Exploring determinants of response-ready influenza vaccination programs in middle-income countries

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SABIN VACCINE INSTITUTE

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See Appendix A for study team and advisory committee member bios.

LIST OF ACRONYMS

ACIP	Thai Advisory Committee on Immunization Practice
AEFI	Adverse Event Following Immunization (reporting system)
AFRO	WHO Africa Regional Office
AMRO	WHO Region of the Americas
ANC	Antenatal Clinic
ARI	Acute Respiratory Infection
ASEAN	Association of Southeastern Asian Nations
BARDA	Biomedical Advanced Research and Development Authority
BDS	Brazilian Diabetes Society
CDC	United States Centers for Disease Control and Prevention
CGDT	General Coordination of Transmissible Diseases
CHE	Current Healthcare Expenditure
CHIF	Albanian Compulsory Health Insurance Fund
CNI	Bolivian National Committee on Immunization
CoAg	Cooperative Agreement
COVID-19	Coronavirus-19; SARS-CoV-2
cPIE	COVID-19 Vaccine Post-Introduction Evaluation
CSO	Civil Society Organization
CTAI	Comitê Técnico Assessor em Imunizações
DDC	Department of Disease Control
DOH	Department of Health
ECDC	European Centers for Disease Control and Prevention
EPI	Expanded Programme on Immunization
ESAVI	Events Supposedly Attributable to Vaccination or Immunization
EURO	WHO European Regional Office
FETP	Field Epidemiology Training Program
FSVI	Albanian Food Safety and Veterinary Institute
GDP	Gross Domestic Product
GISRS	World Health Organization's Global Influenza Surveillance and Response System
GPO	Government Pharmaceutical Company

GSK	GlaxoSmithKline (pharmaceutical company)
HICs	High-Income Countries
HITAP	Health Intervention and Technology Assessment Program
HW	Health Worker
IA2030	Immunization Agenda 2030
IEM	Russian Institute of Experimental Medicine
IIS	Albanian Integrated Immunization System
ILI	Influenza-like Illness
INCQS	Brazilian National Institute for Quality Control in Health
IPH	Albanian Institute of Public Health
KAP	Knowledge, Attitudes and Practices
KI	Key Informant
KII	Key Informant Interview
LICs	Low-Income Countries
LMICs	Low- and Middle-Income Countries
LUHC	Albanian Local Units of Health Care
MERS	Middle East Respiratory Syndrome
MICs	Middle-Income Countries
MOH	Ministry of Health
MOHSP	Albanian Ministry of Health and Social Protection
MOPH	Ministry of Public Health
mRNA	Messenger Ribonucleic Acid
NAGI	South African National Advisory Group in Immunization
NGO	Non-Governmental Organization
NHIP	National Health Insurance Plan
NHSO	National Health Security Office
NIC	World Health Organization National Influenza Center
NICD	National Institute for Communicable Diseases
NIH	National Institutes of Health
NITAG	National Immunization Technical Advisory Group
NPI	Non-Pharmaceutical Interventions
OOP	Out of Pocket

PAHO	Pan American Health Organization
PIVI	The Partnership for Influenza Vaccine Introduction
PLHIV	People Living with HIV/AIDS
PNI	Brazilian National Immunization Program
RSV	Respiratory Syncytial Virus
RUDA	Albanian Animal Health Surveillance System
SAFCI	United Family Community and Intercultural Health System
SARI	Severe Acute Respiratory Infection
SARS	Severe Acute Respiratory Syndrome
SBIM	Brazilian Immunization Society
SEARO	WHO South-East Asia Regional Office
SECID	South-East European Center for Surveillance & Control of Infectious Disease
SEDES	Bolivian Department of Health (Sericio Departamental de Salud)
SEEHN	Southeastern Europe Health Network
SIPINI	Brazilian National Immunization Program Information System
SISI	Albanian Human Health Surveillance System
SLIPE	Latin American Society of Pediatric Infectious Disease
SUS	Unified Health System (Sistema Único de Saúde)
TESSy	The European Surveillance System
UHC	Universal Health Coverage
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VACFA	The Vaccines for Africa Initiative
VCR	Vaccine Coverage Rate
WCO	World Health Organization Country Office
WHO	World Health Organization

^	Indicates information received from a key informant

EXECUTIVE SUMMARY

Although influenza imposes a persistent seasonal burden and looms as a severe pandemic threat (1–3), many countries fail to meet the recommended 75 percent threshold for vaccine coverage of vulnerable individuals set by the World Health Assembly and the European Council (4,5). Prior research explored policy and programmatic factors that improve and sustain influenza VCRs in high-income countries, but not in middle-income countries (MICs), several of which maintain national influenza immunization programs—and where the majority of the world's population resides(6,7).

To begin to fill this gap, Sabin Vaccine Institute, funded by Ready2Respond, sought to identify factors underlying resilient influenza vaccination programs in MICs and to highlight information, policies and activities that could guide optimal investment in influenza programs by other MICs. In addition, recognizing that COVID-19 strenuously tested national immunization programs, we also interrogated the contribution of influenza immunization systems and infrastructure to recent pandemic response and the extent to which these assets provide a foundation for responding to all emerging infectious diseases, including the certain threat of pandemic influenza.

Our study met the following specific objectives:

- Compile a synthesized review of influenza vaccination program status across a selection of MICs
- Conduct in-depth case study reviews in five geographically diverse MICs with outstanding national influenza immunization programs to identify determinants of improved and sustained vaccine coverage
- In the selected MICs, examine the contribution of influenza-specific evidence, investment and infrastructure to their response to COVID-19.

Data collection was structured according to the following categories of key determinants driving influenza vaccine uptake in MICs, which we defined based on a landscaping review of relevant literature: political; economic; structural; socio-behavioral; demand generation. A multi-step selection process led us to choose Albania, Bolivia, Brazil, South Africa and Thailand for individual case study: countries that are diverse in the challenges posed to them by influenza and in their approaches to meeting those challenges.

Each case study gathered information on the five determinants—plus a sixth category, the influence of influenza programming on COVID-19 response—through narrative reviews of the literature and from key informant interviews (KIIs) among diverse stakeholders ranging from Ministry of Health officials to frontline health workers in both public and private sectors. We employed an adapted Framework Method (8,9) to derive key themes from coded transcripts of KIIs.

The following general themes emerged as consistent indicators of positive influenza vaccine program trajectories and response readiness:

- Locally relevant surveillance and research informs evidence-based policymaking.
- Alternative procurement solutions ensure availability of timely and affordable vaccines.
- Frontline health workers drive vaccine uptake.
- Community-tailored demand generation efforts boost vaccine confidence and uptake.
- Life course immunization builds pandemic preparedness.

These themes reveal key factors contributing to positive influenza program trajectories, providing valuable context for further efforts to build resilient influenza programs in diverse MICs.

INTRODUCTION

Influenza is a double menace: a virus that kills hundreds of thousands of people and sickens millions more each year, and a lurking pandemic threat (1–3). Reducing the annual burden of influenza is a goal of the Immunization Agenda 2030 (IA2030) of the World Health Organization (WHO) (10), which recommends that every country establish annual influenza vaccination programs that are also prepared to respond if a virus with pandemic potential emerges (11). However, most countries—and especially low- and middle-income countries (LMICs)—have yet to achieve the goal, set by WHA56.19, of vaccinating at least 75 percent of individuals at high risk for influenza (4), a group that includes adults over 65 years of age and people with underlying chronic conditions. Due to low uptake in LMICs, half the global population currently receives only six percent of the available doses of seasonal influenza vaccine (12).

Previous research efforts have identified policy and programmatic characteristics associated with improved and sustained influenza vaccine coverage rates (VCRs) among four high-income countries (HICs) (8) and multiple LMICs (6). We found no in-depth research specifically examining the policy and programmatic factors driving influenza vaccine uptake across middle-income countries (MICs), which collectively represent three quarters of the world's population and one third of global gross domestic product (GDP) (6,7). In MICs, decision makers faced with the challenge of allocating limited resources among competing health priorities may overlook the role of annual influenza vaccination in supporting pandemic preparedness, a proven advantage during recent pandemics of H1N1 influenza (2009) and COVID-19 (14).

We aimed to discover key characteristics and lessons learned that can increase influenza VCRs in MICs and that improve the pandemic readiness and resilience of their influenza immunization programs. Thus, we sought to identify MICs with outstanding annual influenza programs and identify factors crucial to their development and sustainment. We also wished to understand how influenza programming influenced the response to COVID-19 in these MICs. Our findings are intended to reveal practical and evidence-based principles and guidance to support influenza vaccine introduction and increase VCRs in additional MICs.

To build this informational foundation, we conducted a landscape review of both published and grey literature relevant to influenza vaccination program status in 17 MICs. In-depth analyses were performed in five selected countries in which influenza VCRs have been sustained or have increased in recent years: Albania, Bolivia, Brazil, South Africa, and Thailand. Case studies for each of these MICs describe factors contributing to robust or improved influenza VCRs and examine how investments in influenza vaccination infrastructure influenced national response to COVID-19.

METHODS

To understand and describe structural and programmatic elements of effectiveness and resiliency within MIC influenza vaccination programs, we utilized a multiple or collective case study design (15).

Case Study Selection

We used a multi-step process to select countries for case-study analysis. Initial landscaping of MIC influenza programs narrowed the scope of our search, which we pursued through extended literature review, stakeholder mapping, and dissemination of a landscaping survey. This process provided preliminary data on countries eventually selected for case study and supported further data collection through interviews with identified stakeholders.

Initial Landscaping Literature Review and Stakeholder Mapping

An initial landscaping of both published and grey literature reviewed influenza vaccination programs across all MICs identified approximately 60 countries with vaccination policies related to seasonal influenza (16,17). Among them, we recognized 15 countries in which influenza vaccination policies and/or programs were at least partially funded by the national government, had been in place for five or more years, and had stakeholders we could reasonably expect to engage.

We then conducted an extended landscaping literature review to identify key components of influenza vaccine programs in each of the 15 candidate countries. The search terms [Country name] + 'influenza vaccination program' or 'influenza immunization program' were used in Google, Google Scholar, and PubMed to yield sources from the published scientific and policy literature, as well as from the grey literature. Curated resources included but were not limited to government and health authority reports, strategy briefs, conference presentations, market data and public messaging and advocacy campaign materials. Information gathered in these reviews informed our identification of key determinants for increasing and sustaining VCRs in each country, which are summarized in Table 1.

Country-specific landscaping reviews allowed us to identify key actors and stakeholders associated with influenza vaccine policymaking, procurement, distribution and vaccination programming or delivery. Stakeholders were discovered by searching author lists of relevant journal publications or grey literature and by searching the websites of relevant government, non-governmental organization (NGO), civil society organization (CSO) and academic institutions. Key partners of Sabin's program network and through the professional contacts of members of the project team and Advisory Committee identified additional stakeholders. These individuals included representatives of ministries of health and finance and of national immunization technical advisory groups (NITAGs) or their equivalent, along with healthcare providers, experts and advocates from academia and civil society.

Scoping Survey

Stakeholders within the 15 candidate countries were invited by email to complete an online survey developed using Survey Monkey. Survey questions were designed to probe vaccination program design and evaluation elements, to identify important implementing partners within and external to the government, to investigate influenza vaccine accessibility and to characterize messaging campaigns and their target populations. Results were analyzed within the Survey Monkey platform.

Final Selection of Case Study Countries

In our selection case study countries, we aimed to represent each of the following regions: Africa, Eastern Europe and the Middle East, Latin America and Southeast Asia. Initially we had eliminated Latin America from consideration due to the uniquely significant influence of the Pan American Health Organization (PAHO) Revolving Fund on influenza vaccine procurement and supply in that region. However, our review of the literature caused us to recognize that studying programming and policy experience in Latin American MICs was critical to the goals of this project.

The five MICs selected for case study analysis (Albania, Bolivia, Brazil, South Africa, and Thailand) were accepted by consensus of the project Advisory Committee. Each country met the following final selection criteria:

- Its influenza vaccination policy and/or program resided at the national or other administrative level of health delivery services

- It had published information in the public domain related to at least three out of five likely determinants of influenza vaccination program and policymaking as listed in Table 1
- An in-country collaborator able to facilitate engagement with key informants had been identified.

Table 1: Hypothesized determinants of influenza vaccine coverage rates in middle-income countries

Determinant Category	Factor Characteristics
Political Prioritization Accountability Partnerships	• Accountability to influenza vaccination policies and recommendations • Timeline of decision-making and program build following initial national policy recommendations • Influenza vaccine prioritization among the health authority • Investments and programming from multiple government authorities/ministries (e.g., Education or Social Welfare) • Presence and structure of multi-sectoral in-country influenza vaccination coalitions and frequency of engagement • Streamlined, accurate and sustainable procurement processes
Economic	• Procurement costs • Out-of-pocket costs • Reliable and updated burden of disease and economic impact data
Structural Access Data collection Management	• Influenza vaccination integrated into other services healthcare workers (HWs) provide • Readily accessible/available to the public (minimized burden on travel and time) • Data collection and management system on vaccine distribution and uptake • Leveraging of Expanded Programme on Immunization (EPI) assets and infrastructure
Communication & Education Advocacy Messaging	• Source of advocacy messaging (e.g., govt/health authority, civil society, academia, HW societies, private sector) • Components of advocacy messaging • Target audience of advocacy campaigns • HWs educated and regularly engaged on the importance of influenza vaccination, including guidance across age/risk groups • Incentives for HWs to advocate for and/or community members to receive influenza vaccine • HWs provided tools to share vaccination information with patients
Socio-behavioral Trust Attitudes Perceptions	• Perception of disease risk • Relationship to/trust in health system and health messaging sources • Attitudes towards vaccination (trust in the safety and efficacy of influenza vaccines) • Perceived importance of vaccination • Intention to be vaccinated

Case Study Development

Narrative literature review and key informant interviews with identified stakeholders informed our in-depth analysis of each case study country.

