2020, on interpersonal communication and social mobilisation to support the upcoming polio immunisation campaigns, particularly in the National Capital Region (NCR). • The training, supported by UNICEF, was expected to build the capacity of health promotion officers and frontline workers in community engagement and addressing refusals. A roll-out training activity was then conducted 19–21 February 2020. Source: UNICEF & WHO Philippines Situation Report 16: Polio Outbreak (19 Feb 2020).	Limited information on community mobilisation systems and effectiveness.	Community Mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.
Vaccine Hesitancy	• No data readily available.	No data available.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough info to rate.	Not enough info to rate.
Vaccine Enablers	• No data readily available.	No data available.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough info to rate.	Not enough info to rate.

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Summary Analysis – Philippines

Philippines has seen a significant number of COVID-19 cases. As of 18 November 2020, a total of 416,852 confirmed cases had been reported in the Philippines. The most affected age group are people aged 20–29 years (27%), followed by people 30–39 years (24%). A total of 8,080 confirmed deaths have been reported, with the most affected age group being people over 70 (34.6%), followed by 60–69 years (27.6%). The Government of the Philippines appears to be actively seeking urgent access to the COVID-19 vaccine to curb the current outbreak.

The proportion of the population that is at increased risk of severe COVID-19 is 21%, which is similar to the global average of 22%. The proportion of the population at high risk is the same as the global average at 4%.

The country's routine immunisation coverage is low, which has resulted in outbreaks of measles and vaccine-derived polio in recent years. Philippines is currently conducting mass vaccination campaigns to stop these outbreaks. The country will have the added challenge of completing these campaigns before starting a mass COVID-19 vaccination campaign, or running parallel campaigns to very different population targets. The latter would significantly stretch logistical and human resources. The H1N1 influenza vaccination campaign in 2010 had low immunisation coverage, reaching around 40% of the target population (around 3% of the total population).

Government of Philippines interest in urgently accessing the COVID-19 vaccine suggests governance will be strong at the central level. The IMT and its emergency operating centre include multiple government agencies, which is an asset for a successful mass vaccination campaign. However, the decentralised state, with three major players involved in service delivery for immunisations, may pose challenges for governance. An EPI policy is in place, but there is no data on a COVID-19 vaccine policy. It is unclear if there is a NITAG in place, due to contradictory data sources. Philippines has a high rate of nurses to population, while also reporting a shortage of human resources in the healthcare systems. This is most likely due to the high rate of emigration among HCW. Training for mass immunisations campaigns is recent.

Regulatory pathways and systems for procurement are not documented publicly. Routine EPI is fully government-financed. Philippines is eligible for Gavi COVAX AMC.

Data on cold chain, waste management, security, information systems, and risk communication are too sparse to provide an analysis or rating.

There are many information gaps in the public domain, which make it challenging to assess the readiness of the Philippines for delivering a COVID-19 vaccination mass campaign. Philippines may request donor and technical support to deliver a COVID-19 mass vaccination campaign; and a phased campaign would be advisable. Completing the current mass vaccination campaigns first would be beneficial in terms of having the resources to effectively deliver a COVID-19 vaccination campaign; however, the current COVID-19 outbreak necessitates urgent delivery of the COVID-19 vaccine.

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6. TIMOR-LESTE

Country and Healthcare System Background

Geography

- Timor-Leste has a total land area of 14,874 square kilometres, and a coastline that stretches over 709 km.
- Timor-Leste is a mountainous country on the eastern half of the island of Timor, while the western half of the Timor island is part of Indonesia (shared border).

Service Delivery

- Emerging from decades of conflict, Timor-Leste became the first new sovereign state of the 21st century in May 2002.
- Faced with the task of rebuilding public infrastructure – including roads, ports and airports, water and sanitation systems, and government facilities – and institutional frameworks, Timor-Leste has made significant progress in key areas since independence.
- Today, with a population of 1.3 million people, Timor-Leste is a peaceful, democratic nation. While poverty levels remain high, progress has been made in improving living standards. The proportion of Timorese living in poverty declined from 50% in 2007, to an estimated 42% in 2014.
- Timor-Leste has 25 HCW/10,000 population, which is average for an LMIC (average 20–30).
- Nationally, health services are administered under 13 Municipal Health Service (MHS) offices. Under these municipalities there are 70 health centres, 313 health posts, and more than 400 Integrated Community Health Services (SISCa) and mobile clinic posts.
- Service delivery in Timor-Leste is provided under primary health care. Primary health care is the intervention provided to all Timorese and covers all public health programs, including maternal and child health, nutrition, communicable and non-communicable disease control, and immunisation.

Health Financing

- Timor-Leste is classified as an LMIC.
- The Government of Timor-Leste has decentralised, which may have significant impacts on health service delivery, including immunisation and Gavi Transition Plan implementation. Since the budget allocation for health is under the control of decentralised municipalities, advocacy on immunisation with the municipal governments will be critical.
- Government expenditure for health as a share of general government expenditure has been decreasing, but has stabilised in recent years at about 2–3%, which is considered to be low compared with other LMICs.
- The private sector provides vaccination services to approximately 5–10% of children, and sends immunisation reports to the Health Management Information System (HMIS) on a monthly basis.

COVID-19 Situation Summary

- As of 18 November 2020, a total of 30 confirmed cases had been reported in Timor-Leste.

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Source: World Bank Timor-Leste Overview; Grey literature: Wikipedia for Geography of Vietnam; Gavi Joint Appraisal Report 2017 [Timor-Leste], WHO Timor-Leste COVID-19 Situation Report – 71 (28 Oct 2020); WHO Global Health Workforce Statistics (Dec 2018); WHO COVID-19 Western Pacific Situation Report #29 (18 Nov 2020).

Population Data

- Total population in 2020 is 1,318,442.
- A total of 31% of the population live in urban areas, and 69% live in rural areas.
- Population with high-risk comorbidities, requiring hospitalisation if infected is 43,521, which equates to 3% of the total population.
- Population with increased risk, with one or more underlying conditions that increase risk for severe COVID-19, is 220,999, which equates to 17% of the total population.
- Populations at risk of severe COVID-19 are distributed across age groups, with the majority aged between 30–70 years, as shown in Figures 1 and 2.

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020)

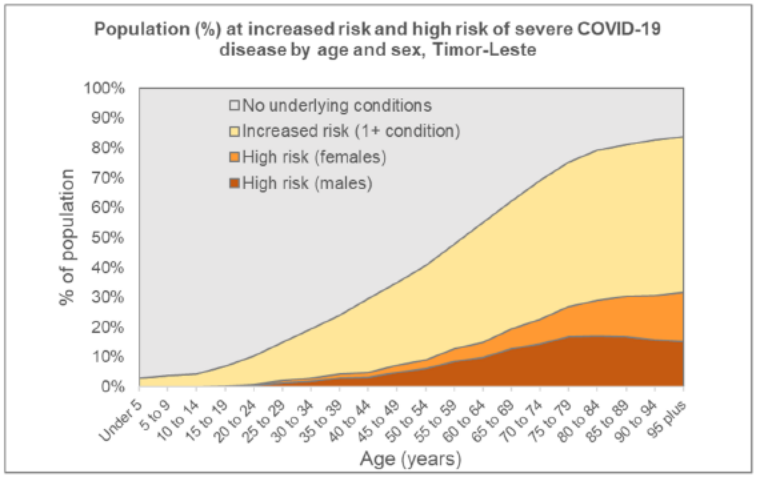


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

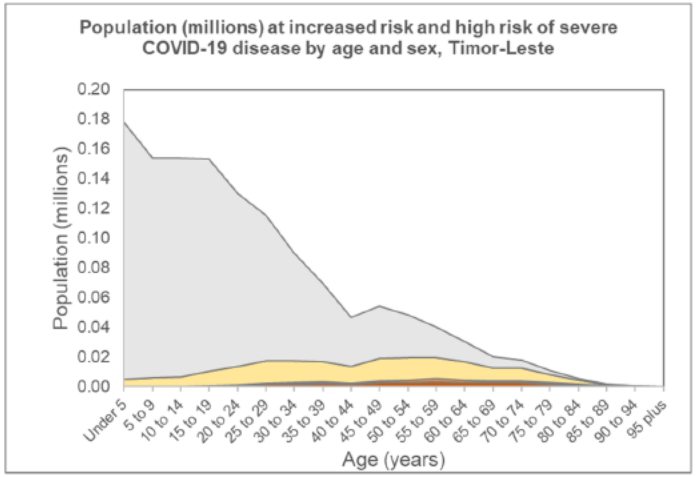


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: Lancet Global Health article (2020).

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<tr><td>10 weeks</td><td>DTP-Hep B-Hib, OPV</td><td>90%</td><td>83%</td></tr>
<tr><td>14 weeks</td><td>DTP-Hep B-Hib, OPV, IPV</td><td></td><td></td></tr>
<tr><td>9 months</td><td>MR</td><td>85%</td><td>85%</td></tr>
<tr><td>18 months</td><td>DPT, MR</td><td>80%</td><td>80%</td></tr>
<tr><td>11–12 years, females</td><td>HPV in selected provinces</td><td></td><td></td></tr>
<tr><td>6 years</td><td>DT</td><td></td><td></td></tr>
<tr><td>Pregnant women</td><td>Td</td><td></td><td></td></tr>
</table>

RV planned introduction in 2019, no information on success.
PCV planned introduction in 2021.
From administrative reports, geographic inequity in immunisation coverage is seen within some municipalities, such as those with dispersed populations having lower coverage. A Demographic and Health Survey (DHS) was completed in 2016, and is expected to provide data to assist with better understanding of equity issues and to guide broader efforts to improve system performance.
There are issues with denominator data, which resulted in 7/ 13 municipalities with coverage over 100% in 2017.