Narrative Literature Review

Searches of PubMed, Google Scholar, Google News, social media (Twitter, Facebook, LinkedIn) and information from key informants supplied the narrative literature reviews conducted for each case study country. Searches were structured as follows: [Country Name] + influenza-specific terms associated with each of the five determinant categories; [Country name] + COVID-19 specific term (see Appendix B for a full list of search terms).

Using separate search term criteria (see Appendix B), data were also gathered on COVID-19 vaccination rates in case study countries: [Country name] + 'COVID-19 specific terms.' This research informed the development of questions posed to key informants that further probed how influenza vaccination infrastructure contributed to COVID-19 response efforts.

Sources included in the reviews provided supplementary information regarding each determinant category on select topics pertaining to a lower-middle or upper-middle income country as designated by the World Bank (see Table 2) (18). Sources were excluded from review if they failed to examine the topic of immunization as it relates to influenza or COVID-19, or if they did not pertain to lower-middle or upper-middle income countries.

A landscaping table of the shortlisted MICs can be found within Appendix C.

Table 2: Additional characteristics influencing influenza vaccine coverage rates (from Narrative Literature Review)

Determinant Category	Hypothesized Factor Characteristics	Factors Identified from Narrative Literature Review Process
Political Prioritization Accountability Partnerships	• Accountability to influenza vaccination policies and recommendations • Timeline of decision-making and program build following initial national policy recommendations • Influenza vaccine prioritization among the health authority • Investments and programming from multiple government authorities/ministries (e.g., Education or Social Welfare) • Presence and structure of multi-sectoral in-country influenza vaccination coalitions and frequency of engagement • Streamlined, accurate and sustainable procurement processes	• Elements of influenza policy of programming • Decision-making entities related to immunization • Implementation partners or partnerships • Pandemic preparedness planning and/or implementation
Economic	• Procurement costs • Out-of-pocket costs • Reliable and updated burden of disease and economic impact data	• Procurement of influenza vaccines for the public or private sector • Cost-effectiveness of influenza vaccines
Structural Access Data collection Management	• Influenza vaccination integrated into other services HWs provide (incentives) • Readily accessible/available to the public (minimized burden on travel and time) • Data collection and management system on vaccine distribution and uptake • Leveraging of EPI assets and infrastructure	• Data collection and/or surveillance efforts including disease burden, vaccine coverage and adverse events reporting
Communication & Education Advocacy Messaging	• Source of advocacy messaging (e.g., govt/health authority, civil society, academia, HW societies, private sector) • Components of advocacy messaging • Target audience of advocacy campaigns • HWs educated and regularly engaged on the importance of influenza vaccination, including guidance across age/risk groups	• Current or past seasonal influenza campaigns

	• Incentives for HWs to advocate for and/or community members to receive influenza vaccine • HWs provided tools to share vaccination information with patients	
Socio-behavioral Trust Attitudes Perceptions	• Perception of disease risk • Relationship to/trust in health system and health messaging sources • Attitudes towards vaccination (trust in the safety and efficacy of influenza vaccines) • Perceived importance of vaccination • Intention to be vaccinated	• Socio-behavioral factors influencing public trust or perception associated with vaccination, such as those reflected in Knowledge, Attitudes and Practices (KAP) studies

Key Informant Interviews

Select key informants (KIs) identified through stakeholder mapping were emailed an invitation to interview and offered an honorarium of US$500.

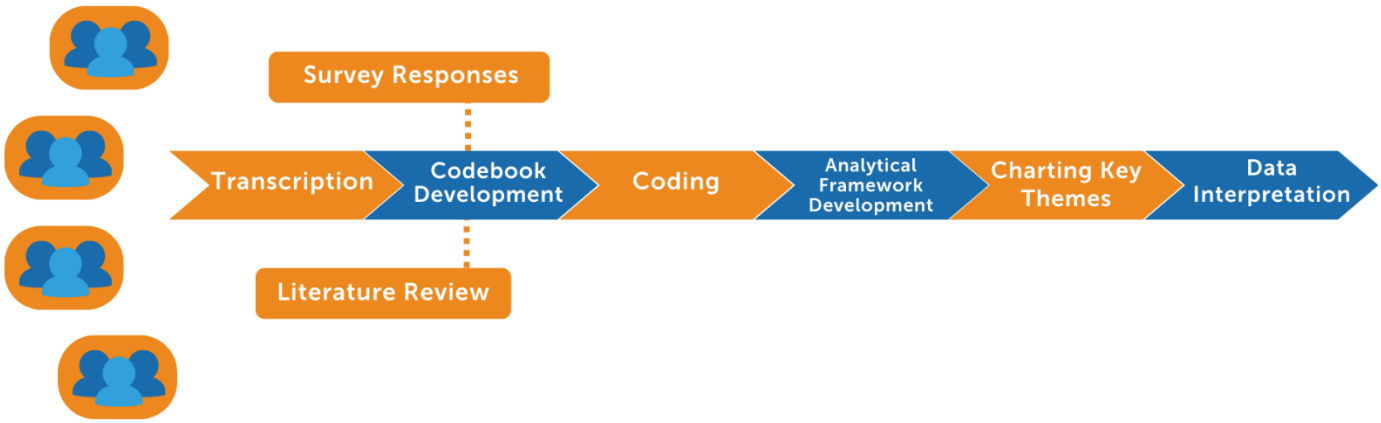
Key informant interviews (KIIs) were structured according to a guide we developed to probe the identified determinant categories of influenza VCRs in MICs shown in Table 1. Country-specific questions were added to fill in knowledge gaps identified through literature review.

Interviews of approximately one hour were conducted via Zoom by one team member and supported by another, who served as note-taker. All interviews were recorded following verbal assent by the interviewee. In some cases, interviews were conducted in the preferred language of the interviewee through real-time interpretation enabled by Zoom's Language Interpretation function; in one case, a Sabin team member fluent in Spanish conducted the interview and its transcript was translated into English.

Analysis

To analyze literature review, survey and KII data, we employed an adapted Framework Method (8,9) comprised of the six stages outlined in Figure 1 and further described below.

Figure 1: Framework methodology for analysis



1. Transcription. The audio file from each KI was uploaded to Rev, an online transcription service. The resulting transcript was uploaded to Dedoose, a qualitative data analysis program.

2. Codebook Development. Our initial landscaping literature review, which yielded the five categories of determinants for "response-ready" influenza programs shown in Table 1, provided the foundation for our framework. We also interrogated a sixth category: the impact of influenza programs on COVID-19 response. These categories, along with landscaping survey responses and KII interview guides, informed the development of a hierarchical codebook (see Appendix D). A total of 77 codes were employed to represent each determinant category for each country. The codebook also included a set of "cross-cutting" codes for universal reference. Additional codes were added as needed during analysis.

   Within each country code, the five determinant codes (Table 1), plus a sixth code representing the influenza program-COVID response relationship, were set as parent codes. Code content and structure continued to be developed and refined through several initial KIIs.

3. Coding. Each transcript was coded deductively in Dedoose by a primary coder, after which it was reviewed by a second person, along with any comments or questions left by the primary coder. At least one member of the coding team had not participated in the KII being analyzed. Unresolved questions regarding coding were addressed during meetings of the analysis team.

4. Analytical Framework Development. The analytical framework employed the five determinant categories shown in Table 1 plus an additional category representing the influenza program-COVID response relationship.

5. Charting of Key Themes. Teams of three to four Sabin members were assigned to each case-study country. Each team member reviewed the coded transcripts, the results of the associated narrative literature review and the landscaping survey results for their assigned country. Based on this information, each member independently identified key themes related to influenza program response-readiness and resilience, charting these findings as a matrix. Key themes (by determinant category) comprised the first column of the matrix; supporting data and transcript excerpts were entered in the adjacent row.

6. Data Interpretation. Case-study country teams met virtually to compare their individual matrices and reach consensus on the key themes associated with each country's influenza vaccination program and response to COVID-19. Teams also sought to identify emergent patterns within and across determinant categories. These patterns and relationships were evaluated as additional factors in increasing influenza vaccine uptake and in promoting response readiness and resilience within each country's program. A single observer, tasked with identifying cross-cutting themes among all case-study countries, attended every analysis team meeting.

Ethical Considerations

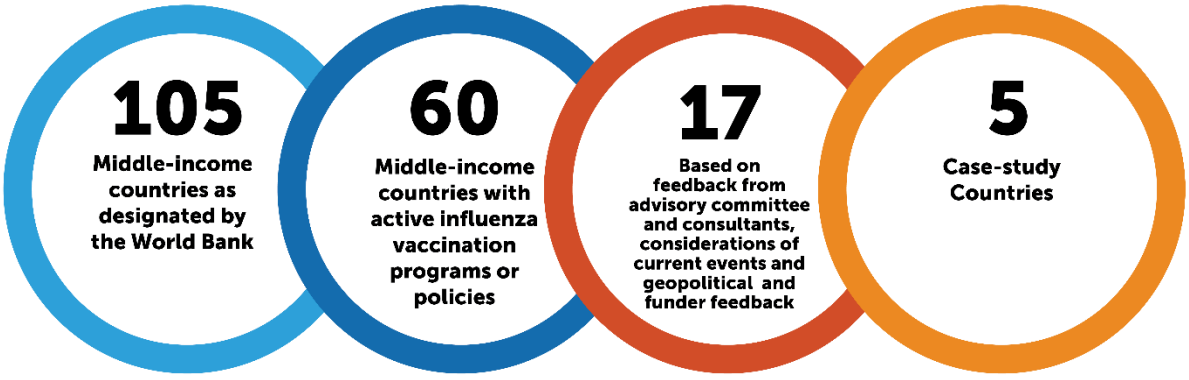
Our evaluation of influenza immunization programs and policy in MICs included interviews with key informants who shared their knowledge and perspectives. Key informants are defined as experts who "do not require consent forms, because they are not considered human subjects needing protection if you are asking them questions that relate solely to their field of expertise, and the questions are factual in nature(19)." We did not conduct research on human subjects, nor was personal or medical information requested or disclosed in KIIs. In the reporting of the project findings, no personal identifiable information is included.

RESULTS

Case Study Country Selection

We selected five countries for case study through the three-step process depicted in Figure 2. Our initial landscaping literature review of World Bank-designated MICs identified 60 with active influenza vaccination programs and policies. Through consultation with the project advisory committee and additional subject matter experts, we shortlisted fifteen MICs for further investigation: Algeria, Albania, Bhutan, Indonesia, Laos, Cote d'Ivoire, Malaysia, Mongolia, Morocco, Philippines, Romania, South Africa, Thailand, Turkey, and Viet Nam. Bolivia and Brazil were added following reversal of our previous decision to exclude from consideration countries with access to PAHO's Revolving Fund for vaccine procurement.

Figure 2: Case study country selection process



Initial Landscaping Literature Review

Table 3 summarizes findings from the initial landscaping literature review pertaining to the 17 shortlisted MICs.

Table 3: Key findings from initial landscaping literature review of 17 shortlisted middle-income countries for case study

Political	• All countries have instituted an Influenza Pandemic Preparedness Plan • Fifteen (15) countries have active NITAGs or equivalents that have produced recommendations for influenza vaccination (Brazil and Romania excepted)
Economic	• A majority of countries offer influenza vaccines free of charge to individuals within all or selected defined risk groups OR subsidize immunization for risk group members. • Select groups receive free vaccines in Indonesia (Hajj pilgrims), Mongolia (HWs and children younger than nine years of age) and the Philippines (adults aged 60 years and older). • Malaysia and Viet Nam do not fund influenza immunization.
Structural	• Fifteen (15) countries include both HWs and adults aged 60 years and older as a high-risk group (Philippines does not include HWs; Viet Nam does not include adults 60+ years old) • Pregnant women are considered a high-risk group for influenza in all MICs except Cote d'Ivoire, Indonesia, Morocco, the Philippines and Viet Nam. • Seven countries—Albania, Bhutan, Bolivia, Brazil, Cote d'Ivoire, Mongolia and Thailand—designate children (age range varies) as ahigh-risk group. • Algeria, Brazil, Indonesia, Morocco, Romania, South Africa, Thailand, and Viet Nam have capacity (both active and dormant) to manufacture influenza vaccines.

Scoping Survey

Sixty-three individuals in 14 countries received the scoping survey, which yielded ten responses (16 percent response rate; see Table 4). As the survey was disseminated prior to the inclusion of Bolivia and Brazil among the MIC candidates for case study, those countries are not represented, nor was Romania, where we were unsuccessful in obtaining stakeholder contact information.