Impact of COVID-19 on Routine EPI
</td><td>Routine immunisation rates are good, although MR needs strengthening. There are immunisation gaps in some communities. Gavi funds have been redirected to support COVID-19, but it is not clear if impacts on routine immunisation coverages rates have been documented.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough info to rate.</td><td></td></tr>
</table>

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	• Gavi funds for health system strengthening were reprogrammed for COVID-19 response. • Timor-Leste has put in place measures such as: developing guidelines for the screening and triage of patients coming to health care facilities; procuring and encouraging the use of masks and gloves for healthcare workers; safe hand hygiene; controlling overcrowding at health care facilities; and recommending that vaccination sessions be conducted in well-ventilated and frequently-disinfected areas. Source: WHO VPD Monitoring: 2020 Global Summary: Timor-Leste, Gavi Joint Appraisal Report 2017 [Timor-Leste]; Gavi COVID-19 Situation Report #16 (25 Aug 2020); Gavi COVID-19 Situation Report #10 (2 Jun 2020).			
Experience with Mass Campaigns	• MR campaign was planned for 2018–2019, but no information available on its success. • References to SIA in a Gavi Appraisal that Ministry of Education) also actively participated in national immunisation campaigns in the past, and was engaged in the measles and rubella campaign in 2018–2019). Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].	Very limited data available.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough info to rate.	Not enough info to rate.
Adult Vaccination Campaigns	• No data readily available.			

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Governance				
Leadership and Governance	• The national coordination forums for immunisation in Timor-Leste are the EPI Working Group (EWG) and NITAG. Both forums play a crucial role in overseeing the entire immunisation program in-country. Each of these forums has its own structure and term of references to guide the work on immunisation-related activities and policy and strategy development. The forums collaborate to research vaccine-preventable diseases prevalence, advocate for new vaccine introductions (e.g. exploring need for MR campaign), and improve routine immunisation coverage. • The EPI program, headed by the EPI Manager, is part of the Department of Maternal and Child Health, a group of technical, management, logistics and training experts from EPI Program, National Medicine Procurement Agency, and National Institute of Health. • Bi-monthly coordination meetings or emergency meetings among MOH and partners; the Immunisation Working Group to monitor current immunisation activities and follow-up actions. • Above the EPI Working Group, there is the National Immunisation Technical Advisory Group (NITAG), which advises on the introduction of new vaccines and advocates to the key decision-makers in the MOH. • Review meetings are also conducted at the municipality level every six months, including community leaders at village levels to mobilise support of key influencers. • WHO and UNICEF, routinely oversee the immunisation program implementation, identify bottlenecks, and find solutions. Discussions are held on a quarterly basis in the immunisation review meeting at district level, and annually at the national level. Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].	Strong governance for EPI, with two committees with clearly defined roles and regular meetings. Technical partners, WHO and UNICEF, are invited to this forum.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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COVID-19 Vaccine National Policy	• WHO and UNICEF are working with the MOH and NITAG to prepare for the COVID-19 vaccine introduction plan. • This is part of global vaccine introduction plans being developed with support from WHO and UNICEF to help governments when a vaccine for COVID-19 is available. Source: WHO Timor-Leste COVID-19 Situation Report – 71 (28 Oct 2020).	National COVID-19 vaccine introduction plan is being developed with technical partners, WHO and UNICEF.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not enough info to rate.	
National Immunisation Technical Advisory Group (NITAG)	• A NITAG was established in late 2015. • NITAG consists of 11 members, of whom 7 are core members. • NITAG formally met twice in 2017. • Three-year workplan and budget endorsed by MOH-appointed medical doctor as full-time secretary to NITAG, and office space was provided in the MOH. USD 6,000 was allocated in the MOH budget in 2017 for NITAG work. • NITAG-TLS established three technical committees to provide recommendations on Introduction of Rotavirus Vaccine, Conduct of MR keep-up campaign in 2018, and strengthening of Routine EPI and VPD surveillance. • Three subcommittees met three times during the year, and made recommendations to NITAG at the NITAG meeting in October 2017. • The NITAG is composed of scientists, researchers, epidemiologists, surveillance experts, the EPI Manager, and immunisation experts from WHO and UNICEF. It is headed by a Chairperson and a Secretariat. • It also has one core and one non-core group, which have specific tasks to implement and present in the sub-group meetings. • Each sub-group sits four times a year, and the NITAG sits twice a year with its sub-groups to finalise immunisation-related draft recommendations, policies,	NITAG is well established; members have diverse expertise and clearly-defined roles. The NITAG meets twice annually. The NITAG has effectively assessed the local RV incidence and therefore recommended the introduction of the RV vaccine.	NITAG established: Green = well established; Amber = somewhat established; Red = Not yet established.	

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	and strategies, to present to the council of directors and to get endorsement and approval from the Health Minister. • The NITAG has recently concluded its clinical research on the RV prevalence rate in Timor-Leste and concluded that 32% of the severe gastroenteritis is caused by RV infection, which can easily be prevented through the introduction of 3 doses of RotaTeq oral vaccine. • In 2018, the NITAG was preparing to present research findings to its council of directors to obtain endorsement and approval of Rotavirus vaccine introduction into the routine immunisation program. Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].			
Healthcare Workforce (vaccine providers)	• There is an uneven distribution of health staff at the health facilities' level. The distribution of the health workforce favours urban locations, leaving rural areas not as well covered. • As most immunisation focal persons at the municipality level have additional responsibilities with programs such as MCH and Communicable Disease Control, the recruitment of 13 additional EPI officers (one for each municipality) has been approved by the Minister of Health. The recruitment process started in 2017. • The first two years of salary for these 13 officers were to be provided through Gavi funds, and thereafter the government would absorb them into the MOH permanent cadre. • During 2016–2017, two additional staff were deployed by MOH to work in the national EPI unit; their capacity building is ongoing. SAMES has two dedicated staff for vaccine and immunisation supplies at the national level. Two additional staff were deployed by MOH to work in the EPI unit. • Timor-Leste has 13 nurses per 10,000 population, which is lower than the average for lower-middle-income countries in the Asia–Pacific region (19 nurses per 10,000 population).	It is noted that staffing numbers are insufficient; however, actions are being taken to improve HR, with support from Gavi.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough info to rate.	

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	Source: Gavi Joint Appraisal Report 2017 [Timor-Leste]; WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.			
HCW EPI Training	• In 2016–2017, a total of 320 vaccine managers and handlers nationwide were trained in the EVM Standard Operating Procedures. • Training was provided to another 10 warehouse staff on Standard Operating Procedures for Effective Vaccine Management (SOP-EVM). Currently, SAMES also has five volunteers and plans to build their capacity in SOP-EVM. • MOH (in collaboration with Ministry of Finance and UNICEF) conducted training on results-based planning and budgeting for 140 health managers, and MOH plans to conduct training to cover all municipalities. • Many new health workers have not received training yet on Immunisation in Practice. • Supportive supervision and funding allocations are inadequate for EPI training. • Activities in 2017 to strengthen health workforce: ○ Standard Operating Procedures (SOP) training: 16 batches of Effective Vaccine Management training were conducted, with participation of 307 health workers from national level to health post level. ○ Immunisation in Practice (IIP) training: INS training institute conducted four batches of IIP training in 2017, using funds from the Gavi HSS grant, Human Capital Development Fund Grant to Government, as well as UNICEF. The four batches of training were provided to approximately 90 new health workers. ○ In addition to the above training, WHO provided capacity building on immunisation and VPDs surveillance through three STOP consultants. The training activities were done to address the issues identified during the supportive supervision visits. Six batches of the training were conducted at the municipality level. Each training batch was attended by approximately 25 health workers. ○ With regard to capacity building of new staff at central level, UNICEF and WHO provided day-to-day technical assistance. New MOH staff also participated in the IIP and SOP training conducted at the municipality level.	It is noted that capacity of HCW is generally low. However, there were a number of training activities on a wide array of EPI activities delivered or planned during the Gavi appraisal reporting period.	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out-of-date; White = not enough info to rate.	

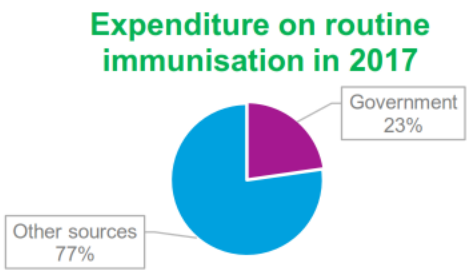
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	○ In 2016, a missed opportunity study was conducted in Dili Municipality to understand the reasons for missed opportunities for vaccination. The recommendations are currently under implementation in health facilities in Dili municipality. ○ A performance-based reward scheme to improve quality of immunisation was introduced in Dili Municipality health service in early 2017. The first reward ceremony was conducted in December 2017 and the outcome is promising. • Areas in need of further improvement: ○ There is a need to translate immunisation material into the local language. ○ There are limited immunisation training facilitators at the national level, and there is a need to do training of trainers (TOT) for immunisation training. • In 2017, INS made significant improvements in building the capacity of health workers. INS conducted nationwide training on SOP-EVM to 307 health workers from health posts, community health centres, municipality health service level, and the central pharmacy. Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].			
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• The NITAG advises on the introduction of new vaccines and advocates to the key decision-makers in the MOH. Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].	Limited data on regulatory pathways; NITAG are the key decision-makers and appear to be strong.	Vaccine regulatory pathways are established: Green = well established; Amber = somewhat established; Red = being	Not enough info to rate.

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			established; White = not enough info to rate.	
Systems in Place for Procurement	• Procurement of vaccines is carried out by SAMES, a central procurement agency/store, which has a separate budget directly from Ministry of Finance (MOF). • Since 2009, MOH procured vaccines through UNICEF procurement service. There were no issues related to budget allocation for the procurement of vaccines. MOH has not had issues related the co-financing of pentavalent vaccine with Gavi. Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].	Procurement systems in place through UNICEF.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
EPI Funding	• Proportion of government funding for EPI: 2019 = 55%; 2018 = 23%; 2017 = 39%; 2016 = 53%; 2015 = 39% (Source: WHO VPD Monitoring: 2020 Global Summary: Timor-Leste). • Immunisation planning, budgeting, execution, and reporting is fully integrated with other health programs, and therefore budget and expenditure tracking is complex. • There is concern over a decreasing trend and annual variability in this budget (considering increasing expenses with higher co-financing obligations due to transition and possible planned new vaccine introductions). Public financial management challenges persist and are being given specific attention to improve the efficiency and effectiveness of spending in the health sector (and beyond). The main donors for immunisation are Gavi, WHO, and UNICEF. No other donors support immunisation directly but some, such as DFAT and	A large proportion of EPI is donor financed, although the exact proportion is unclear as it varies by source. In addition, annual government funding is variable which poses challenge for program planning activities.	EPI funding: Green = fully government funded for vaccines and program; Amber = mainly government funded >50%; Red = mainly donor funded, government funds <50%; White = not	

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	USAID, support other initiatives within the maternal and child health area with beneficial impacts on immunisation.  Source: GAVI • The percentage of government funding in 2017 estimate varies by source: WHO = 39% and GAVI = 23%. Source: WHO VPD Monitoring: 2020 Global Summary: Timor-Leste; Gavi Timor-Leste Co-Financing Information Sheet (1 Feb 2019); Gavi Joint Appraisal Report 2017 [Timor-Leste].		enough info to rate.	
Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• During the 2016-2017 EVM self-assessment, an associated improvement plan was completed for SAMES and two municipalities. SAMES' self-assessment reported that the vaccine store met EVM certification standards in five out of eight categories assessed (an increase from three out of eight in the 2015 assessment). • MOH has conducted cold chain inventory updates, identifying 254 health facilities, including 170 health posts, equipped with cold chain equipment. • As part of the EVM improvement plan, nationwide SOP training, revision of immunisation tools, and self-assessments of EVM at national and municipality levels have been completed. • The EVM self-assessment at national cold stores revealed that there were improvements made in the central store. In the 2015 EVM assessment, there	There has been recent assessment and strengthening of the cold chain system. There have been no stock outs of vaccines, although there are still some challenges with the computerised	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not	

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	were only three categories that scored over 80%. However, during a later assessment, it was found that five out of seven categories showed improvement. • Challenges in stock data beyond the national store: ○ Timor-Leste has multiple logistics management systems, including vaccine and other immunisation-related supplies. SAMES uses mSupply software, but it has not been fully rolled out across the country, especially to lower-level stores and facilities. ○ The new Timor-Leste Health Management Information System (TLHMIS) also has a supply information module and is being rolled out country-wide with the support of various partners. ○ The Gavi Transition Plan, which extended the HSS grant to the government, identified ways to improve supplies, logistics, and information management, but there is no decision on whether mSupply will be scaled up country-wide, or if there will be a shift to TLHMIS. There are also discussions within government to bring all ICT-based information systems onto one platform. ○ In 2017, both systems were introduced down to the lower level, but are not yet being fully used by most health workers in these health facilities. ○ Further training and close monitoring and supervision are needed to increase access to and use of these systems. • Support needed for the use of mSupply and/or TLHMIS. Timor-Leste is using multiple systems to record and manage logistics information on supply-related matters, including vaccines. • The new DHIS2 based health information system (TLHIS) also has a supply information module and is yet to be rolled out country-wide. • Between 2015 and 2017, there has been no stock out of MCV or pentavalent vaccine at national level. • UNICEF supported installation of vaccine cold chain equipment (procured in 2017). Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].	logistics management systems. Data on vaccine storage at more extreme temperatures was not available.	enough info to rate.	

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Waste Management	• Data not readily available.	No data available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	Not enough info to rate.
Security Arrangements	• Data not readily available.	No data available.	Has capacity for security surrounding COVID-19 vaccine: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = Not enough info to rate.	Not enough info to rate.

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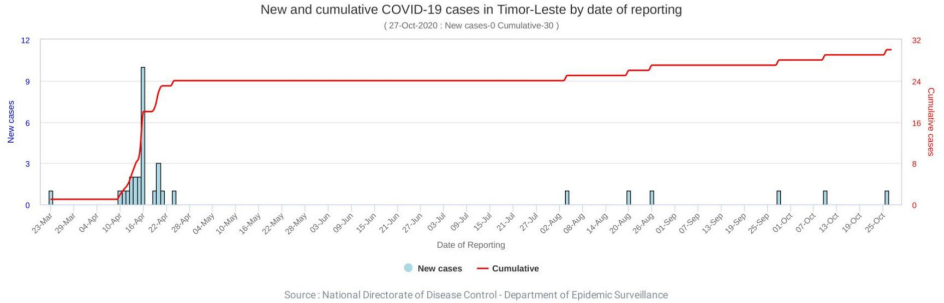
Immunisation Information Systems				
Individual Immunisation Records	• Data not readily available.	Discrepancies in the denominator data exist. There was little information on an individual or national immunisation register. Plans in 2017 to scale up digital health data platform, but no data on the success.	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no individual immunisation record; White = not enough info to rate.	Not enough info to rate
National Immunisation Register	• Data not readily available.			
Monitoring Vaccine Coverage	• Issues related to data remain a major challenge in Timor-Leste. The challenges include: o The denominator used by MOH for 2017 is not based on real data, but is a projection based on the latest (2015) census. o The latest figure for children under-one-year-old, according to the 2015 census, shows a large gap in the population estimate of over 9,000 children compared with the 2010 census. The new denominator resulted in the coverage being more than 100% for many antigens, including BCG. o There is also a discrepancy between data recorded at the field level and the reported data. There is a different number of children registered in register forms, tally sheets, and monthly reports. o The MOH is in transition from a paper-based system to a digital platform (TLHIS). The paper-based system is vulnerable to many errors, due to repeated data entry at different levels. • MOH has made efforts to improve its reporting and recording system: o One of these efforts was to introduce the digital TLHIS platform. MOH planned to conduct training on the implementation of the TLHIS, and nation-wide scale-up was envisioned by the end of 2017. No data is available on whether this occurred. o With close follow-up and monitoring, the TLHIS will contribute to quality immunisation data. The TLHIS will also reduce data entry workload at different levels, and will contribute to minimising the gap between different levels of administration in the MOH. o TLHIS is also expected to contribute to timeliness and completeness of data that is more easily accessible to key decision-makers and stakeholders.			

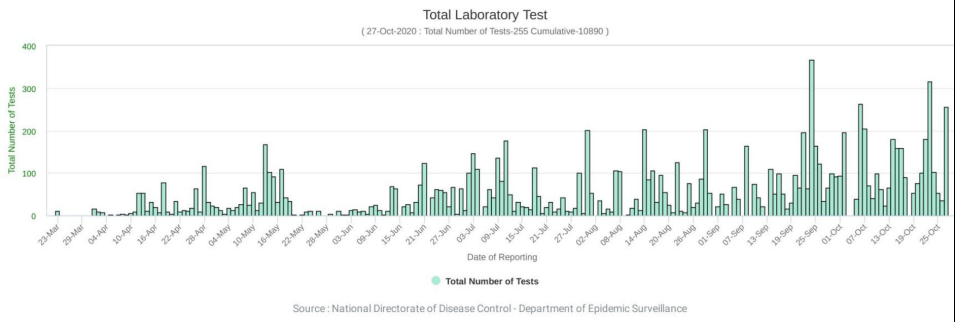
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	Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].			
AEFI Reporting and Management	• MOH Timor-Leste developed AEFI guidelines in 2011. • The socialisation of the guidelines to community and health workers was limited, resulting in limited cases being reported. • The guidelines were recently revised and are awaiting endorsement by MOH. The latest revision was completed to make it more comprehensive and include death case reporting and investigation. • There were no AEFI cases reported in 2016; however, two cases were reported in 2017. These two cases of AEFI in 2017 resulted in deaths. • The reasons for the limited number of cases of AEFI in Timor-Leste: ○ Limited awareness of AEFI cases by caregivers. ○ Many new health workers were deployed before being trained on AEFI case identification and reporting. ○ No active surveillance. Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].	AEFI reporting appears to be established, with guidelines in place; however, it seems there are gaps that need to be filled.	AEFI reporting system is established: Green = well established; Amber = somewhat established; Red = being established; White = Not enough info to rate.	
COVID-19 Surveillance Systems	• As of 28 October 2020, the total number of COVID-19 cases in the country now stands at 30. WHO Timor-Leste Strategic Objectives for COVID-19 • Interrupt human-to-human transmission, including reducing secondary infections among close contacts and healthcare workers, preventing transmission amplification events. • Strengthening of surveillance systems and increasing laboratory capacity to detect COVID-19 cases. • Ensuring adherence to the strictest standards of infection prevention and control and increase capacity for IPC. • Identify, isolate, and care for patients early, including providing optimised care for infected patients.	Timor-Leste has had very few confirmed COVID-19 cases. Testing rates are reasonable. No information available on case definitions, data management, training, or reporting.	COVID-19 surveillance system is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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- Communicate critical risk and event information to all communities and counter misinformation.
- Minimise social and economic impact through multisectoral partnerships.