Table 4: Scoping survey response rate across 14 middle-income countries

Countries	Surveys Sent (N=63)	Survey Responses Received (N=11)	Survey Response Rate by Country (17.5%, overall)
Albania*	2	0	0
Algeria	4	1	25
Bhutan	4	1	25
Côte d'Ivoire	4	0	0
Indonesia	1	0	0
Laos	4	0	0
Malaysia	2	0	0

Mongolia	3	0	0
Morocco	5	1	20
Philippines	2	0	0
S. Africa*	15	4	26.7
Thailand*	8	2	25
Turkey	5	2	40
Viet Nam	4	0	0

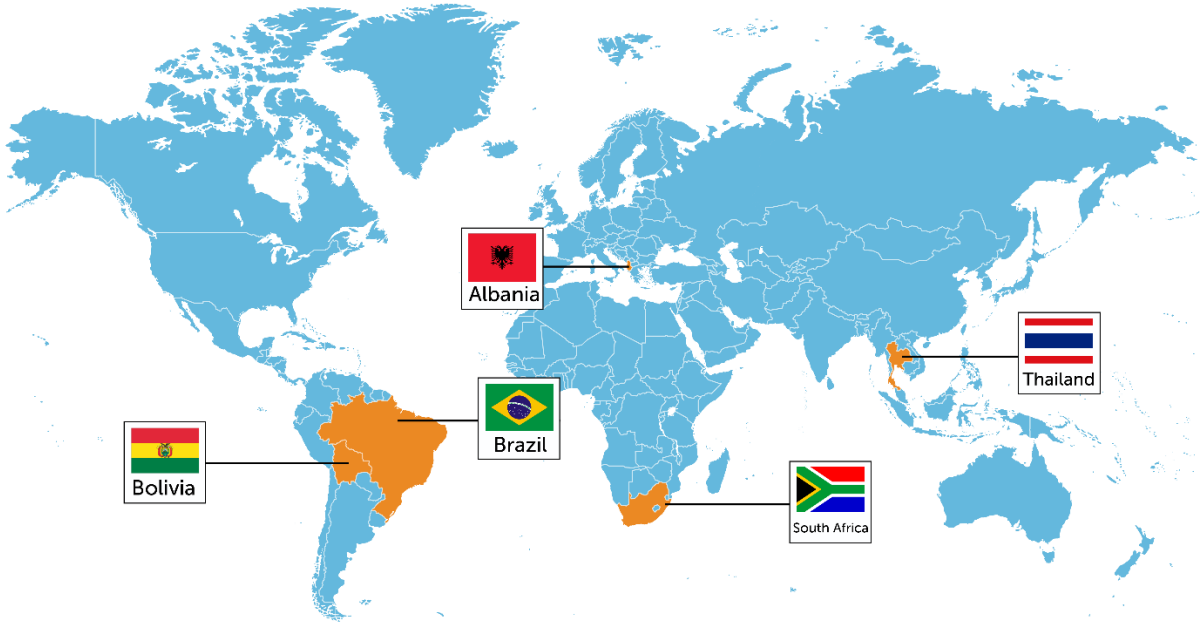
**Selected for case study*

Of the ten respondents to the scoping survey, six represented their country's Ministry of Health (MOH) or another national agency, three were affiliated with an academic or research organization, and one represented a non-governmental or civil society organization. Respondents described their involvement with the following activities related to seasonal influenza vaccination: research (n=2); financing and procurement (n=2); program management (n=4); executive leadership (n=1); "other" (n=1).

Final Selection of Case Study Countries

To achieve geographic diversity, we applied final selection criteria (described in Methods) to groups of countries within the following regions: Africa; Eastern Europe and the Middle East; South and Latin America; Southeast Asia. One country was chosen from each of three regions: Albania (Eastern Europe and Middle East), South Africa (Africa) and Thailand (Southeast Asia). From South and Latin America we chose both Bolivia, which procures influenza vaccines through the PAHO Revolving Fund, and Brazil, which does not, to probe that difference. Countries selected for case study are shown in Figure 3.

Figure 3: Countries selected for case study.



Case Study Development

Key Informant Interviews

Of the 119 invitations sent to potential key informants, 26 were accepted. KIs were interviewed between June 3 and August 25, 2022 (Table 5). The proportional majority of interviews were conducted within South Africa (n=8) and Brazil (n=6). We also interviewed a former director of the PAHO Revolving Fund to learn more about the Fund's influence in Bolivia and its absence in Brazil; information derived from this interview was used solely to establish context and was not applied to case studies.

Table 5: Summary of Key Informant Interviews within Case Study Countries

Case Study Country	Key Informants Contacted	Interviews Conducted	Interviewee Affiliation (Interviewees may have multiple affiliations listed)
 Albania	9	4	• Southeast European Center for Surveillance & Control of Infectious Diseases (SECID) • Medical Epidemiology, Institute of Public Health, Ministry of Health • Control of Infectious Diseases, Institute of Public Health, Ministry of Health • The Partnership for Influenza Vaccine Introduction (PIVI) • Influenza Division, US CDC
 Bolivia	29	3	• National Committee on Immunization (CNI) (2) • Pediatric Infectious Disease Specialist
 Brazil	20	6	• Instituto Butantan • Pediatrician (southern Brazil) (2) • Pediatric infectious disease physician (northern Brazil) • Brazil Society of Immunization • Latin American Society of Pediatric Infectious Diseases (SLIPE) • Centers for Disease Control and Prevention São Paulo
 South Africa	22	8**	• South Africa National Advisory Group on Immunization (NAGI) • Communicable Disease & Zoonotic Diseases, South Africa National Department of Health • Medical Epidemiology, National Institute of Communicable Diseases (NICD) • Communications Department, NICD • National Immunization Safety Expert Committee • Cold Chain Department, National Department of Health • Sanofi South Africa (retired) • Vaccines for Africa • Professor of Vaccinology, University of the Witwatersrand, Johannesburg • Pharmacist • Pediatrician • General Practitioner
 Thailand	31	4	• Advisory Committee on Immunization Practices (ACIP) • National Vaccine Institute • Adult vaccine research, Chulalongkorn University • Medical anthropology, Ministry of Health • Infectious Hazard Management, World Health Organization Regional Office for South-East Asia (SEARO)
PAHO	8	1	• Former Director, Revolving Fund
TOTAL	119	26	

**Two KIs were interviewed simultaneously.

Case Study Primer

The case studies presented below represent the combined evaluation of data and information gathered from literature review and key informant interviews. Table 6 summarizes key descriptive statistics for the five case study countries. Each case study comprises the following elements:

Background: A context-setting summary of current influenza, vaccine and pandemic preparedness policies and programs.

Results: Organized by the five determinant categories of influenza vaccine uptake considered to be key factors contributing to response-readiness and influenza vaccine program resilience: political, economic, structural, communication & education and socio-behavioral.

Impact of the Influenza Program on COVID-19 Response: Describes the country's experience of COVID-19 and how plans, policies, infrastructure, funding, and partnerships previously established to address seasonal influenza contributed to the country's pandemic response. In cases where influenza programs and seasonal influenza vaccination were sustained amid COVID-19, we note factors that contributed to the maintenance of influenza immunization during the pandemic.

Table 6: Case study country profiles

	 Albania	 Bolivia	 Brazil	 South Africa	 Thailand
WHO Region	EURO	AMRO	AMRO	AFRO	SEARO
World Bank Income Level	Upper middle	Lower middle	Upper middle	Upper middle	Upper middle
Population[1] (millions)	2.81	11.83	213.99	60.04	69.95
Gross Domestic Product (GDP) per capita[1] (in USD)	6,494	3,414	7,518	6,994	7,233
%Current Healthcare Expenditure (CHE) on Immunization (2019)	NA	NA	1.13%	0.48%	0.33%
Physicians per capita[1] (2021)	1.6	1.0	2.3	0.8	0.9
COVID-19 Vaccine Coverage Rate (VCR)[3] (as of October 30, 2022)	45%	50%	80%	33%	75%

Annual Healthcare Out of Pocket (OOP) cost per capita[1] (in USD, 2021)	122.6*	58.7	212.3	31.1	25.7

Africa Regional Office, AFRO; Regional Office of the Americas, AMRO; WHO/Europe, EURO; South-East Asia Regional Office, SEARO; World Health Organization, WHO.
[1]The World Bank (7).
[2]Global Health Expenditure Database, WHO (20).
[3] Our World in Data (21).
**Albania Annual Healthcare OOP per capita from 2018*

CASE STUDY: ALBANIA

Background

From the end of World War II until 1992, Albania was under Communist rule (22). Its healthcare system has since undergone significant reform, but it retains elements of its predecessor, which provided free services and prioritized secondary healthcare, inpatient treatment and acute illnesses (23). Healthcare in Albania remains centralized, with some administrative duties shared among 36 Local Units of Health Care (LUHC). These function as public health directorates for Albania's 61 municipalities (***bashki***) ^ (24,25). Albania's Compulsory Health Insurance Fund (CHIF) is financed through payroll taxes and annual fees paid by its employed population. According to 2021 data, the CHIF covers approximately 61 percent of the Albanian population. Private health insurance is offered as an employee benefit by large corporations; however, Albanians with private health insurance must still contribute to the CHIF (25). Influenza vaccines purchased from the private market are not reimbursed by the CHIF ^. Health-related costs incurred by the unemployed—including children under 18 years of age, students under 25 years of age, pensioners, mothers on maternity leave, people with disabilities and people receiving assistance and economic aid—are covered by funds transferred to the CHIF by the government (25).

Albania's Institute of Public Health (IPH), within the Ministry of Health and Social Protection (MOHSP), manages all public health and disease prevention services, including influenza vaccine procurement and distribution (24). In 2007, Albania established an influenza vaccine policy intended to increase

PIVI's Global Impact

Launched in 2013 by the Task Force for Global Health and in coordination with the US CDC, the Partnership for Influenza Vaccine Introduction (PIVI) is a public-private program that helps countries reduce the burden of seasonal influenza and prepare for pandemic influenza (27). Originally a vaccine donation initiative, PIVI now also provides technical assistance; the organization also assists partner countries with capacity building for policy development and with program planning, implementation and evaluation. PIVI's partners include ministries, NITAGs, industry and other stakeholders in LMICs, along with the US CDC and WHO. By supporting countries as they initiate or expand national-level influenza policy, PIVI encourages the creation of sustainable, country-owned seasonal influenza vaccination programming (27).

Since its inception in 2017, PIVI has partnered with 18 countries across Central America, Northern and Sub-Saharan Africa, Eastern Europe, the Middle East, as well as across East, South and Southeast Asia. It has donated over 4.4 million vaccines, valued at $30.9 million (27).

Each country that collaborates with PIVI develops a multi-year plan to introduce or increase influenza vaccine access among its high-risk populations (28). PIVI initially contributes the required doses of influenza vaccine; however, each country soon begins to purchase some of those doses, and gradually increases its purchase share every season. During PIVI's first five years, the organization partnered with 17 countries, all of which demonstrated increased influenza VCRs (28); two of these countries completed their transition to fully sustainable national vaccination for influenza, and six were slated to do so within five years.

vaccination uptake among people with chronic diseases and frontline HWs. In 2009, the policy was expanded to include all HWs. The Albanian government procured its first doses of influenza vaccine in 2014 as part of a program for HWs (26).

In 2016, Albania joined the Partnership for Influenza Vaccine Introduction (PIVI), a program of the Task Force for Global Health. PIVI works with the US CDC and country partners to create sustainable, seasonal influenza vaccination programs in LMICs (27). PIVI donated doses of influenza vaccine to Albania and provided technical support for capacity building (28); the organization also supported a series of studies and evaluations of influenza immunization in Albania and assisted in the implementation of the resulting recommendations to expand the country's risk group definitions. Currently, these risk groups include children aged six months to 18 years, people 60 years and older, people with chronic diseases and obesity, pregnant women, teachers, and all HWs (26,28). Albania's NITAG, established in 2015, recommends annual influenza immunization for all people aged 6 months and older (22). As shown in Table 7, influenza VCRs have been robust during years with available data, and highest among HWs and the elderly.

Table 7: Influenza vaccine coverage rates among select risk groups in Albania

Select Risk Group	2016 - 2017	2017 - 2018	2018-2019	2019-2020	2020-2021	2021-2022
Health workers ^ (29)	60%	67-72%	62%	65%	75%	56%
Elderly (>60 years) ^ (29,30)	68.4%	69%	60.9%	56%	49.9%	58.9%
Cardiovascular disease patients ^ (29,30)	36%	42%	45.6%	51%	32.3%	41.3%
Pregnant women (29,31)	0.5%	1%	N/A	6%	9.7%	N/A
All risk groups ^	N/A	**85.6%**	**97.2%**	N/A	N/A	**91%**

^*Some data provided by key informants*

On November 26, 2019, months before COVID-19 struck the country, Albania suffered a severe earthquake that displaced 13,000 people, injured almost 950, and killed 51(32). More than three dozen (8%) of Albania's health facilities were damaged or destroyed, including primary health facilities, hospitals, and health centers and health posts. Health services such as blood banks were suspended in the wake of the disaster. The cost of recovery, including infrastructure repair and risk reduction measures is estimated at 14.54 million euros. The MOHSP responded quickly, coordinating with the WHO Country Office (WCO) and other international partners. Remarkably, Albania maintained campaigns to vaccinate vulnerable populations against seasonal influenza during this crisis. Immediately following the earthquake, Albania undertook multiple preparedness and response initiatives, including a pilot of the ***First Pandemic Influenza A Cases and Contact Investigation*** protocol in January 2020 (33) and the further strengthening of the IPH's laboratory quality management system. These improvements better prepared the country for its subsequent response to COVID-19 (34).

Political Determinants

Growth in coverage. Influenza vaccine policy in Albania is driven by its IPH (35) and NITAG (36). The country's first policy on influenza vaccination, enacted in 2007, defined risk groups as people with chronic diseases and frontline HWs. Following the 2009 H1N1 pandemic, increased demand for influenza vaccination resulted in the expansion of risk groups that year, and again in 2014, 2016, 2017 and 2019 ^ (37). Currently Albania's risk groups for influenza vaccination include people 60 years of age and older, people with chronic diseases and obesity, pregnant women, teachers, and all HWs. The MOHSP provides influenza vaccination free of charge to members of risk groups, while the NITAG recommends vaccination for all individuals aged six months and older ^ (37).

National level champions. Influential members of Albania's national government have driven the expansion of the country's influenza immunization program by advocating for the prioritization of influenza and by facilitating the establishment of external collaborations such as Albania's partnership with PIVI ^. These successes demonstrate how individuals can leverage their expertise, position and trustworthiness to raise awareness of and investment in the influenza vaccine ecosystem (38).

Evidence-based expansion. Data collection and evaluation improved the Albanian government's understanding of influenza incidence and burden and led decision-makers toward more comprehensive influenza policies ^^. Multiple studies and evaluations conducted among influenza risk groups (22,23,34,35) further supported expansion of the influenza program and increased procurement of vaccines. For example, prior to Albania's 2017 piloting of FLUTool—a costing tool designed by WHO to support seasonal influenza immunization programs in LMICs—only frontline HWs were designated as a risk group. After FLUTool revealed the cost-effectiveness of vaccinating all HWs for influenza, Albania expanded that risk group accordingly ^.