Source: [WHO Timor-Leste COVID-19 Situation Report – 71 (28 Oct 2020)].

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Risk Communication				
Risk Communication Plan	• COVID-19 information and media queries: ○ The MOH has established a hotline number – 119 – for COVID-19, on which people can call to get any COVID-19 related information. ○ Additionally, the MOH Facebook page provides timely updates on COVID-19 developments in the country. ○ WHO Timor-Leste, through its Facebook page and Twitter handle, also disseminates information on preventive measures, questions and answers, myth-busters, and latest updates on COVID-19 globally and nationally. Source: WHO Timor-Leste COVID-19 Situation Report – 71 (28 Oct 2020).	There are some risk communication strategies in place, but little analysis on effectiveness.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
Community Mobilisation/ NGO	• With Gavi HSS funds, MOH has conducted quarterly meetings with community leaders at every community health centre. • MOH has also developed communication materials, such as billboards, posters, and flyers. These communication materials were distributed to health facilities, and are currently being used by health workers to create demand for immunisation. • An advocacy meeting was held by MOH, UNICEF, Gavi, and WHO with religious leaders to learn more about their opinion of immunisation and how they can contribute. As a follow-up to the meeting, immunisation communication fliers were printed and distributed through regular meetings. • With UNICEF assistance, MOH has developed an integrated communication package, including an interpersonal communication training curriculum and guidelines; guidelines for establishing and working with mother support groups to promote desired behaviour and practices; and audiovisual materials for primary healthcare workers and mother support groups in communities. Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].	Engagement with community and religious leaders is good and supported by technical partners.	Community Mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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Vaccine Hesitancy	• No information on vaccine hesitancy.	No information available.	Vaccine hesitancy: Green = none or little; Amber=some; Red=present; White = not enough info to rate.	Not enough info to rate.
Vaccine Enablers	• In partnership with UNICEF and WHO, MOH Timor-Leste conducted an advocacy meeting in close collaboration with the Ministry of Education. The meeting aimed to provide teachers at national level, municipality health services, and health centres with information on the value of immunisation and diphtheria and tetanus (DT) vaccination in schools. • The involvement of the Prime Minister in advocacy for immunisation campaigns and routine immunisation has also been a key success factor of the immunisation program in Timor-Leste. • The communication materials were launched by the First Lady and Vice Minister of Health, and are currently being used at the health facility level. To date, mother support groups have been established in all villages of five municipalities, and over 400 PHC workers of these five municipalities have been trained in interpersonal communication. • School teachers, religious leaders, community-based organisations, mother support groups, and local community leaders have played a crucial role in the successful implementation of the EPI program and DT vaccination in schools. DT vaccine was introduced to the national EPI program in April 2016 in all primary schools and to all new students of grade 1 irrespective of age. DT is also being integrated into the routine immunisation schedule. • These civil society groups are also involved in immunisation demand creation and strengthening EPI service delivery in their catchment areas for both routine immunisation, and first-time national immunisation campaigns.	Engagement at all levels.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough info to rate.	

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	• MOH, with the support of WHO and UNICEF, involves many national and international NGOs in health, and maternal and child health (MCH) related activities in Timor-Leste. All health, MCH, and immunisation-related work is shared, discussed, and coordinated through regular monthly health development partner meetings. Source: Gavi Joint Appraisal Report 2017 [Timor-Leste].			

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Summary Analysis – Timor-Leste

Timor-Leste has had very few COVID-19 cases (as of 18 November 2020, a total of 30 cases have been reported). Timor-Leste has a young population in general. The proportion of the population who are at increased of severe COVID-19 is 17%, which is lower than the global average of 22%. The proportion of the population at high risk is 3%, slightly lower than the global average of 4%.

Timor-Leste is a relatively new country, which had to rebuild public infrastructure – including roads, ports and airports, water and sanitation systems, and government facilities – and institutional frameworks. Timor-Leste has made major progress in key areas since independence; however, the healthcare system has significant resource challenges, including the number of trained staff for EPI.

Routine immunisation rates are reasonable, with limited information available on mass campaigns.

Timor-Leste has strong governance for EPI at national level, with two committees coordinating EPI activities, the Immunisation Working Group and, above it, the NITAG advises on the introduction of new vaccines and advocates to key decision-makers in the MOH. There is limited information on regulatory pathways, other than that the NITAG oversees this process. HCW capacity is limited in number and it is noted that additional EPI training is required, which was planned in the last Gavi joint appraisal in 2017.

There is limited available data on regulatory pathways. Good systems are in place for procurement via UNICEF. EPI is heavily partner-funded. There is little information on immunisation information systems. Timor-Leste is COVAX AMC eligible.

Cold chain capacity has been improved in recent years, but still needs support. No data is available on waste management or security arrangements.

There is limited information on immunisation information systems. An AEFI reporting system is in place. A COVID-19 surveillance system is in place with reasonable testing rates, but little further information.

Risk communication and community mobilisation are good.

Timor-Leste appears to be well-placed to deliver a COVID-19 mass vaccination campaign, but may request technical assistance. More information from its previous mass campaigns would be useful.

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7. VIETNAM

Country and Healthcare System Background

Geography

- Vietnam is located on the eastern margin of the Indochinese peninsula, and occupies about 331,211.6 square kilometres.
- There are 54 ethnic groups in Vietnam recognised by the Vietnamese government. Each ethnic group has its own language, traditions, and subculture.

Service Delivery

- Vietnam in recent years has experienced steady rates of economic growth and social development.
- The country is divided administratively into 4 regions, 63 Provinces, 704 Districts, and 11,138 Communes.
- The health sector structure conforms to the administrative structures, with a network of National Hospitals, Provincial and District Preventive Centres, and Commune Health centres, which are further networked by a system of village health workers.
- Vietnam has 28 HCW/10,000 population, which is at the high end of average for LMICs in the Asia–Pacific region.

Health Financing

- Vietnam's development story over the past 30 years has been remarkable, characterised by high economic growth and a shift towards an open market economy.
- Rising incomes, government revenue, and expenditure have led to substantial investments that have furthered economic development and human capital improvements.
- Despite the increase in health spending, the composition of health spending has not changed significantly.
- Between 2000 and 2016, public spending on health as a share of total health expenditure has increased gradually, but remains around 40%. Likewise, the share of OOP spending has remained persistently high at around 45% in 2016. External financing for health provides 5%, and the funding source for the remaining 10% was not specified in the source document (World Bank Health Financing).

COVID-19 Situation Summary

- As of 18 November 2020, Vietnam has passed 50 days without COVID-19 cases reported from the community.
- The country continues to accelerate active measures to achieve dual objectives of economic development and disease control; and move toward a 'safe coexistence with COVID-19'.
- As of 18 November 2020, Vietnam has reported a total of 1,306 laboratory confirmed cases of COVID-19, from 44 out of 63 cities/provinces, and also 35 deaths.

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Source: World Bank Future of Health Financing in Vietnam (June 2019); Grey literature: Wikipedia for Vietnam geography and ethnic groups; MOH National EPI Multi-Year Plan 2016–2020 (Aug 2015); WHO COVID-19 Western Pacific Situation Report #29 (18 Nov 2020).

Population Data

- Total population in 2020 is 97,338,583.
- A total of 37% of the population live in urban areas, and 63% live in rural areas.
- Population with high-risk comorbidities, requiring hospitalisation if infected, is 4,159,234, which equates to 4% of the total population.
- Population with increased risk, with one or more underlying conditions that increase risk for severe COVID-19, is 22,082,822, which equates to 23% of the total population.
- Populations at risk of severe COVID-19 are distributed across age groups, with the majority aged between 25–75 years, as shown in Figure 1 and 2.

Source: UN World Population Prospects 2019 and Lancet Global Health article (2020).

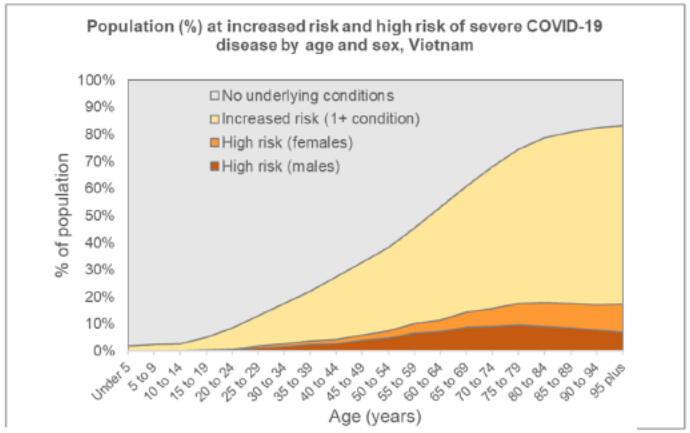


Figure 1. Population at increased risk of COVID-19 shown as a percentage of the total population

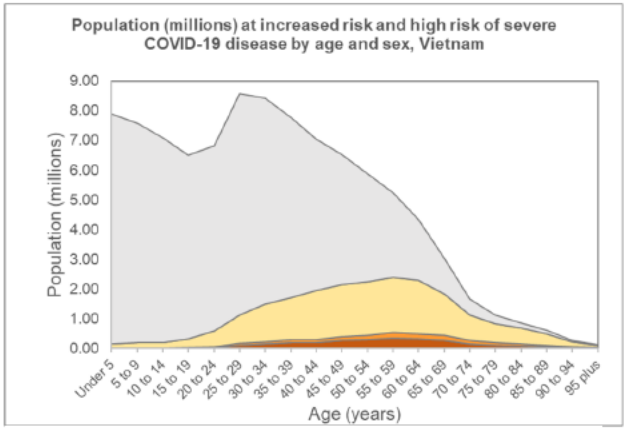


Figure 2. Population at increased risk of COVID-19 shown as number of people

Source: Lancet Global Health article (2020).