Albania's experience demonstrates how building a strong evidence base and effectively presenting it to national decision-makers, can advance policy. MICs lacking the resources to conduct national-level evaluations may gain support for such efforts from external funders including the US CDC, WHO, U.S. Agency for International Development (USAID) and the United Nations Children's Fund (UNICEF). In some cases, MICs can extrapolate results from countries that exhibit similarities in their health system structures, influenza disease burden, and demographics to inform policymaking, including the need for country-specific evaluation ^.

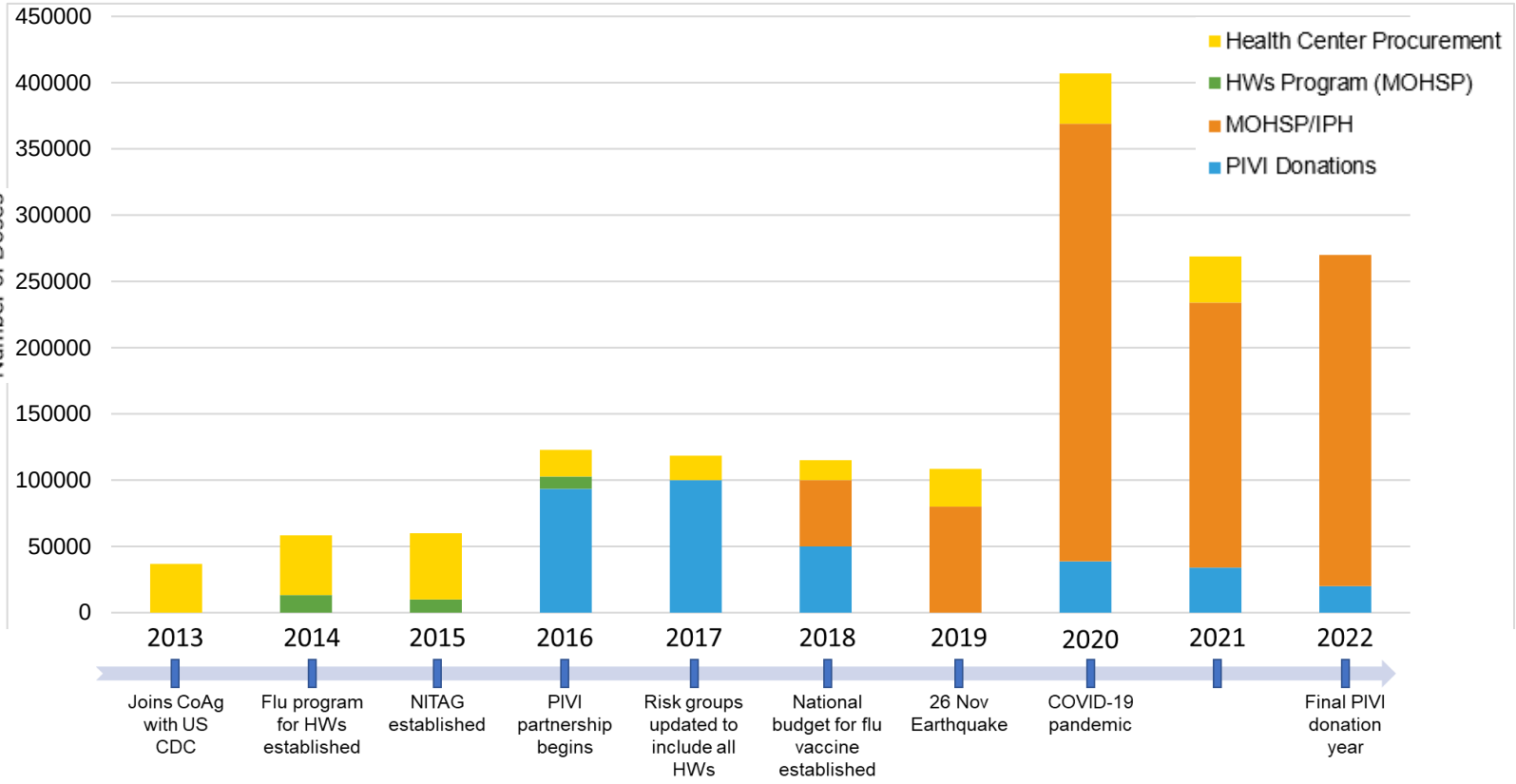
Partnerships driving progress. Partnership with PIVI—which included technical assistance and the funding of evaluations that led to policy change—has enabled Albania to expand its risk groups for influenza immunization, produce targeted promotional campaigns and train HWs.

Albania's transition out of PIVI begins with the 2023-2024 influenza season, the first for which the country will fund its entire immunization program. Sustainability plans like that developed early in Albania's partnership with PIVI can enable similar transitions in other countries currently reliant on international assistance for procurement of influenza and other vaccines ^.

Regional leadership. Albania shares surveillance data with regional neighbors including North Macedonia, Kosovo, Montenegro, Serbia and Croatia and hosts meetings and collaborative exchanges with them. These convenings are led by Albanian experts who share best practices and lessons learned ^. Albania's partnership with PIVI, which at the request of the Albanian team has addressed regional as well as national needs, demonstrates how MICs can create networks for data sharing and capacity building ^. When built gradually, during "peacetime," such networks establish trust among neighboring countries and promotes effective regional cooperation during crises ^.

Influenza-specific funding. In 2018, Albania's MOHSP established a line item specific to influenza immunization within the budget for its National Immunization Program (NIP) ^. Funds earmarked for influenza pay for government-supplied vaccine doses and their delivery, as well as for awareness campaigns ^. As shown in Figure 4, influenza vaccine procurement by the IPH, via UNICEF, has increased from an initial 50,000 doses, which were fully matched by PIVI, to the more than 250,000 doses projected to be fully funded by Albania 2023-2024 season ^(28). This sustainability model could be adapted to enable other countries receiving dose donations to transition toward self-sufficiency.

Figure 4: Influenza vaccine procurement in Albania by source (2013 - 2022)



Cooperative Agreement, CoAg ; ^ Data in table provided by key informant

Staying the course during COVID-19. As shown in Figure 4, Albania's influenza vaccine procurement in 2020 rose more than fourfold over the previous influenza season. It declined during the subsequent two years of the coronavirus pandemic, yet nonetheless remained at nearly twice the level of pre-pandemic years ^. As after the November 2019 earthquake, Albania continued to prioritize influenza vaccine procurement and distribution through the COVID-19 crisis.

Sustaining independence. Although the 270,000 influenza vaccine doses Albania had expected to procure for the 2022-2023 season would not completely cover its risk groups, planned increases in procurement over subsequent seasons will enable Albania to vaccinate pregnant women, people aged 65 years and older with chronic conditions and hospital HWs ^. As government procurement of influenza vaccines has

increased, Albania's private market for influenza vaccines has declined to less than 20,000 doses per season ^. Immunizations from private providers are not currently reimbursed under Albania's national health insurance, but the subsidization of privately provided influenza immunization is under discussion ^.

Forecasting success. Consistent forecasting can maximize the impact of IPH's planned increases in influenza vaccine procurement and expansion of coverage. Albania's Institute of Statistics, along with local public health institutes, provide data on risk group populations and vaccine uptake rates to inform cost-benefit decisions regarding vaccine allocation ^.

Structural Determinants

Influenza vaccine access in the workplace. While most Albanians receive influenza vaccine at a health center, the IPH partners with some office-based workplaces and banks to provide free vaccines to their employees ^. Such programs remove significant barriers to vaccine uptake, benefitting both workers and employers.

Robust uptake reporting. Within the public and private primary healthcare and hospital system, vaccinators report bi-weekly to the IPH through a platform called the Integrated Immunization System (IIS) ^. The social security number, age and risk group (if applicable) of the vaccinee is registered for each dose administered, along with the vaccine source (i.e., whether the vaccine was from the public supply or purchased from the private market) ^. Albania also has an established reporting system for adverse events ^ (39).

Surveillance networks. Surveillance and disease monitoring have long been prioritized in Albania's health system, particularly for influenza (40,41). For this reason, in 2013 the Southeastern Europe Health Network (SEEHN) chose the Albanian IPH to host its new regional surveillance network, the Southeast European Center for Surveillance & Control of Infectious Diseases (SECID). SECID supports influenza surveillance, molecular diagnostic capacity building and preparedness planning in its nine member nations. As part of a project on surveillance and response to avian and pandemic influenza funded by the US CDC and WHO, SECID collects approximately 2,000 samples per year from sentinel sites throughout the country and reports to the US CDC, the WHO National Influenza Centers (NICs) and FluNet ^ (40). The WHO NIC in Tirana, Albania, collects samples, performs preliminary analysis, and reports to the WHO's Global Influenza Surveillance and Response System (GISRS), informing the composition of the upcoming season's influenza vaccine (42).

Since 1999, Albania has conducted universal acute respiratory infection (ARI) syndromic surveillance based on reporting from all general practice, pediatric, and polyclinic facilities, as well as from emergency departments. An influenza-like illness (ILI) sentinel surveillance system, ALERT, monitors outpatients at two health facilities in densely populated Tirana during the influenza season, when Albania also reports virological and epidemiological data weekly to WHO through The European Center for Disease Prevention and Control's (ECDC) The European Surveillance System (TESSy) platform (43). Albania established year-round Severe Acute Respiratory Infection (SARI) surveillance in 2009 in 11 regional and university hospitals ^ (44).

HW training. Prior to each influenza season, the IPH and NIC host training sessions for HWs including physicians, nurses and laboratory technicians. These trainings aim to improve recognition of influenza-like illnesses, upper respiratory infections, lower respiratory tract infections and SARIs, and thereby improve syndromic surveillance. After each influenza season, the performance of each SARI center is evaluated to inform preparation for the next season.

Prioritizing One Health. In 2016, Ending Pandemics supported Albania's development of a One Health dashboard which enables the exchange of information between Albania's human health (SISI) and animal

health (RUDA) surveillance systems (45,46). Data uploaded to the dashboard include publicly reported events, results from media scraping and confirmed cases of diseases of concern. Although the dashboard was in its pilot phase during the onset of the COVID-19 pandemic, it proved critical to Albania's pandemic response ^. Presentation of the One Health dashboard to other countries in the region has generated keen interest and potential for adaptation to other pathogens of concern.

Albania's influenza infrastructure has also been harnessed to address brucellosis, a common zoonosis that significantly affects veterinary and human health worldwide (47). The IPH and Albania's Food Safety and Veterinary Institute (FSVI) conduct joint outbreak investigations for avian influenza and brucellosis ^. FSVI also provided critical training for IPH staff on COVID-19 molecular diagnoses ^. Both institutes share a work environment, which facilitates communication between them, as well as the sharing of data and technical capacity ^.

Communication and Educational Determinants

Media as critical stakeholders. Recognizing the media's crucial role in health communication, the Albanian government conducts media training sessions to improve the quality of health reporting and gain media support for vaccination, particularly against influenza and COVID-19. An ongoing program for local journalists, co-hosted by WHO Euro representatives and Albania's MOHSP, provides training in accurate health reporting with the goal of improving citizens' health literacy. Journalists who attend these sessions learn to interpret vaccine effectiveness and disease burden data from Albania and neighboring countries, and how to identify and debunk vaccine mis- and disinformation (48).

Communications workshops for HWs. During Influenza Awareness Week in 2018, the MOHSP and IPH, in collaboration with WHO, organized influenza-focused workshops for epidemiologists, health personnel and chief vaccinators. Participants discussed influenza as a vaccine-preventable disease, components of a successful vaccination campaign, and how to engage in productive dialogue with anti-vaccine activists (49).

Creative campaigns. In 2018, the MOHSP and IPH designed and disseminated a vaccination campaign with the motto ***Godasim Gripin*** ("Hit the Flu," Figure 5). Aimed at hospital directors and HWs, the campaign posed the question, "will you be part of the team to Hit the Flu?". Campaign materials encouraged health centers to build a multidisciplinary flu team—comprised of epidemiologists, hospital directors, laboratory workers, physicians, nurses and administrators—to address all aspects of influenza prevention and treatment. The campaign also encouraged health centers to set achievable goals, track progress, recognize star team members and communicate successes to the public ^.

Figure 5: Logo of the Albanian 2018 vaccination campaign targeting HWs and hospital staff. Translation: "Will you be part of the team to Hit the Flu?"

Each year, the IPH recognizes a HW from each district as an "influenza vaccination champion." Typically, these champions are nurses in primary care and hospital settings who distribute influenza campaign materials or who effectively advocate for influenza vaccination among their patients. Each district champion receives a small prize, and champions are introduced to each other and encouraged to exchange strategies and best practices ^. Such simple acts of appreciation and recognition can effectively incentivize HWs in countries with limited resources to promote influenza vaccination.

Socio-behavioral Determinants

The role of medical professional societies. The majority of Albanian HWs have consistently received annual influenza vaccination and are recognized as effective drivers of vaccine acceptance and uptake among their patients. According to a knowledge, attitudes and practices (KAP) study of pregnant women and their HWs in Albania, pregnant women are likeliest to accept an influenza vaccination if a HW recommends it (50) . According to a KI, professional societies representing highly trusted physician specialties, such as obstetricians and cardiologists, encourage their members to endorse and recommend influenza immunization ^.

Targeting hesitancy through workshops. Overall vaccine uptake in Albania declined during the COVID-19 pandemic, and particularly among university students (51). To address this trend, the MOHSP, IPH and UNICEF, in collaboration with the University of Medicine Tirana, launched a series of workshops targeting university students in Albania's most populous regions (Tirana, Durres and Shkodra). The workshops, with the motto "Choose life, GET VACCINATED!", focused on the safety of vaccines and their importance to personal and public well-being (52). These in-person sessions encouraged the transparent and meaningful exchange of ideas between medical professionals and students, who also learned how vaccines prevent and reduce illness and how clinical trials ensure the safety and efficacy of vaccines.

Impact of the Influenza Program on COVID-19 Response

National Influenza Plan. In 2009, a multisectoral committee established the Albanian National Plan for Influenza. Updated annually, the plan guides the stockpiling of antivirals and personal protective equipment, the conduct of sentinel site surveillance and the marshalling of resources for surge capacity and beyond (53). Because Albania lacks a multi-hazard public health emergency response plan, its National Influenza Plan has served as an important model for crisis preparedness and response, including during the COVID-19 pandemic (53).

Joint vaccination and surveillance. As early as October 2021, the Albanian MOHSP endorsed dual vaccination for seasonal influenza and COVID-19 ^(54). In June 2022, Albania conducted a COVID-19 vaccine Post-Introduction Evaluation (cPIE) to gauge the effectiveness of its pandemic response. An influenza addendum included in the cPIE specifically examined the influenza program, identifying components that were critical to COVID-19 response ^. Results of this analysis encouraged the IPH to create a joint influenza-COVID-19 vaccination strategy that enables the sharing of promotional, human, financial and technical resources.

Over the last decade, in response to the threat of pandemic influenza, Albania and its SECID partners strengthened sentinel surveillance and standard operating procedures, increased laboratory capacity and expanded human resources. These advancements aided the national and regional response to the COVID-19 pandemic —evidence that even where resources are limited, pandemic preparedness can be achieved

through collaboration and creativity ^. As one KI stated, "Without that [existing influenza infrastructure] we couldn't have responded. ...[Our] molecular diagnostic capacities, surveillance capacities, data management...they were used for COVID." Now, as the pandemic turns toward endemicity, joint efforts to address influenza and COVID-19 can lead to improved disease detection and access to vaccines.

CASE STUDY: BOLIVIA

Background

Officially named the Plurinational State of Bolivia in 2009, the country has maintained a socialist government since the election of Evo Morales in 2005—excepting the self-declared interim presidency of Jeanine Áñez, from November 2019 to November 2020 (55). There are 36 recognized indigenous peoples within Bolivia, which comprise between 40 to 60 percent of Bolivia's population (56,57). Former President Morales is part of this community and served as Bolivia's first indigenous head of state. The Morales administration, which concluded in 2019, aimed to address social inequalities with initiatives including healthcare reform. During his presidency, extreme poverty was reduced by half in Bolivia; in 2010, the World Bank changed Bolivia's status from "lower-income" to "lower-middle income"(56,57). Government investments in social spending included multiple raises to the minimum wage, cash transfers, a universal monthly pension program for people aged 60 years and older and incentives for pre- and post-natal healthcare (55,57,60).

Bolivia's influenza vaccination program has received strong support and coordination from PAHO. Bolivia acquires annual influenza vaccine through PAHO's Revolving Fund which is supplied free of charge to all members of Bolivia's designated risk groups ^. Bolivia's MOH oversees two influenza-related programs, the Program of Influenza and Hantavirus (***Programa Influenza y Hantavirus***) and the EPI National Immunization Program (***Programa Nacional de Inmunizacion de PAI***), which runs the country's seasonal influenza immunization campaign. Bolivia's NITAG is its National Committee on Immunization (Comité Nacional de Inmunización; CNI). The CNI makes recommendations to the MOH, which approves and executes Bolivia's immunization plan.

Bolivia's risk groups for influenza vaccination include children aged six months to two years, pregnant women, adults aged 60 years and older, HWs and people with chronic diseases. Bolivia's national immunization plan has included adult influenza vaccinations since the plan's 2010 inception, which followed the H1N1 influenza pandemic. Influenza vaccines are often required for enrollment of children into Bolivian schools and are either required

The Right to Health in Bolivia

Bolivia is among the few countries that define healthcare as a constitutional right (390). The country's constitution, ratified in 2009, guarantees Bolivia's citizens the right to health and to a free, intercultural and participatory universal healthcare system (57,391). In 2019, Bolivia launched its Unified Health System (Sistema Único de Salud; SUS) which provides free healthcare for those not covered by private health insurance, estimated to comprise more than half of its people (390,392); however, full implementation of SUS was interrupted by a contested presidential election in late 2019 (393). Although the current Bolivian government is committed to achieving true universal health coverage, realizing that goal will require further strengthening of the country's healthcare infrastructure.

Nevertheless, Bolivia's inclusive healthcare model proved valuable during the COVID-19 pandemic, when it served the country's indigenous population of more than 40 percent, and its informal workforce, which comprises almost 85 percent of the total—people who, prior to the launch of the SUS, lacked access to free healthcare (393–395). Despite the additional challenge of political instability, Bolivia is reported to have sustained essential health services during the coronavirus pandemic (390), when prompt funding enabled medical supplies to be distributed to the country's 339 municipalities.

or encouraged by employers in public-facing sectors, such as healthcare.

Bolivia reports risk group VCRs for influenza (Table 8), which generally perform above regional average, to both WHO and PAHO (59). As in many other countries, influenza VCRs declined in Bolivia during the COVID-19 pandemic.

Table 8: Influenza Vaccination Coverage Rates (%) by Risk Group in Bolivia, 2018-2020 (62–64)

Risk Group	2018	2019	2020
6-23 months of age	70*	63 – 80	61
60+ years of age	72	75	59
HWs	136**	100	64
Pregnant women	87	96	55
Chronic diseases	147	100	55

**WHO designates two groups in reporting: "child age 1" and "child age 2" but age ranges are undefined. This column shows average of child age 1 and child age 2.*
***WHO Reported coverage > 100%*

In 2018, Bolivia's Santa Cruz district experienced a severe influenza outbreak with high mortality rates (1.61%) among at-risk populations, and particularly among people with chronic diseases (65). In response, the MOH launched a national influenza vaccination campaign targeting risk groups, which achieved 80 percent coverage across these populations. This success was achieved through collaboration between Bolivia's MOH and PAHO, the Bolivian Red Cross, district-level health departments and experts from its National Health Laboratories Institute and National Centre for Tropical Disease.

Political Determinants

Political will drives immunization. Bolivia's experience over the past decade illustrates the power of political advocacy for immunization programming. Bolivia introduced influenza vaccines in 2010 (66) and in 2011, expanded access to immunization and its multilateral collaboration with PAHO and UNICEF ^. Table 9 summarizes Bolivian influenza vaccination policy and vaccine availability data collected annually through the WHO/UNICEF Joint Reporting Form on immunization (67).

Bolivia's CNI serves as its NITAG. Comprised of volunteers representing diverse professional perspectives including doctors, infection control specialists, pediatricians and community HWs, the CNI routinely makes immunization policy recommendations to the MOH ^. The CNI typically convenes when a new vaccine becomes available, or when manufacturers change vaccine prices ^. Committee members gather information and discuss issues internally prior to issuing recommendations to the MOH ^. One KI who serves on the CNI described the committee as a unique strength of the Bolivian immunization program and noted that its volunteer members were strongly invested in their participation. The CNI was also described as an apolitical advisor to the Bolivian government, which advocates for immunization policies that benefit the entire country ^.

Decentralized government. Bolivia is divided into nine departments department—Chuquisaca, Cochabamba, Beni, La Paz, Oruro, Pando, Potosi, Santa Cruz and Tarija—each of which is further partitioned into provinces. Every department manages its own health service, called the Servicio Departamental de Salud (SEDES). Department-level governments are run by elected officials that often represent different political

parties: a situation that can obstruct collaboration among SEDES ^. Bolivia's MOH sets policy on vaccine procurement and mandates, while decisions involving incentives, campaigns and mobilization, which are made at the departmental level, vary significantly among SEDES ^.

Mandates. Robust vaccine mandates are a significant driver of influenza vaccine uptake in Bolivia ^. Influenza vaccination is required for children to attend school, for HWs and by some employers. Although apparently unenforced in workplaces, compliance among mandated workers is high ^. Both children and adults receive cards that provide proof of influenza vaccination ^.

Table 9: Bolivia Influenza Vaccination Policy Breakdown (67)

Description	2021	2020	2019	2018	2017
Formal national influenza vaccination policy (public and private sectors)	✓	✓	✓	✓	-
Vaccines licensed by the country's National Regulatory Agency	✓	✓	✓	✓	-
Vaccines available within the influenza season or year through either public or private sector	✓	✓	✓	✓	-
Doses distributed	2,390,518	1,520,563	1,730,000*	-	1,735,680
Trivalent inactivated vaccine type used	✓	✓	✓	✓	-
Live attenuated influenza vaccines (LAIV) used in the country	-	✓	✓	✓	-
Time of year vaccines offered	Autumn-December	April-September	May-September	May-December	

**Estimation from the International Federation of Red Cross and Red Crescent Societies Outbreak Summary Report* (65).

Economic Determinants

A commitment to health for all. In 2009, Bolivia adopted a new constitution granting autonomy to its indigenous majority and establishing intercultural and participatory universal healthcare through its unified health system, Sistema Único de Salud (SUS)(53,55,66). In 2019, the Morales government announced that it would provide free, public medical care for individuals without health insurance. However, the status of this declaration is unclear under the current administration, which has presided since 2020, and in the context of government funding challenges both preceding and exacerbated by COVID-19 (68).

PAHO's partnership. Through the PAHO Revolving Fund, Bolivia procures all doses of influenza vaccine that it distributes free of charge to members of its designated risk groups (see Table 8) ^. Influenza vaccines supplied to the Revolving Fund are manufactured by Sanofi, Green Cross, Seqirus and Instituto Butantan ^. In advance of influenza season, each SEDES issues a request to the MOH for vaccine doses to cover its risk group population. The MOH requests the total of these doses from the Revolving Fund and is presented with

options for their purchase ^. For state-provided immunization, the MOH buys and delivers vaccines and syringes to the SEDES and health facilities. All operational expenses and department-level campaigns are paid for by the department ^.

During a severe influenza outbreak in 2018, Bolivia acquired 1.8 million influenza vaccines from the Revolving Fund. Of these doses, 1.3 million were administered to adults and 432,000 were administered to children (65).

Among the nine SEDES, there is wide variation in commitment of resources to activities such as influenza immunization campaigns or mass vaccination events ^. Districts with urban centers and/or where tourism is important are likelier to host vaccination campaigns and events than rural districts and those with limited resources ^.

Private access. Bolivians who are not risk group members access influenza vaccine through the private health system ^. Vaccines provided by the private sector require MOH approval, but they may differ from those available publicly. Some large employers, including Coca Cola and packaging company La Papelera, purchase vaccines and organize immunizations for their employees ^. Bolivians working in the formal sector often receive health insurance from their employers; however, relatively few Bolivians are eligible for these benefits as the country has (proportionately) one of the world's largest informal work sectors (68).

Structural Determinants

The last mile. Bolivia's influenza season typically begins in June. Ideally, vaccines are secured by April, but procurement is often delayed until cases noticeably rise. Once purchased by the national government, influenza vaccines are widely available from health centers that include clinics, hospitals and pharmacy chains. As one KI explained, "There have always been enough vaccines for the population. And requesting a vaccine... at the rural level is quite affordable." There are also mass vaccination events in locations such as sports stadiums and mass transit stations and, as previously noted, some workplaces and industries offer immunizations to their employees ^.

Trained HWs. By adapting immunization programs to train and deploy skilled HWs, Bolivia has undoubtedly increased vaccine access in rural communities. Multiple cadres of HWs undergo robust education and training to become vaccine administrators ^. One KI stated, "We do not need in the rural areas to have a doctor to administer a vaccine or to determine that a child has a complete vaccination schedule or an incomplete one. A nursing assistant can do that, can actually administer the vaccines, they are highly trained to do so"^. HWs are trained in vaccine storage and preservation as they frequently transport vaccines to remote immunization sites—often in small coolers carried on bicycles or motorcycles ^.

SEDES initiate sharing. Bolivia's autonomous SEDES arrange to share vaccine doses among themselves, a practice which can reduce wastage and support departments in which vaccine demand exceeds forecasts. One KI gave an example of how this has worked: "Two years ago, there was an [unanticipated] increase in the number of influenza type A [cases]... in [a particular] city.... So vaccines were transferred from one department to the other, but there was no additional bidding process or ... additional purchase to complement the number of vaccines." He further noted that this transfer was possible because HWs knew how to preserve the unused doses that were transferred across departments.

Surveillance and uptake monitoring. Bolivia's influenza surveillance program, which began in 2011, comprises one ILI surveillance site and nine SARI sentinel surveillance sites. The latter reside in hospitals, mainly in La Paz and Santa Cruz (69). Each week, the MOH reports influenza data to PAHO, which incorporates it into regional situation reports, published weekly (70).

Vaccine uptake is tracked via software distributed across the Bolivian healthcare system and subsequently reported to PAHO and WHO (see Table 9). Because vaccine uptake is tracked geographically, migration among departments for work and school compromise the accuracy of this information ^. Private sector reporting on uptake—and presumably also adverse events—is inadequate, according to a KI ^. Adverse immunization events are also tracked, and this reporting has been strengthened during the COVID-19 pandemic ^. While KIs suggested that uptake and adverse event data were publicly accessible within Bolivia, we were unable to obtain this information.

Communication and Educational Determinants

Campaigns, regional to local. Across Latin America, educational and communications campaigns launched in the aftermath of the 2009 H1N1 pandemic continue to raise awareness of influenza risks and vaccination benefits. A key example is the annual PAHO-led Immunization Week campaign, which takes place at the beginning of the Southern Hemisphere's influenza season. Bolivia's MOH also organizes immunization campaigns during influenza season, using radio and television to alert the public to the availability and benefits of influenza vaccination. Radio ads are widely used to target commuters in urban settings ^. Local health facilities display banners and posters, distribute brochures, and send letters to announce when and where people should receive vaccines ^. In some areas, local influencers, including HWs and the Bolivian rapper, Krisso MC, have also been used to promote vaccination ^ (71).