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Table 1. Costings for Vaccines[1]

Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Healthcare workers[2]	**100%**	276,027	552,054	2,760,271	5,520,543
Comorbidities at high risk[3], excluding HCW	**3%**	116,496	232,992	1,164,962	2,329,924
	20%	776,641	1,553,283	7,766,413	15,532,827
	40%	1,553,283	3,106,565	15,532,827	31,065,653
	60%	2,329,924	4,659,848	23,299,240	46,598,480
	80%	3,106,565	6,213,131	31,065,653	62,131,306
	100%	3,883,207	7,766,413	38,832,066	77,664,133
Comorbidities at increased risk[4], excluding HCW and those at high risk	**3%**	529,427	1,058,854	5,294,268	10,588,537
	20%	3,529,512	7,059,025	35,295,123	70,590,246
	40%	7,059,025	14,118,049	70,590,246	141,180,491
	60%	10,588,537	21,177,074	105,885,368	211,770,737
	80%	14,118,049	28,236,098	141,180,491	282,360,982
	100%	17,647,561	35,295,123	176,475,614	352,951,228
Adults ≥60 years, excluding those at increased or high risk	**3%**	131,847	263,694	1,318,468	2,636,937
	20%	878,979	1,757,958	8,789,789	17,579,579
	40%	1,757,958	3,515,916	17,579,579	35,159,157
	60%	2,636,937	5,273,874	26,369,368	52,738,736
	80%	3,515,916	7,031,831	35,159,157	70,318,314
	100%	4,394,895	8,789,789	43,948,946	87,897,893
Adults 18–59 years, excluding HCW and those at increased or high risk	**3%**	1,345,217	2,690,434	13,452,170	26,904,339
	20%	8,968,113	17,936,226	89,681,131	179,362,261
	40%	17,936,226	35,872,452	179,362,261	358,724,522
	60%	26,904,339	53,808,678	269,043,392	538,086,783
	80%	35,872,452	71,744,904	358,724,522	717,449,045
	100%	44,840,565	89,681,131	448,405,653	896,811,306

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Population by risk group	Target vaccination coverage	Target population, number of people	Number of doses required to fully immunise target population with a two-dose schedule	Costing in USD for two doses at $5/dose	Costing in USD for two doses at $10/dose
Children <18 years, excluding those at increased or high risk	3%	772,328	1,544,656	7,723,282	15,446,564
	20%	5,148,855	10,297,709	51,488,547	102,977,095
	40%	10,297,709	20,595,419	102,977,095	205,954,189
	60%	15,446,564	30,893,128	154,465,642	308,931,284
	80%	20,595,419	41,190,838	205,954,189	411,908,379
	100%	25,744,274	51,488,547	257,442,737	514,885,473
Total population	3%	2,920,157	5,840,315	29,201,575	58,403,150
	20%	19,467,717	38,935,433	194,677,166	389,354,332
	40%	38,935,433	77,870,866	389,354,332	778,708,664
	60%	58,403,150	116,806,300	584,031,498	1,168,062,996
	80%	77,870,866	155,741,733	778,708,664	1,557,417,328
	100%	97,338,583	194,677,166	973,385,830	1,946,771,660

[1] The HCW population has been subtracted from three sub-populations: high risk, increased risk, and adults 18–59 years, in the assumption that HCW will be vaccinated first, followed by one of the sub-group populations.

[2] Data extracted from WHO country specific indicator on the density of HCW per population and rate applied to 2020 population (see methodology for more details). Source: WHO Global Health Workforce Statistics (Dec 2018).

[3] The population at high risk is defined as those who would require hospital admission if infected and was calculated using age-specific infection-hospitalisation ratios for COVID-19 estimated for mainland China, with adjustments to reflect country-specific differences in the prevalence of underlying conditions and frailty. It was assumed that males were twice as likely as females to be at high risk (see Lancet Global Health article (2020) for further details).

[4] The population at increased risk is defined as those with at least one condition listed as 'at increased risk of severe COVID-19' in current guidelines from WHO, UK, and USA, by age, sex, and country, using prevalence data from the Global Burden of Diseases, Injuries, and Risk Factors Study (GBD) 2017, and UN population estimates for 2020 (see Lancet Global Health article (2020) for further details).

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<table>
<tr><th rowspan="2">Area of Analysis</th><th rowspan="2">Description</th><th colspan="3">Capability Assessment</th></tr>
<tr><th>Qualitative Assessment</th><th colspan="2">Traffic Light</th></tr>
<tr><th colspan="5">EPI Coverage and Mass Campaigns</th></tr>
<tr><td>Routine Immunisation Schedule and Coverage</td><td>
Table 2. Routine immunisation schedule and coverage 2019
<table>
<tr><th rowspan="2">Age</th><th rowspan="2">Vaccine</th><th colspan="2">Coverage for key indicator vaccines</th></tr>
<tr><th>Official country estimates</th><th>WHO–UNICEF estimates</th></tr>
<tr><td>Birth</td><td>BCG, Hep B</td><td></td><td></td></tr>
<tr><td>+2 weeks</td><td>JE</td><td></td><td></td></tr>
<tr><td>2 months</td><td>DTP-Hep B-Hib, OPV</td><td>96%</td><td>96%</td></tr>
<tr><td>3 months</td><td>DTP-Hep B-Hib, OPV</td><td>89%</td><td>89%</td></tr>
<tr><td>4 months</td><td>DTP-Hep B-Hib, OPV</td><td></td><td></td></tr>
<tr><td>5 months</td><td>IPV</td><td></td><td></td></tr>
<tr><td>9 months</td><td>MR</td><td>95%</td><td>95%</td></tr>
<tr><td><12 months</td><td>JE</td><td></td><td></td></tr>
<tr><td>18 months</td><td>DTP, MR</td><td>92%</td><td>92%</td></tr>
<tr><td>2 years</td><td>JE</td><td></td><td></td></tr>
<tr><td>7 years</td><td>Td</td><td></td><td></td></tr>
<tr><td>Pregnant women</td><td>TT</td><td></td><td></td></tr>
<tr><td>Influenza</td><td>Provided for HCW, and recommended on the private market for adults but not provided as part of EPI</td><td></td><td></td></tr>
</table>

25% of districts have DPT3 ≥80% coverage.
84% of districts have MCV1 ≥95% coverage.
IPV introduced in 2018.

</td><td>Vietnam has high vaccine coverage; however, there is geographic variation, with 25% of districts reaching DTP3 ≥80% coverage. No discrepancy between official and WHO–UNICEF estimates.</td><td>Vaccine coverage:
Green = high >85%;
Amber = moderate 70–84%;
Red = low <70%;
White = not enough info to rate.</td><td></td></tr>
</table>

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	Impact of COVID-19 on Routine EPI • Vietnam Targeted Country Assistance (TCA)/post-transition engagement reprogramming of Gavi funds applications approved; however, Gavi report does not document what the funds will be rechannelled to. Source: WHO VPD Monitoring: 2020 Global Summary: Viet Nam; Gavi COVID-19 Situation Report #6 (21 Apr 2020).			
Experience with Mass Campaigns	• An in-depth analysis was carried out to identify high-risk districts with low performance of MCV1 and MCV2 (less than 95% of vaccine coverage and/or high measles incidence in last three years). • These districts were selected for a large-scale MR follow-up SIA in 2019, with an estimated 4.2 million children aged 1–5 years old targeted. Source: Gavi Joint Appraisal Report 2018 [Vietnam].	Very little data on mass campaigns in Vietnam. It is not clear if this is because there have not been many or if the information is not available publicly.	Experience with mass campaigns: Green = highly experienced; Amber = somewhat experienced; Red = limited experience; White = not enough info to rate.	Not enough info to rate
Adult Vaccination Campaigns	• Influenza vaccination provided for HCW and recommended for high-risk groups, but not provided as part of EPI, only on the private market. Source: WHO VPD Monitoring: 2020 Global Summary: Viet Nam.			
Governance				

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Leadership and Governance	• On 31 July 2017, the Government issued Decision No. 1125/QD-TTg, approving 'The Health Population Target Program period of 2016–2020' that included EPI. Since then, EPI has continued to be one of eight priority health projects. However, a new mechanism of funding was applied to all health programs, including EPI. • In 2017, leaders and EPI staff at provincial and district level had a high turnover, because of changes in system structure. These changes may cause challenges in management and coordination, planning, advocacy, and implementation of immunisation activities. It is not known if there continues to be a high turnover of leaders and EPI staff. *COVID-19* • National Steering Committees continue to be convened on periodic and ad hoc bases to review the evolving outbreak situation and to discuss, direct, and adjust response measures, especially as the country is striving to achieve dual targets of outbreak control and economic development. Source: Gavi Joint Appraisal Report 2018 [Vietnam]; WHO Viet Nam COVID-19 Situation Report #14 (22 Oct 2020).	There is a National Steering Committee for COVID-19 in place, which meets regularly, but very little other information available.	Governance capacity for COVID-19 vaccine: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.
COVID-19 Vaccine National Policy	• National EPI Policy 2016–2020. Source: WHO VPD Monitoring: 2020 Global Summary: Viet Nam.	No information available on a COVID-19 Vaccine National Policy.	COVID-19 vaccine national policy in place: Green = policy developed; Amber = in preparation; Red = no policy or plans to develop; White = not	Not enough info to rate.