Two KIs expressed the view that Bolivians—especially those who live or work in urban settings—increasingly recognize the benefit of influenza vaccines, and particularly for elderly people and those with chronic illness. A KI who provides private care observed that his patients are often well informed about the risks of influenza and the benefits of immunization, and that many request the vaccine as the season commences.

HW messengers. A key strength of Bolivia's communication and demand generation efforts is the deep involvement of HWs across cadres and settings. The MOH, in collaboration with the CNI, provides information on influenza vaccination to workers' groups, unions, associations and educational institutions like nursing schools. Health workers, including nurses and nursing assistants, undergo robust education and training to become vaccine administrators. One KI reported, "In the university and also medicine and nursing students of the later years have a rotation and they are asked to conduct promotion, not only for vaccination, but also for the various programs, health-related programs." To fulfill this requirement, students may, for example, provide community outreach at public markets ^. Health worker presence and accessibility builds trust in communities and creates opportunities for education and dialogue.

Practical training for HW vaccinators in some settings may include annual refresher trainings, where updated information can be presented ^. Health workers—typically nurses or nursing assistants--may also be incentivized by bonuses awarded for vaccinations ^. One KI observed that "our work mainly as doctors is to promote. If we identify a patient at consultation who does not have an immunization schedule that is updated, we issue an order for that patient to be vaccinated immediately as soon as possible."

Socio-behavioral Determinants

Urban vs. rural. Influenza VCRs for Bolivians in risk groups reflect robust uptake, while mandates extend coverage for school children and some workers. One KI observed that vaccine hesitancy tends to be greater in rural areas, where people are more likely to view modern medicine with skepticism and/or mistrust and rely more on traditional healing practices. Another KI, who practices medicine in urban La Paz, expressed the

view that Bolivians' hesitancy regarding COVID-19 vaccines contrasted with their typical acceptance of immunization. Patients who express hesitancy toward influenza vaccines often fear adverse events ^.

Indigenous and ancestral knowledge. Bolivia's large indigenous population resides in both urban and rural areas. The importance of traditional medicine to Bolivian culture, one KI explained, derives from "knowledge of the pre-colony cultures. And [it is because of] this ancestral knowledge that they have on diseases...they have usually resorted to other means of treatment and most of them resort to natural remedies ... this is common throughout the community." To bridge the gap between traditional and formal health care, Bolivia established its National Intercultural Community Family Health Policy (***Salud Familiar Comunitaria e Intercultural***; SAFCI) in 2008 to support intercultural care and create better partnerships between the traditional and formal health systems (57,72).

Misinformation. During COVID-19, anti-vaccine groups in Bolivia have become increasingly visible at mass vaccination events and other public venues, where they spread misinformation and falsehoods about the likelihood of adverse events such as paralysis ^.

Impact of the Influenza Program on COVID-19 Response

Surveillance and uptake monitoring. Between January 3, 2020, and September 1, 2022, Bolivia reported over one million cases of COVID-19 and 22,198 deaths. Over 60 percent of Bolivia's population (7.4 million people) had received at least one dose of the COVID-19 vaccine as of August 2022, and nearly 15 million doses of COVID-19 vaccine were administered by September 2022 (73).

Bolivia's surveillance and monitoring of adverse events following immunization improved during the COVID-19 pandemic, when the reporting process by which the MOH captures data from the public health system was strengthened to support the rollout of novel vaccines ^. However, private health care providers do not consistently report vaccine uptake or adverse events to the MOH; one KI identified this as a significant weakness in Bolivia's influenza vaccine program and a target for immediate improvement.

Hesitancy and opportunity. As previously noted, Bolivians were reportedly more hesitant toward COVID-19 vaccines than toward other vaccines, including influenza. It was also observed that hesitancy toward influenza vaccines apparently increased over the course of the COVID-19 pandemic ^. Many Bolivian vaccination centers offer and encourage dual COVID-19 and influenza vaccination ^. However, while the COVID-19 vaccine was available to all who accessed a vaccination center, the influenza vaccine remained reserved for those in risk groups.

CASE STUDY: BRAZIL

Brazil

Background

The 1988 Brazilian Federal Constitution, which defines health as a universal right and state responsibility, drove the establishment of its national health care system, the ***Sistema Único de Saúde*** (SUS)(74). In 1999, Brazil's National Immunization Programme (PNI) added influenza immunization to the SUS vaccination schedule (75). Initially, influenza vaccination efforts were restricted to people aged 65 years and older; they have since expanded to include designated risk groups comprising about 40 percent of its population. Members of these groups include individuals aged 60 and over, individuals with chronic illnesses,

children aged six months to five years, pregnant women, indigenous people, ***quilombolas*** (Afro-Brazilian residents of settlements established by escaped enslaved people), HWs, emergency responders, defense force members, public transportation professionals, truck drivers and educators ^. The SUS provides trivalent influenza vaccines free of charge to all risk group members. Brazil's private market for influenza immunization, which offers quadrivalent vaccine, is relatively small ^.

In 1999, Brazil's Ministry of Health, along with state vaccine manufacturer Instituto Butantan, contracted with Sanofi Pasteur, enabling Brazil to produce doses of trivalent influenza vaccine sufficient to cover all risk group members (75). Since then, manufacturing capacity has expanded to accommodate ongoing increases in demand for trivalent influenza vaccines, and in preparation for pandemic influenza (75).

In-country production has boosted influenza vaccine availability in Brazil, while public health campaigns and high levels of trust drive demand. As a result, influenza VCRs among Brazil's risk groups historically have been high; in 2018, for example, they were: 97 percent for adults aged 80 years and older; 88 percent for children aged six months to five years; 81 percent for pregnant women; and, 95 percent for HWs(76). In 2022, Instituto Butantan began offering influenza vaccine to other Latin American countries and laid plans to increase exports going forward, establishing Brazil as a regional leader in influenza vaccine production ^.

Solid progress in influenza immunization came to an abrupt halt following the 2019 election of President Jair Bolsonaro, whose broad-based opposition to vaccination has upended public health in Brazil ^. Fueled by COVID-era misinformation, MOH immunization campaigns were replaced by anti-vaccine messages and, not surprisingly, Brazil's influenza vaccination campaign was defunded ^. As a result, influenza VCRs declined significantly in Brazil ^. Our case study, which compares Brazilian immunization programs before and during the Bolsonaro era, illustrates the significance of political influence on influenza immunization efforts.

Political Determinants

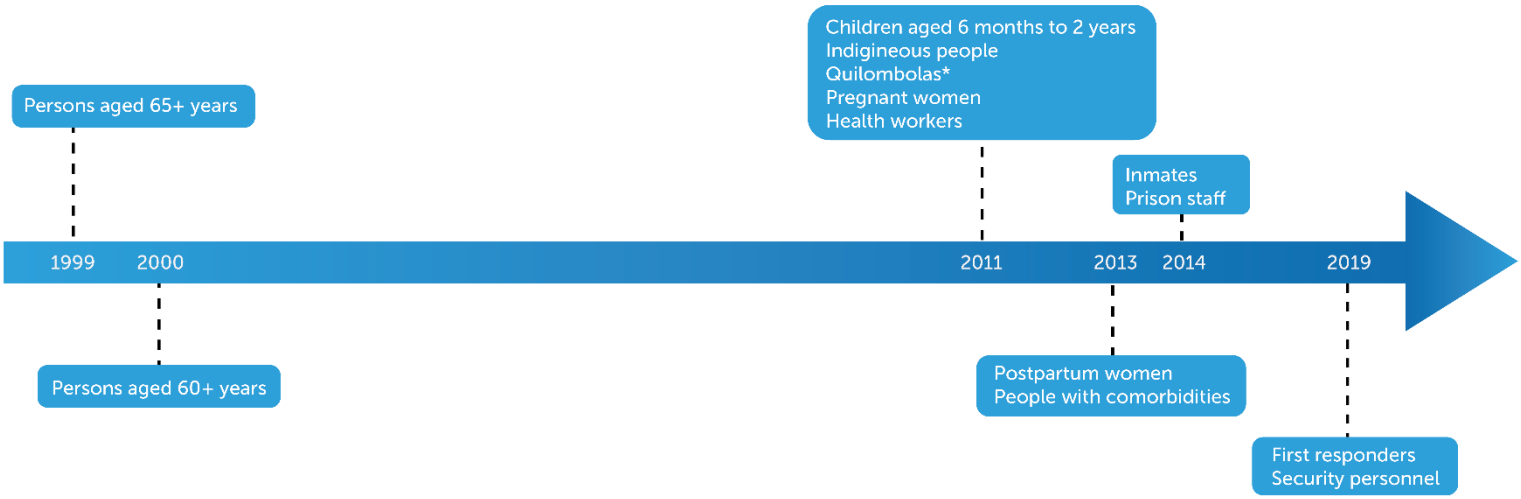
Politics undermines a robust program. Brazil's recognition of health as a human right underlies the country's longstanding prioritization of infectious disease control, including efforts to mitigate influenza. Its National Immunization Program (PNI), established by the MOH in 1973, was modeled on successful vaccination programs for polio and rubella (77). The ***Comitê Técnico Assessor em Imunizações*** (CTAI), which serves as Brazil's NITAG, was created in 1999 ^ (77). That same year, Brazil launched its first influenza immunization campaign, which targeted individuals aged 65 years and older; in 2000, coverage was expanded to those aged 60 years and older (75).

The PNI's structure admits significant political influence, which under the Bolsonaro government took the form of political interference. Historically the PNI appointed individuals experienced in immunization to the CTAI. These appointees represented professional public health associations (e.g., pediatricians, infectious diseases physicians, the Brazilian Immunization Society, nurses and tropical medicine professionals) as well as the country's two public vaccine manufacturers (Instituto Butantan and FIOCRUZ) ^. Bolsonaro disbanded the CTAI along with "all technical advisory committees from all ministries within the government," one KI stated. "He said it was a waste of time and money" ^. While historically the seven secretaries under Brazil's Minister of Health, and the directors who served these secretaries, were selected by MOH staff, those positions became political appointments during the Bolsonaro administration ^.

Multiple risk groups. The PNI reviews Brazil's national influenza immunization guidelines every two years ^. Following the H1N1 influenza pandemic in 2009, Brazil's influenza program expanded to become one of the world's most comprehensive campaigns. As part of strategic alignment with international recommendations, Brazil includes all risk groups identified by WHO and the US CDC ^ (75) . Approximately 80 million Brazilians—about 40 percent of the country's population—are members of at least one of its risk groups, several of which

have been added since 2000 (see Figure 8) ^ (77). KIs also reported that members of Brazil's defense forces, public transportation professionals, truck drivers and educators are currently included among influenza risk groups; however, we were unable to determine when these additions were made, nor when the risk group for children was expanded to include children up to five years ^.

Figure 8: Expansion of risk groups for influenza vaccination in Brazil (77)



Quilombolas: Afro-Brazilian descendants of formerly enslaved people

Brazil has no national vaccination mandates, but influenza immunization may be required for youth to attend select schools ^. For example, all public schools in the city of São Palo require influenza vaccination for children of risk group age; the same requirement is under consideration at some of the city's private schools ^. Prior to the expansion of risk groups in the national influenza immunization program, some private companies purchased influenza vaccines for their employees; this practice is now very rare, if not obsolete, due to the wide public availability of influenza immunization ^.

National manufacturing. Brazil produces all the trivalent influenza vaccine its public system requires and maintains sufficient capacity to meet increased demand in the event of an influenza pandemic (75). In response to the 2009 H1N1 pandemic, Brazil administered over 89 million doses of influenza vaccine, enabling the country to surpass the MOH's immunization targets among several priority groups, including HWs (78). Instituto Butantan, the largest influenza vaccine manufacturer in the Southern Hemisphere, currently produces up to 140 million doses of influenza vaccines annually for use during influenza seasons in both the Southern and Northern Hemisphere(79).

Economic Determinants

Funding procurement and distribution. Brazil's economic and public health investment policies support a sustainable and response-ready influenza immunization program. In 1989, the country established SUS, its publicly funded health care system, which provides free comprehensive coverage, including influenza immunizations to all risk group members ^. Brazil's influenza vaccination program is funded entirely by the SUS, through a budget proposed by the MOH and approved annually by its Congress ^. The influenza immunization section of this budget comprises two line items: procurement, which purchases vaccines from Instituto Butantan, and vaccination support, which funds demand generation, vaccine transportation and immunization program teams ^. A technology transfer agreement between Brazil's MOH and Sanofi Pasteur

has enabled public manufacturer Instituto Butantan to acquire both vaccines and technology, thereby reducing vaccine costs and supporting the creation of a sustainable national supply.

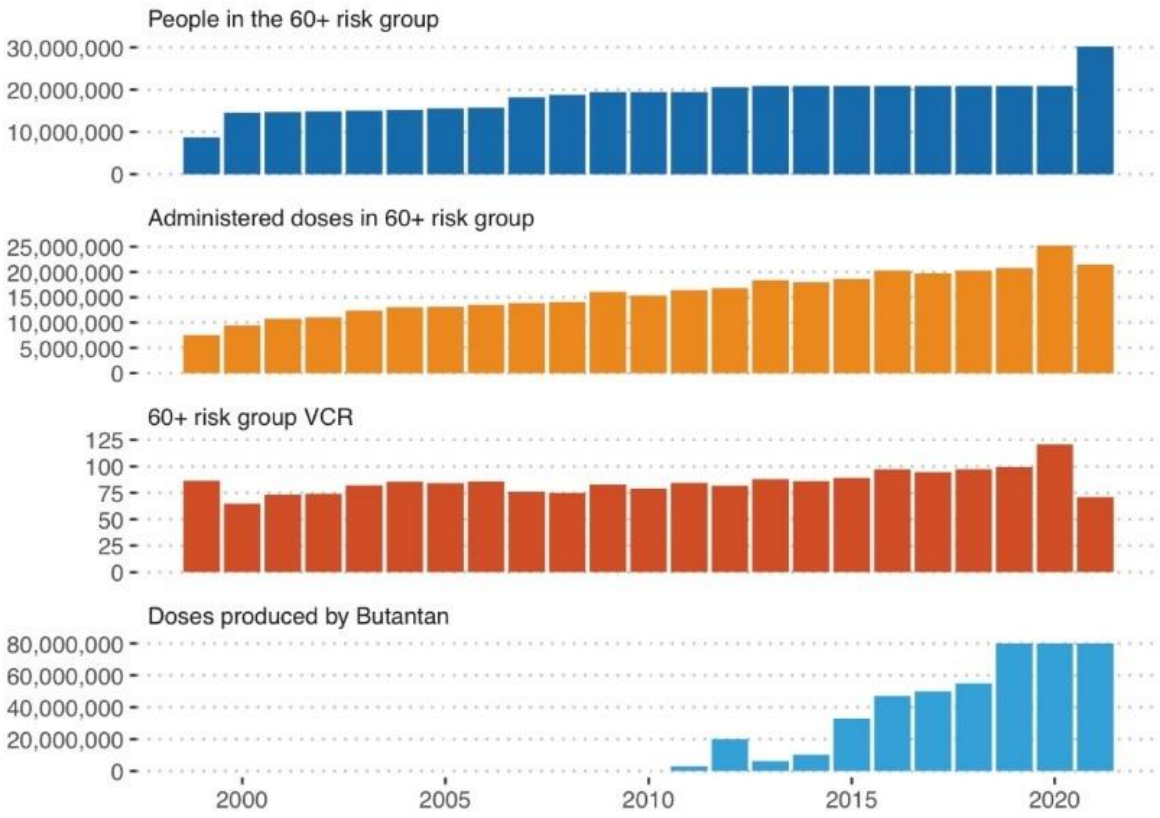
Located in São Paulo State, Instituto Butantan produced 65 percent of all vaccines distributed in Brazil in 2022 (79). Following the initiation of technology transfer from Sanofi, it took 14 years—during which the MOH supplemented publicly-produced vaccine with purchases from private companies—for Brazil to establish independent influenza vaccine procurement (75). Excluding COVID-19 vaccines, influenza vaccines account for 70 to 80 percent of all vaccine doses produced by Instituto Butantan ^. Having achieved self-sufficiency, Brazil now produces influenza vaccines for other countries in the region ^.

Brazil's process for predicting demand for seasonal influenza vaccines begins with an estimate by each municipality of the number of its citizens in each risk group. Those estimates are received and compiled by the state and forwarded to the MOH, which calculates the forecast and places its order with Instituto Butantan ^. In years when uptake is low among risk group members, vaccine doses are wasted ^.

Economic benefits of in-country production both for Brazil and the region. By purchasing its vaccines from Instituto Butantan rather than from private manufacturers, the Brazilian MOH saves an estimated US$300 million each year ^. The price of a typical dose of trivalent influenza vaccine from Instituto Butantan, set annually, is typically less than US$3; quadrivalent vaccines, currently in clinical trials, are expected to cost more, and should be subject to cost-benefit analyses ^. On average, privately purchased influenza vaccines cost between US$15 and US$30 ^; in June 2022, average monthly income in Brazil was about US$515 (80).

As shown in Figure 9, influenza vaccine production at Instituto Butantan earmarked for Brazilians aged 60 years and older increased steadily from 2013 until 2018, when demand for that group was saturated ^. Instituto Butantan reports that it can continue to meet current national risk group demand for trivalent influenza vaccine while increasing supply to other countries in the region—including through the PAHO Revolving Fund, which received 1.9 million doses in 2022 and anticipates future increases ^. In 2022, the Revolving Fund paid US$2.85 per dose for influenza vaccine produced by Instituto Butantan, which is the PAHO Revolving Fund set price (81) ^. Instituto Butantan, via the Revolving Fund, also sold influenza vaccine to Uruguay and Honduras in 2022 and expected to send doses to Ecuador for the Northern Hemisphere influenza season ^.

Figure 9: Influenza vaccine doses produced and administered to Brazilians aged 60 years and older.



**In 1999, the risk group only included 65+*
^^^Data provided by key informants
(a) Population in the 60+ risk group (b) number of doses administered among the 60+ risk group, (c) Influenza vaccine coverage rate among the 60+ risk group, and (d) number of doses produced by Instituto Butantan, between 1999 and 2021. The number of doses produced by Instituto Butantan plateaued in 2019 at 80 million doses. The number of people in the 60+ risk group grew about 50 percent from 2020 to 2021; however, the number of doses administered decreased by about 15 percent. The highest number of doses administered in one year occurred in 2020.

Structural Determinants

Public versus private access. Brazil's public healthcare system provides free influenza immunizations for about 40 percent of its population, about 64 million people (82). A much smaller private market delivers about seven million doses of quadrivalent vaccines, manufactured by Sanofi, GSK and Abbot ^. Private providers offer quadrivalent influenza vaccines every March; public sector rollout of trivalent vaccines begins in April for those age 60 and older and for indigenous people and HWs, followed by pregnant women and eligible children, then all remaining risk groups ^.

Brazilians eligible for free influenza vaccines can receive them at an estimated 36,000 "vaccination rooms" located throughout the country and supported by its national cold chain, which has received robust investment since 2012 (75). Vaccination rooms typically occupy the same building as primary care offices, providing convenient access. In addition, vaccines are offered during weekend campaigns and can be administered by pharmacists, as well as by physicians and nurses ^.

Monitoring uptake, increasing access. Brazil's MOH launched the National Immunization Program Information System (SIPINI) in 2010. Developed in partnership with the Department of Information Technology of SUS, SIPINI combines information from multiple databases to improve tracking of vaccine

uptake and adverse events following vaccination, along with other vaccination-related metrics (83). Vaccinators immediately upload information on each immunization to SIPNI, enabling real-time monitoring of uptake for all vaccines and contributing to a public-facing database called the ***vacinômetro*** ^. Brazil's adverse events reporting system collects data on influenza vaccine-associated events. As of 2016, this was limited to passive pharmacovigilance; prospects for active pharmacovigilance in Brazil are uncertain (74). In response to adverse event reports, Instituto Butantan, PNI, Anvisa, the National Institute for Quality Control in Health (INCQS) and General Coordination of Transmissible Diseases (CGDT) engage in joint discussions (75). Following a May 2021 invitation to participate in the regional Events Supposedly Attributable to Vaccination or Immunization (ESAVI) surveillance system, Brazil shared its national ESAVI database (84).

To ensure vaccine access for all Brazilians, its MOH creates comprehensive population maps, identifies remote populations (such as residents of Amazonia) and develops strategies to reach them ^. This activity also contributes to response readiness—as did an indigenous health division within the MOH which was terminated by the Bolsonaro administration ^. Brazil's MOH has coordinated with the country's military to send vaccines (and vaccinators when necessary) to hard-to-reach populations by boat, helicopter and plane. A KI described how vaccinators would "go in a small boat, and then we find a house and stop there, vaccinate, and then two miles away, another house." While relatively expensive per dose administered, this effort successfully vaccinated numerous members of indigenous communities ^.

Surveillance and pandemic planning. Brazil's municipalities and states report epidemiological surveillance data to the MOH (75). The country's robust influenza surveillance system benefits from regional collaboration as well as from the participation by three national influenza laboratories: the Adolfo Lutz Institute in São Paulo, FIOCRUZ in Rio de Janeiro, and the Evandro Chagas Institute in Belém (75). Brazil also shares data with the PAHO FluID platform on a biweekly basis(75).

In 2010, following the H1N1 pandemic, Brazil created its Pandemic Influenza Plan (85). The country routinely conducts pandemic influenza drills and simulations, has a rapid response team and has established a risk communications strategy (85).

Communication and Educational Determinants

Demand generation. Brazil's MOH historically has executed robust campaigns and outreach programs to increase vaccine demand, but these efforts were defunded into extinction during the Bolsonaro administration, according to a KI ^. Past campaigns featured television commercials, social media posts, radio announcements and signs on public transportation. ***Zé Gotinha*** ("Joseph Droplet"), the national vaccination program's mascot created in the 1980s for the polio vaccination campaign, was reportedly very popular with children (86). As part of their efforts to increase remote populations' access to influenza vaccination, the MOH developed radio campaigns featuring indigenous leaders who broadcasted messages to remote communities describing how to get immunized ^.

Brazilian HWs continue to play a vital role in demand generation by speaking with patients about the benefits of influenza immunization. Some receive specific communication training, although it is neither standardized nor consistently provided ^.

Before the Bolsonaro era, political leaders publicly received influenza immunizations as a way to increase trust in and drive demand for immunization ^. Following the disbandment of Brazil's CTAI and the defunding of national vaccination campaign efforts, former CTAI members and other HWs lead their own campaigns through social media to encourage Brazilians to receive influenza vaccines ^.

Socio-behavioral Determinants

History of trust. No publicly available data gauge influenza awareness among Brazil's risk groups. However, several KIs described a high level of trust and confidence in vaccines among the general population. They report that prior to the COVID-19 pandemic and associated 'infodemic,' anti-vaccine sentiment was rare in Brazil ^. Organizations working to increase uptake of all vaccines include the Brazilian Immunization Society (SBIM) and the Brazilian Diabetes Society (BDS). The SBIM produces age-specific vaccination calendars that include all recommended vaccines and its website reportedly features a question-and-answer section on influenza vaccination (we could not access this website in order to verify its content or status) (87). The BDS promotes the government's recommendation that people with diabetes get vaccinated against influenza.

Impact of the Influenza Program on COVID-19 Response

Preparation and resilience. Brazil's influenza immunization program provided a firm foundation for its COVID-19 response, which demonstrated resilience in an environment of politically driven science denialism. In August 2021 (after the CTAI had been disbanded), Brazil established its ***Câmara Técnica de Assessoramento em Imunização da Covid-19*** (COVID-19 Technical Immunization Advisory Board) ^. The Board conducts epidemiological analyses, assesses national vaccine coverage, and evaluates the effectiveness of vaccination strategies such as the creation of COVID-19 vaccine eligibility groups (88). Brazil's combined vaccination campaign for influenza and COVID-19 builds on previously successful influenza vaccination campaigns. The National Immunization Program Information System (SIPNI) and a public-facing database called the *vacinômetro* that allow for real-time monitoring of uptake for all vaccines, adverse events following vaccination and other vaccination related metrics, were used for tracking COVID-19 vaccine uptake ^.

Regional influence. Instituto Butantan currently produces COVID-19 vaccines for regional use beyond Brazil ^. The country's Institute of Immunobiology Bio-Manguinhos participates in PAHO's Regional Platform to Advance Manufacturing of COVID-19 Vaccines and other Health Technologies. This program, launched in 2021, supports the adoption of mRNA vaccine technology by Latin American companies (89).

Increased influenza vaccine uptake in 2020. Early in the coronavirus pandemic, Brazil reported high influenza VCRs, which according to KIs were driven largely by fear of coinfection ^. As seen in Figure 8, administered doses of influenza vaccine in the 60+ risk group increased more than 20 percent between 2019 and 2020: a significant change, and one likely duplicated in other risk groups (2022 data not accessible at time of report publishing) ^. However, it appears that mis- and disinformation, coupled with the cancellation of MOH influenza campaigns, caused this positive trend quickly to be reversed ^. A key informant reported that the 2022 VCRs fell significantly across risk groups, prompting the government to remove eligibility requirements for free trivalent influenza vaccine.

CASE STUDY: SOUTH AFRICA

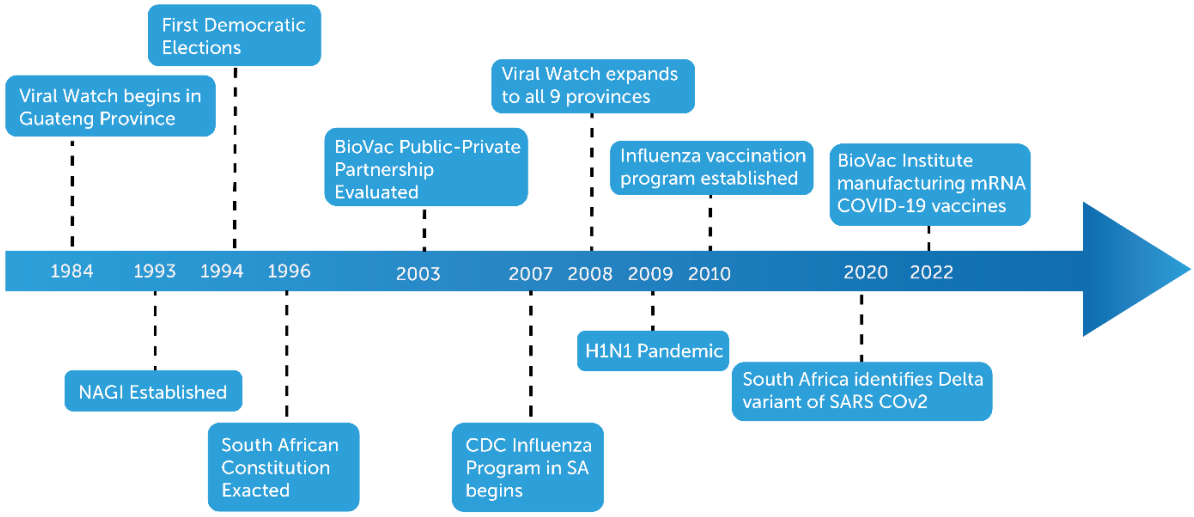
Background

Since the end of Apartheid, a system of institutionalized racial segregation that existed in South Africa from 1948 until 1994, the country has made significant sociopolitical progress; nevertheless, it remains among the world's least equitable societies (90,91). Inequality poses enormous challenges for the provision of health and other social services in South Africa. The country suffers epidemic levels of poverty-related diseases including malnutrition and maternal mortality, non-communicable diseases and infectious diseases including HIV/AIDS and tuberculosis, as well as gender-based violence and trauma (92). These concurrent epidemics, which strain the country's limited health resources, place South Africa's national health outcomes lower than those of many low-income countries (LICs) (93). Not surprisingly, this historical, socioeconomic and epidemiological context raises barriers to seasonal influenza immunization.