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			enough info to rate.	
National Immunisation Technical Advisory Group (NITAG)	• NITAG in place. Source: WHO VPD Monitoring: 2020 Global Summary: Viet Nam.	No information available on NITAG, except that it exists.	NITAG established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	Not enough info to rate.
Healthcare Workforce (vaccine providers)	• A challenge highlighted in the GAVI appraisal was changing the organisational structure of preventive medicine systems at provincial and district levels. At provincial level, Centres for Disease Control were established by merging Preventive Medicine Centres, Communication Centres, and others. At district level, Health Centres and District Hospitals were merged. This change caused a high turnover of EPI staff at all levels. These staff need to be trained or re-trained in immunisation. The date of this change was not provided. • Multiple staff are tasked beyond EPI and lack time for regular supervision, which is an additional burden on health staff. • Inequitable distribution of vaccinators was quoted as a health system constraint in the National EPI Policy. Vietnam has 11 nurses per 10,000 population, which is lower than the average for lower-middle-income countries in the Asia–Pacific region (19 nurses per 10,000 population). Source: Gavi Joint Appraisal Report 2018 [Vietnam]; MOH National EPI Multi-Year Plan 2016–2020 (Aug 2015); WHO Global Health Workforce Statistics (Dec 2018); Health at a Glance: Asia/Pacific 2020.	Vietnam has a low rate of nurses to population, and their distribution is not equitable according to the population needs. There are challenges with a high turnover of staff.	HCW available to deliver EPI: Green = above average; Amber = average; Red = less than average; White = not enough info to rate.	

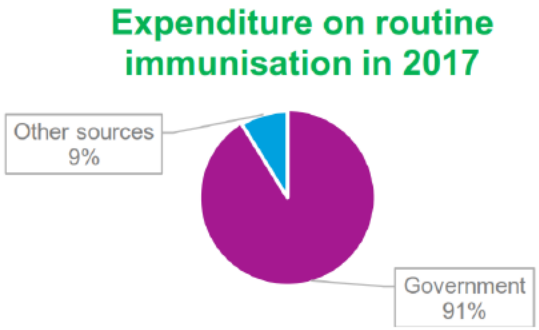
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HCW EPI Training	• In 2018, training was provided in EPI for health workers in 13 districts, to improve vaccination coverage rates and the quality of immunisations. This included five districts in four provinces in central region, and eight districts in four provinces in the northern region. • A national guideline on vaccine storage and management for provincial and district EPI staff has been revised in 2017, and 2,000 booklets on vaccine storage and management, and 2,000 posters on regulation of vaccine management have been printed and distributed to health facilities nationally. • National staff have improved knowledge of vaccine and cold chain equipment procurement through participation in relevant workshops organised by UNICEF. • High staff turnover and high rates of new staff. Source: Gavi Joint Appraisal Report 2018 [Vietnam].	Training has been provided in relatively recent years (2018).	HCW trained in EPI: Green = very recent; Amber = somewhat recent; Red = out of date; White = not enough info to rate.	
Vaccine Access and Procurement				
Vaccine Regulatory Pathways	• In 2018, there were two new vaccines licensed in Vietnam, including ComBE Five vaccine from Biological E, India, and a DPT-Hep B-Hib vaccine from SII, India. National EPI has been approved by government to procure these vaccines through UNICEF. • In 2018, the ComBE Five vaccine replaced the Korean-made Quinvaxem, according to the National Institute of Hygiene Epidemiology. • Vietnam has a National Institute for Control of Vaccines and Biologicals; in June 2015, the WHO formally certified Vietnam to have a fully equipped national regulatory system that ensures the safety and efficacy of vaccines produced and used in Vietnam. • WHO continues to support the modification of pharmaceutical legislation. • The National Centralised Procurement Unit requested further support from Gavi until June 2020. • The first batches of the new DTP-Hep B-Hib vaccine did not pass the safety tests conducted by the local drug administration (NRA), thus were not released for use in EPI. Accordingly, DPT-Hep B-Hib vaccine stock out has occurred in Vietnam since August 2018.	Vietnam has regulatory pathways in place which have been effective in licensing new vaccines. However continued support from WHO is required.	Vaccine regulatory pathways are established: Green=well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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	• Pre-qualification experts from WHO reviewed and found the local safety tests did not comply with WHO standards and recommended that NRA conduct the tests again and, in addition, send samples for retesting by a third laboratory in Korea. • A full-time national consultant provides technical support to MOH to strengthen pharmacovigilance functions of the NRA as it prepares for WHO benchmarking in mid-November 2018. Further capacity building activities to strengthen NRA functions, especially on pharmacovigilance and communications and reporting of AEFI, were planned for Q1/Q2 of 2019. Source: WHO Viet Nam National Regulatory Authority Meets International Standards for Vaccine Regulation (Jun 2015); Gavi Joint Appraisal Report 2018 [Vietnam].			
Systems in Place for Procurement	• National EPI has been approved by government for procuring the vaccine through UNICEF. • Vaccine stock-outs are rare; however, during the switch to the ComBE Five vaccine there was a delay in the importation and distribution process, which resulted in a stock out between August–October 2018 for seven provinces, and August–December 2018 for the remaining 56 provinces. • Vaccine-specific national procurement capacity needs to be strengthened for more efficient tendering and negotiations in the medium- to long-term. Source: Gavi Joint Appraisal Report 2018 [Vietnam].	Systems are in place for procurement, UNICEF is approved to procure, and training is being offered for the national system to take over procurement.	Vaccine procurement systems are established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	

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EPI Funding	• Proportion of government funding for EPI: 2019 = 81%; 2018 = 91%; 2017 = no data; 2016 = 56%; 2015 = 44% (Source: WHO VPD Monitoring: 2020 Global Summary: Viet Nam).  (Source: GAVI Appraisal) • Vietnam is in Gavi transition phase. • National EPI developed a planning framework for immunisation, which helps provincial EPI managers to develop their local immunisation plan, with funding proposals submitted to provincial authorities. All provincial EPI managers from 63 provinces of Vietnam have been trained, with EPI funds, and have improved knowledge and understanding of planning and mobilising local funds for immunisation. • In June 2018, immunisation financing activities were moved under WHO's technical assistance in the revised Gavi transition plan. • The central government secures funds for procurement of vaccine and immunisation materials; provincial people's committees allocate budget for operating EPI activities. Source: WHO VPD Monitoring: 2020 Global Summary: Viet Nam; Gavi Joint Appraisal Report 2018 [Vietnam].	Vietnam funds a large proportion of EPI costs, >90%, and is in the GAVI transitioning phase.	EPI funding: Green = fully government-funded for vaccines and program; Amber = mainly government-funded >50%; Red = mainly donor-funded, government funds <50%; White = not enough info to rate.	

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Infrastructure and Systems for Vaccine Management				
Cold and Supply Chain	• In 2018, there was an EVM assessment and procurement of cold chain equipment, co-financed by government and Gavi, with LuxDev (Luxembourg Development Cooperation Agency) supporting the maintenance. • National EPI requested Gavi complete an EVM assessment in 2019 to assess impact. • A list of cold chain equipment that meets WHO standards for keeping, maintaining, and transporting vaccines in immunisation was standardised and used by the national EPI. It serves as a reference to which provincial EPI managers refer when they undertake planning and use their own local funds to procure cold chain equipment for immunisation. Source: Gavi Joint Appraisal Report 2018 [Vietnam].	There were cold chain upgrades in 2018, and SOPs were in place to maintain and conduct further inventories in 2019. Data on vaccine storage at more extreme temperatures was not available.	Has capacity to store routine EPI vaccines at +2 to +8°C: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	
Waste Management	• Data not readily available.	No data available.	Has capacity to manage routine EPI vaccine waste: Green = good capacity; Amber = some capacity; Red = requires increased; White = not enough info to rate.	Not enough info to rate.

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Security Arrangements	• Data not readily available.	No data available.	Has capacity for security surrounding COVID-19: Green = good capacity; Amber = some capacity; Red = requires increased capacity; White = not enough info to rate.	Not enough info to rate.
Immunisation Information Systems				
Individual Immunisation Records	• In 2018, Vietnam started the implementation of electronic immunisation registration in the National Immunisation Information System (NIIS). However, the existing paper-based reporting continues to be maintained and cross-checked with electronic reporting. • Each child has one unique ID; however, there are still challenges, especially in hard-to-reach and urban areas with high rates of immigration. Source: Gavi Joint Appraisal Report 2018 [Vietnam].	A national computerised individual immunisation record has been in place since 2018. Results from the pilot study in selected provinces show it is operating well. Data on number of injections, vaccine doses, and immunisation	Individual immunisation record captured by the service provider: Green = electronic centralised individual immunisation record; Amber = paper-based or not centralised; Red = no	
National Immunisation Register	• Status of the health and immunisation information system and denominator-related information: Starting implementation step-by-step for an electronic immunisation registration in the National Immunisation Information System. • Existing paper-based reporting is maintained and cross-checked with electronic reporting. • Responsibilities are assigned to regional, provincial, and district levels.			

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	• ImmReg; National computerised immunisation register: ○ Data on newborns is entered into the system at birth by neonatal units at hospitals or CHCs. ○ ImmReg generates lists of people due for vaccinations on immunisation day and automatically sends them SMS text reminders. ○ Health centre workers enter data on doses delivered. ○ ImmReg automatically generates immunisation reports, which higher-level managers can access in real time. • ImmReg pilot study took place in 2015 and was scaled up nationally in 2017. Source: Gavi Joint Appraisal Report 2018 [Vietnam]; PATH From Paper to E-Records: Vietnam's Digital Immunization Registry (Nov 2017).	equipment is collected monthly at all levels. This system can manage vaccine usage factor.	individual immunisation record; White = not enough info to rate.	
Monitoring Vaccine Coverage	• Periodical coverage survey should be conducted every five years; last survey was 2015, and next survey due in 2020. • Vaccine management and coordination: web-based reporting software on vaccines and immunisation equipment management has been rolled out for years. • The software has been used at national, regional, and provincial level. Data on number of injections, vaccine doses, and immunisation equipment collected monthly at all levels. This system can manage vaccine usage. Source: Gavi Joint Appraisal Report 2018 [Vietnam].			
AEFI Reporting and Management	• AEFI surveillance and review committee in place. • AEFI investigations: Although the AEFI surveillance system has been established at all levels, some localities have not reported any severe cases, so they have not experienced an AEFI investigation. In 2018, a total of 261 EPI staff and HCW at hospitals in 63 provinces/cities and four regions had been trained in AEFI monitoring and surveillance with support from Gavi/WHO. Currently, most cases of severe AEFI have been reported to the national level within 24 hours	AEFI reporting and review systems have been in place for some time and are running well with recent training.	AEFI reporting system is established: Green = well established; Amber = somewhat established;	

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	and investigated, with causes assessed within five days in accordance with the existing regulations. • In 2018, National Institute for Control of Vaccine and Biologicals and other NRA institutions conducted a national workshop to review the post-marketing surveillance of vaccines and biological products circulated on the Vietnamese market. This workshop was a part of NRA capacity building, as identified in the Institutional Development Plan (IDP), and aimed to familiarise participants with the latest WHO Guidelines on Adverse Effects Following Immunisation (AEFI) Surveillance, share practical experiences with the provincial Centres for Disease Control, and plan for post-marketing surveillance activities in 2019. Source: WHO VPD Monitoring: 2020 Global Summary: Viet Nam; Gavi Joint Appraisal Report 2018 [Vietnam].		Red = being established; White = not enough info to rate.	
COVID-19 Surveillance Systems	• Vietnam has passed 50 days without any COVID-19 cases reported. • The country continues to accelerate active measures to achieve dual objectives of economic development and disease control; as well as moving towards a 'safe coexistence with COVID-19'. • As of 18 November 2020, Vietnam reported a total of 1,306 laboratory confirmed cases of COVID-19, from 44 out of 63 cities/provinces in the country, and also 35 deaths.	Vietnam has been effective identifying and stopping local transmission of COVID-19. However, information on the surveillance system is limited. No information available on case definitions, data management, training, or reporting.	COVID-19 surveillance system is established: Green = well established and effective; Amber = established and somewhat effective; Red = not established or ineffective; White = not enough info to rate.	Not enough info to rate.

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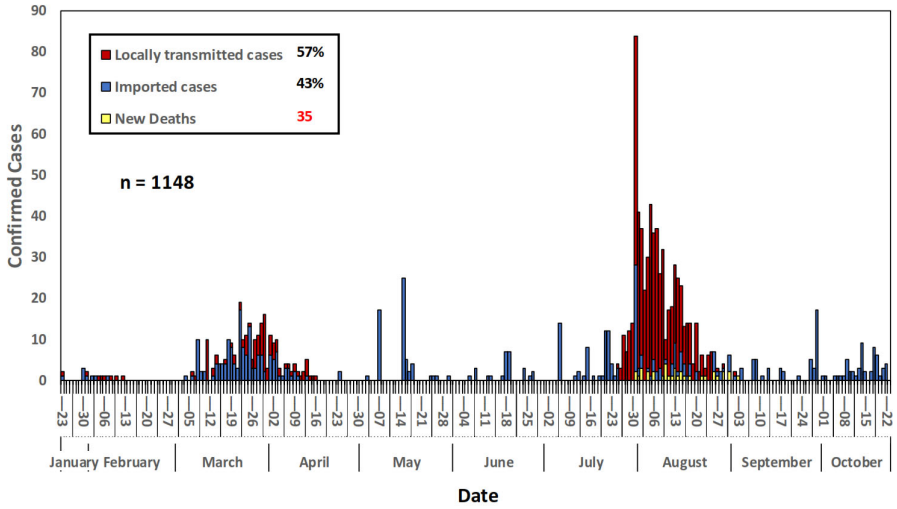


Figure 2. **Epidemic curve of COVID-19 laboratory confirmed cases, Viet Nam, by date of reporting**

- Technical guidelines on surveillance, contact tracing, quarantine, infection prevention and control, and case management continue to be reviewed and updated/revised as needed. Dissemination workshops and training are provided to further equip and build on technical capacity for relevant staff to be ready to respond to the ongoing situation and any resurgence of cases in the community.

Source: WHO Viet Nam COVID-19 Situation Report #14 (22 Oct 2020); WHO COVID-19 Western Pacific Situation Report #29 (18 Nov 2020).

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Risk Communication				
Risk Communication Plan	• Communication to the public has focused on providing updates on outbreak situations and government actions, including stories on the ground, promoting protective measures, and countering rumours and misinformation. • Messaging on protective measures has been repackaged as '5K': (1) facemask; (2) hygiene; (3) safe distance; (4) gathering; (5) health declaration. The Ministry of Health, with support from WHO, has started communication activities supporting the 'safe coexistence with COVID-19' initiative. • To further support this, a long-term online campaign titled 'Normalize the new normal', will be jointly launched by United Nations organisations and other international organisations in November 2020. • This is part of the activities of UN+2 COVID-19 Risk Communication and Community Engagement subgroup, the country's INGO risk communication and community engagement working group. WHO serves as the technical lead and coordinator of this group. Source: WHO Viet Nam COVID-19 Situation Report #14 (22 Oct 2020).	Risk communication appears to be strong for COVID-19.	Risk communication plan is established: Green = well established; Amber = somewhat established; Red = being established; White = not enough info to rate.	
Community Mobilisation/ NGO	• The national communication plan for EPI focuses on demand generation and vaccine hesitancy (through IPV project implemented with UNICEF support). • Communication activities for routine immunisation and MR were carried out with UNICEF support in 2018. Support for implementation of activities to deal with anti-vaccination is ongoing from WHO under the transition plan. Source: Gavi Joint Appraisal Report 2018 [Vietnam].	Community mobilisation for mass campaigns appears to be strong. Support is also provided by partners, WHO and UNICEF.	Community Mobilisation/ NGO is established: Green = well established; Amber = somewhat established; Red = being established.	

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Vaccine Hesitancy	• Information from anti-vaccination group on social media in 2017. Source: Gavi Joint Appraisal Report 2018 [Vietnam].	Some evidence of vaccine hesitancy.	Vaccine hesitancy: Green = none or little; Amber = some; Red = present; White = not enough info to rate.	
Vaccine Enablers	• Data not readily available.	No data available.	Vaccine enablers: Green = numerous; Amber = some; Red = few; White = not enough info to rate.	Not enough info to rate.

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Summary Analysis – Vietnam

The population of Vietnam is 97 million, with 37% living in urban areas, and 63% living in rural areas. The population at high and increased risk of COVID-19 is 4% and 23% respectively, which is similar to the global average of 4% and 22% respectively.

As of 18 November 2020, Vietnam has reported a total of 1,306 laboratory confirmed cases of COVID-19 from 44 out of 63 cities/provinces in the country, as well as 35 deaths. The country continues to accelerate active measures to achieve dual objectives of economic development and disease control; and moving toward a 'safe coexistence with COVID-19'.

Vietnam's strengths for delivering a COVID-19 vaccination campaign are the fact that it has high routine immunisation coverage, strong community mobilisation, risk communication, and AEFI surveillance. There was limited data available on mass immunisation campaigns.

There is limited information on governance or a national COVID-19 vaccine policy. A NITAG is in place, but no information is available on its membership and how often it meets. Vietnam has a low rate of nurses for the population, with uneven geographic distribution, and a high turnover of staff. EPI training was reported in 2018, with Gavi support. Vietnam is COVAX AMC eligible.

Regulatory pathways are in place that have effectively approved new vaccines; however, it seems this process still requires partner (WHO) support. There is an effective system in place for procurement, with partner support from UNICEF. The government funds >90% of routine EPI. The recent stock out in pentavalent vaccine was due to an assessment of the vaccines being unsafe, rather than procurement or supply chain issues.

There have been substantial improvements in cold chain systems over recent years, with new equipment and training. There was limited available data on waste management and security arrangements.

A national computerised individual immunisation record has been in place since 2019. AEFI surveillance appears to be strong. There is very little data on the COVID-19 surveillance system.

Risk communication and social mobilisation are strong.

Vietnam appears to be well-placed to deliver a COVID-19 mass vaccination campaign; some technical support from partners could be requested.

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Terms of Reference: COVID-19 Vaccine Delivery Capability and Gap Analysis for Pacific Island Countries and Southeast Asia

Position Title:	Review of COVID-19 Vaccine Delivery Capability and Gap Analysis for Pacific Island Countries (PICs) and Southeast Asia
ARF Professional Discipline Category:	Technical Adviser Vaccinations – Pacific Island Countries and PNG – Category C Technical Adviser Vaccinations – Southeast Asia – Category C
ARF Job Level:	4
ARF Daily Rate:	$900
Program:	Indo-Pacific Centre for Health Security (CHS)
Child Protection Risk Context	No direct contact with children
Location/s:	Desk-based
Term:	Up to a maximum of 12 days input from 15 October to 15 November 2020.
Reporting to:	This ToR is under an SHS Type 1 Service Order whereby SHS quality assures all deliverables prior to submitting them to DFAT (unless agreed by SHS in writing). The SHS is responsible for the quality assurance of key deliverables. The advisers will submit the agreed deliverables to the SHS Advice Desk and copied to the designated SHS technical lead on the specified dates, unless other arrangements are confirmed in writing. The designated SHS technical lead will liaise with the advisers to ensure the final output meets DFAT requirements. Draft outputs are not to be circulated beyond key counterparts until the final versions have been approved by the DFAT. The Adviser will report to: DFAT: s47F s47F SHS: s47F
Background:	The COVID-19 pandemic has had an unprecedented impact on the well-being of populations around the world. Although most PICs have succeeded in preventing and containing outbreaks of the virus, thus limiting the direct health impact of the pandemic in this region, the economic and social impacts have been severe. As such, the Australian Government has a strong interest in

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	supporting the development and distribution of COVID-19 vaccines, which will be a key tool to enable the reopening and rebuilding of economies in our region. The Government, through the Department of Foreign Affairs and Trade (DFAT), is working to accelerate and enable equitable access to COVID-19 vaccines for countries in our region in several ways. These include targeted financial investments – such as a contribution of $7.5 million to the Coalition for Epidemic Preparedness Innovations (CEPI), which is developing a portfolio of COVID-19 vaccine candidates that will become available for distribution to developing countries – as well as policy engagement to support the development of multilateral mechanisms such as the COVAX Facility. Led by Gavi, the Vaccine Alliance, the COVAX Facility aims to accelerate the development, procurement and equitable distribution of approved COVID-19 vaccines to high-risk populations in participating countries. It is expected that the COVAX Facility (including a specific pool to finance vaccine doses for developing countries, the COVAX Advance Market Commitment) will be the primary source of COVID-19 vaccines for Pacific island countries. More broadly, through the *Partnerships for Recovery* Strategy, DFAT continues to support longer-term efforts to strengthen health systems in the Pacific and Southeast Asia. These systems will be expected to play a vital role in enabling a quick roll out of COVID-19 vaccines as they become available. However, the extent to which they are currently equipped to deliver a COVID-19 immunisation campaign (which could take place beginning as early as 2021) is not clear. The Australian Regional Immunisation Alliance (ARIA), a consortium of more than 20 researchers will work with organisations including the World Health Organization (WHO) and UNICEF, to support immunisation programs in the Pacific region starting with Timor-Leste and Papua New Guinea followed by other PICs. The partnership is funded through an AUD 3 million grant from the Centre for Health Security (CHS). For the Pacific, PNG and Timor-Leste, DFAT envisages a shared COVID-19 vaccine delivery support strategy between partners and countries, where partners could include Australia (DFAT), New Zealand (MFAT), WHO, SPC, UNICEF, the World Bank, Asian Development Bank and Gavi, the Vaccine Alliance. s33(b) s33(b) DFAT has proposed a gap analysis of readiness for new vaccine introduction across PNG, PICs and Southeast Asia to inform a coordinated approach to supporting the roll-out of a COVID-19 vaccine if/when available.
Purpose and Objectives:	**The purpose of this gap analysis is to inform the development of a targeted regional (PICs, PNG and Southeast Asia) COVID-19 vaccine delivery support strategy.** The geographies of interest include: • All Pacific island countries and territories, with a primary focus on: • Fiji • Kiribati • Nauru

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- Samoa
- Solomon Islands
- Tonga
- Tuvalu
- Vanuatu
- Papua New Guinea

- Indonesia, Timor-Leste, Laos, Cambodia, Myanmar, Vietnam and Philippines

The priority focus of the Vaccine Delivery Gap Analysis will be the development of a practical framework for assessing, mapping and rating vaccine delivery readiness and completing preliminary gap analysis based on relevant, publicly available information on the countries of interest.

The gap analysis will involve the following:

Phase 1. Desk Review – Develop a framework for analysis (based on Annex B) – in table format and populate framework with data from relevant publicly available reports, assessments, strategies and other information on vaccine delivery systems/immunisation programs in PICs, PNG and identified countries in Southeast Asia. The Specialist Health Service (SHS) has been engaged to collate the relevant, publicly available documents. These documents will be provided to the advisers at the start of the consultancy.

Phase 2. Map and rate readiness of vaccine supply and delivery capability to roll-out a COVID-19 vaccine for PICs, PNG and Southeast Asia against key steps in the vaccination pathway – from country approval of a COVID-19 vaccine, to vaccination of the target population (see Annex B), using standard indicators as thresholds for consistent assessment, including:

i. Existing infrastructure and systems for vaccine management, including storage and delivery. e.g. equipment for safe vaccine storage (i.e. vaccine fridge and portable vaccine storage), cold chain management, and transport.

ii. Immunisation information systems (including individual immunisation records; a National Immunisation Register (NIR); vaccine safety – reporting mechanism for adverse events following immunisation (AEFI); and COVID-19 surveillance systems.

iii. Current key strategies applied by each PIC and identified Southeast Asian country to improve population vaccine coverage including those applied in routine vaccine programs and intermittent 'catch-up' campaigns.

iv. Risk communication plan and identification of key barriers and enablers to vaccine uptake in each country, particularly addressing vaccine hesitancy and positive influencers.

v. Current immunisation coverage across core vaccines, results of previous mass campaigns conducted in the country, and/or information on any future planned campaigns.

The gap analysis should build upon existing relevant analyses (e.g. produced by UNICEF, WHO, World Bank Multi-Donor Trust Fund, ARIA Country Scoping Reports, Pacific Immunisation Review 2015, other relevant SHS products). The gap analysis should take into consideration the overall

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<table>
<tr><td></td><td>objective of assessing a country's ability to make COVID-19 vaccines available equitably and efficiently, with an initial focus on reaching target populations.

The gap analysis should have a summary needs assessment of each country's vaccine readiness, available resources (including funding), key gaps, and relevant country-specific factors – for example, vaccine hesitancy and uptake enablers.

If required, the advisers may liaise directly with key partners to fill in information gaps, however, Phase 1 and Phase 2 will be the key priority for this consultancy.

The two technical advisers will work collaboratively to develop the framework and methodology for the gap analysis to ensure comparison across countries in the Indo-Pacific region. Experts from the National Centre for Immunisation Research and Surveillance (NCIRS), the Therapeutic Goods Administration (TGA) and The University of Auckland will participate in peer review for the gap analysis.</td></tr>
<tr><td>Deliverables with dates:</td><td>The advisers will develop two identical documents – one for PICs and one for Southeast Asia – that assess vaccine delivery gaps and country readiness for COVID-19 vaccine delivery. The documents will include a brief summary of each country, gap analysis (table format) and country readiness analysis (using a traffic light system). The maximum number of pages will be two pages per country.

Key deliverables and indicative dates are outlined in the table below:

<table>
<tr><th>Indicative Date</th><th>Milestone</th><th>Verification Indicator</th></tr>
<tr><td>28 October</td><td>1. Draft COVID-19 vaccine delivery gap analysis (in table format) & Country Readiness (traffic light format) x 2 (one for PICs and PNG and one for SEA)</td><td>Acceptance of milestone/report by DFAT</td></tr>
<tr><td>15 November</td><td>2. Final COVID-19 vaccine delivery gap analysis (in table format) & Country Readiness (traffic light format) x 2 (one for PICs and PNG and one for SEA)</td><td>Acceptance of milestone/report by DFAT</td></tr>
</table>

The indicative inputs required are outlined in the schedule at Annex A.</td></tr>
<tr><td>Reporting and Payment:</td><td>The Adviser will submit an activity report and invoice at the following points:
o Acceptance by DFAT of Milestone 2

The total inputs (days) claimed for each milestone should not exceed the indicative inputs as per the adviser inputs schedule provided in this ToR.</td></tr>
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Conditions:	Conditions of engagement may include completing and signing the following documents: The Deed of Confidentiality The Declaration of Adviser Status An Adviser Performance Assessment will be undertaken at the completion of the assignment.

Key Selection Criteria

Required Experience	1. A strong understanding of vaccine delivery systems, particularly in the Indo-Pacific region. 2. Demonstrated ability to work with country, development and program partners to inform advice. 3. Experience working on a health or vaccine delivery program in the Indo-Pacific region.
Required Skills and Qualifications	4. Strong communication skills – to produce a timely and quality product that reflects inputs from all key stakeholders. 5. Post graduate qualifications in public health, or equivalent.
Language Requirements	6. Demonstrated fluency in English and excellent written skills.
Desirable Experience	7. Experience establishing or strengthening National Immunisation Programs.

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Annex A: Indicative Schedule for each Adviser

Date (TBC)	Activity	Indicative input (hours/days)
15 October	DFAT Technical Briefing and Development of Framework/Table format	1
16-20 October	Desk Review of Key Documents	2
21-28 October	Draft Gap Analysis	5
28-31 October	DFAT and Expert Peer Review and Feedback on Draft	0
2-3 November	Revisions to Draft Gap Analysis	1
4-11 November	DFAT and Expert Peer Review and Feedback on Final Draft	0
12-15 November	Finalise Gap Analysis	3
	TOTAL	***12***

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Annex B: COVID-19 Vaccine Delivery in Pacific Island Countries

COVID-19 Vaccine Delivery for Pacific Island Countries



Other Considerations by Country



Other Considerations by Region