South Africa's influenza vaccination program commenced in 2010, in the wake of the 2009 H1N1 influenza pandemic. This effort was supported by the US CDC, which had funded influenza surveillance, research and laboratory capacity building and pandemic preparedness in the country since 2007 (94). The US CDC continues to fund the South African National Institute for Communicable Disease (NICD) and provides ad hoc support for relevant vaccine effectiveness studies, including recent work on effectiveness of the influenza vaccine in pregnant women (95) ^.

South Africa's investments in local manufacturing, as well as in surveillance (see Figure 10) have significantly strengthened its seasonal influenza program. Current domestic vaccine manufacturing capability primarily supports EPI while pursuing the goal of improving both domestic and regional pandemic preparedness. In 2003, the South African Department of Health (DOH) formally partnered with a private firm, the BioVac Consortium, to launch the BioVac Institute, a vaccine manufacturer based in Cape Town (96). Influenza surveillance, which commenced with its Viral Watch program in the early 1980s, has expanded steadily.

Figure 10: Timeline of Key Structural and Political Determinants of the South Africa Influenza Vaccination Program



Political Determinants

Provincial disparities. South Africa's history of Apartheid continues to impose profound inequities across the country's nine provinces. Most decision-making and implementation activities related to influenza vaccination—including dose forecasting, distribution and monitoring—reside at the level of its provinces, rather than with the national influenza program managed by the DOH. South Africa's provinces vary widely in available resources, population, geography and epidemiology ^, all of which influence seasonal influenza vaccination access, demand and uptake. Even so, one KI noted, South Africans "probably do certain things well in a patchy way."

For example, in Limpopo Province, which has the lowest socioeconomic status among South Africa's provinces, as well as the largest proportion of children under 15 years of age (95), officials chose in 2022 to commit their limited immunization resources to reversing COVID-era declines in childhood immunization, rather than purchase influenza vaccine^. Provincial decision makers considered a risk-benefit analysis to determine the greatest return on investment for their specific population; the result aligns with South Africa's policy that healthy children are not considered at high risk from influenza (96).

Evidence-based prioritization. Although the budget for the South African influenza program has not increased over its twelve-year history, funding allocation within the program has been adjusted based on analysis of influenza risk, burden of disease and vaccine efficacy.

Robust local research capacity, supported by the US CDC and other funders, provides South Africa's DOH with evidence to support targeted influenza policy such as the defining of risk groups. Currently those groups include HWs, people aged 65 years and older, individuals with chronic infections including HIV, pregnant women, residents of care facilities and individuals aged six months to 18 years on long-term aspirin therapy (99). Among these risk groups, pregnant women and people living with HIV (PLHIV) were further prioritized after research demonstrated that influenza vaccination is especially effective in preventing severe disease in these populations (100). Additional evidence has also suggested that vaccinating pregnant women shows fetal protection ^ (101).

Advisory support and capacity building. South Africa's National Advisory Group on Immunization (NAGI), established in 1993, meets twice annually and additionally as needed to advise the government on immunization schedules, vaccine introduction and other matters relevant to infectious diseases. NAGI comprises 14 members serving five-year terms, nine of whom represent the fields of pediatrics, vaccinology, community health, virology, microbiology, infectious disease, neurology, pulmonology and medicines regulation. The remaining five members are non-voting observers and ex officio representatives of the DOH and of WHO and UNICEF country offices. Recommendations made by NAGI reflect consensus of its voting members (102) .

The Vaccines for Africa Initiative (VACFA), a research unit at the University of Cape Town, Faculty of Health Sciences, is a stakeholder network that promotes vaccine awareness and uptake on the African continent by producing and translating scientific evidence in vaccinology for policy impact (103). In addition to providing expert scientific advice to decision-makers, VACFA aims to become a scientific hub on the continent that will train vaccinologists and build capacity within African countries currently lacking a NITAG or its equivalent ^.

Economic Determinants

Costs and dose procurement. A study conducted in 2018 (104) estimated the total cost of the South Africa influenza vaccination program at ZAR 38.8 million (~USD 2.29 million), approximately two percent of the country's total expenditure on vaccines. Of this amount, approximately 99 percent was spent on procurement. Since 2010, South Africa consistently has procured approximately two million doses of influenza vaccine per year: enough to cover about five percent of its risk group population ^. About half of these doses are procured by the public sector, based on orders placed by provincial health departments. The DOH negotiates the total purchase with vaccine producers, mainly Sanofi and Abbot. The private sector (e.g., pharmacy chains Clicks and Dis-Chem ^) purchases influenza vaccine from wholesalers ^.

Influenza vaccines must be approved by South Africa's Biological Committee prior to their distribution. Several KIs observed that in recent years, health centers have received influenza vaccine late in the season, reducing demand for immunization ^. Key informants also noted that South Africa's low level of procurement relative to its overall risk group population creates problems throughout its influenza immunization program.

Cost effectiveness. A 2021 analysis (105) of the cost effectiveness of influenza vaccination in South Africa found positive results for all vulnerable populations analyzed except children between the ages of six and 59 months. Findings from this study support the South African strategy of opportunistically targeting individuals for vaccination (discussed below), particularly as it applies to pregnant women, PLHIV and people with underlying medical conditions.

Structural Determinants

Inequality creates two systems of access. The South African influenza vaccination program comprises two systems, according to both literature and KI sources. The public system, which has limited resources, serves a large majority of the population, including its poorest and most marginalized citizens. The private system serves the relatively small population of middle- and upper-class citizens, who pay out of pocket for influenza immunization. One KI observed that in South Africa, the "middle class, upper class, they can get the vaccine conveniently at their nearest pharmacy. But then for the underprivileged, it's a mission to get influenza and it's usually not even a concern to get the influenza vaccine for them ^. Influenza vaccine uptake in the private sector nevertheless is low; for example, a 2018 study of over half a million South African residents with private health insurance found that only five percent had received influenza vaccine(106).

Distribution in the public sector. Within South Africa's provinces, influenza vaccine is uniformly distributed among public clinics. As one KI reported, "the way they distributed the influenza vaccine was, largely, each clinic will get 50 doses.... it's just shipped out in the easiest or the most convenient minimum order quantity to the clinics. So everybody would get stock, but they would get 'X' amount of doses" ^. Vaccinators in public clinics—usually nurses—opportunistically target risk-group members such as pregnant women and PLHIV as they access other routine healthcare services.

Surveillance. Influenza is not a nationally reportable disease in South Africa, but it is subject to limited surveillance, such as through syndromic surveillance of ILI and respiratory disease hospitalizations conducted by NICD. Since 1984, South Africa's Viral Watch program has conducted prospective sentinel influenza surveillance based on data gathered from private providers: the sole administrators of influenza testing in South Africa, and only for patients with severe disease ^. Launched within a few private clinics in Gauteng Province, Viral Watch has expanded to include private clinics in all nine provinces.

The NICD Centre for Respiratory Diseases and Meningitis, a WHO-designated National Influenza Centre (NIC), participates in GISRS and works closely with local partners and WHO Collaborating Centres to monitor novel, emerging or resistant influenza virus strains through genomic surveillance.

Local Manufacturing. South Africa's BioVac Institute is among only five vaccine manufacturers on the African continent, and the only one located within Southern Africa (96). A July 2021 agreement with Pfizer permitted the BioVac Institute to produce 100 million doses of Pfizer-BioNTech COVID-19 vaccine for distribution across Africa (107). In partnership with several bilateral and multilateral organizations, the Institute established the region's first COVID-19 mRNA technology transfer hub in March 2022. Discussions are underway to enable technology transfer for the manufacture of influenza vaccines by BioVac ^.

Communication and Educational Determinants

Public vs. private campaigns. South Africa's public and private health sectors separately fund and conduct activities to generate demand for influenza vaccination. In the private sector, large pharmacy chains Clicks and Dis-Chem, which distribute influenza vaccine, sponsor annual influenza vaccination campaigns. In the public sector, the NICD uses both social media and traditional media—broadcast news, radio, and print—to raise awareness and drive influenza vaccine uptake, even though the national government procures only enough vaccine to cover five percent of its risk group population (104). Approximately 8,000 South African HWs in the NICD's MailChimp database receive up-to-date vaccination guidance from NICD on such issues as the simultaneous administration of COVID-19 vaccine and influenza vaccines ^. The overall campaign is evaluated at the national level each year using traditional media monitoring, social media monitoring, and "sentiment checks, a method of identifying positive or negative sentiment expressed in text" ^.

A recent study evaluated an NICD and DOH-led influenza vaccination campaign in 27 antenatal clinics (ANCs) across Gauteng and Western Cape Provinces (108). Between 2015 and 2018, the campaign helped vaccinate three in four pregnant women who presented to the selected ANCs. Among the 25 percent of pregnant women who did not receive influenza vaccine in these clinics, roughly half reported that this occurred due to lack of vaccine availability at the clinic, highlighting the need to increase dose procurement for this population.

Socio-behavioral Determinants

Risk-benefit perceptions. Several KIs discussed the generally low perception of influenza risk in South Africa, as well as wide-spread belief that the influenza vaccine is not effective ^. One KI ascribed this lack of public confidence to "the unpredictability of the effectiveness of the [influenza] vaccine." One possible exception to this trend may be pregnant women, with KIs pointing out that vaccination is more normalized as pregnant women regularly engage with the health system and are used to receiving prenatal vaccinations (e.g., tetanus). Even among pregnant women, uptake is low with a 2020 estimate suggesting 12.5 percent receiving the influenza vaccine(109).

Trust in HWs. Several KIs observed that South Africans generally trust HWs, particularly those within the public health system that provides care for about 80 percent of the population. "Especially in rural areas or in the township, the healthcare professional is trusted," one KI noted. "If you need someone to even pray at a funeral, it's going to be a healthcare professional because it's the most trusted profession. You're unlikely to get hesitancy or questions around 'do I need this?' ^. This is a key strength of the South African influenza immunization program, and particularly for members of risk groups who most frequently interact with the public health system, such as PLHIV and those with chronic conditions. One KI, a practicing pediatrician, reported that parents of children at high risk from influenza, once counseled, readily assent to having such children vaccinated ^.

Impact of the Influenza Program on COVID-19 Response

COVID-19 vaccination. Between January 3, 2020, and December 26, 2022, South Africa reported over four million confirmed cases of COVID-19, including over 100,000 deaths, to WHO. As of December 25, 2022, South Africa had fully vaccinated 35 percent of its total population; 40 percent were partially vaccinated; six percent had received a booster dose (21,110).

Influenza vaccine uptake. Influenza VCRs in South Africa declined during the COVID-19 pandemic, following years in which procurement and uptake had trended slightly upward. In 2020, influenza vaccine uptake exceeded that of previous years, and more vaccine was purchased to cover HWs. In 2021, influenza vaccine uptake dropped significantly ^. One KI speculated that, in comparison to COVID-19, South Africans perceived the risk of influenza to be low. "People are actually happy to have flu," he said. "They're just like, 'At least it's not COVID,' because flu has not resulted in any lockdowns per se."

Trust. Key informants noted that historic distrust of government among South Africans—which may play a role in limiting demand for publicly-provided influenza vaccine—had worsened following the imposition of lockdown measures during the COVID-19 pandemic ^.

Leveraging surveillance and manufacturing capabilities. Engagement in global surveillance is a key strength of South Africa's influenza program, most recently demonstrated as the country led the identification of both Delta and Omicron variants of SARS-CoV-2 (111). And as noted in the structural determinants section, the BioVac institute began manufacturing the Pfizer-BioNTech mRNA COVID-19 vaccines for domestic and regional use following a technology transfer agreement with Pfizer in 2021.

CASE STUDY: THAILAND

Background

Economic growth between 1960 and 2000 enabled Thailand's change in status from low- to middle-income country (112). Despite significant development of its service and industrial sectors, agriculture remains Thailand's leading employer (112). Before a severe outbreak of avian influenza in 2004, Thailand was ranked among the world's largest poultry exporters, producing nearly a billion chickens per year (113). Approximately 80 percent of rural Thai households raised poultry, either for sale or for their own consumption (112).

During the 2004 outbreak, which resulted in 17 human cases of infection and 12 deaths, Thailand culled 63 million chickens (113,114). The country's major poultry export markets, Japan and the European Union, responded to the outbreak by banning imports of poultry from Thailand, resulting in an estimated loss of US$3 billion (114).

Informed by this experience, Thailand developed a national strategic plan for avian influenza control and influenza pandemic preparedness (113) that proved instrumental in guiding the country's response to H1N1 influenza in 2009 (115). In response to both the 2004 and 2009 influenza outbreaks, Thailand increased its investment in influenza-related surveillance, laboratory capacity and infection control measures, while expanding its stockpile of influenza therapeutics (115).

Thailand's strategic plan for avian influenza includes provisions to vaccinate members of designated risk groups(116). The country's Advisory Committee on Immunization Practice (ACIP), under its National Vaccine Committee, initially defined two influenza risk groups in 2004, and has since added six more (117). Current influenza risk groups include HWs, people aged 65 years and older, people with chronic disease, people with mental disabilities, children aged six months to two years, poultry cullers, people with obesity and pregnant women. In 2004, influenza was integrated to Thailand's EPI (118).

Thailand's influenza program is managed and implemented by its National Health Security Office (NHSO), an autonomous organization governed by Thailand's National Health Security Board and chaired by the country's Minister of Public Health (119). The NHSO procures vaccines and directs their distribution; it also provides technical support, funds health promotion activities, manages prevention services and oversees treatment for adverse effects(117,119).

Political Determinants

Influenza as a national security issue. Thailand stands out for recognizing influenza as an issue of national security. Its national government takes an evidence-based approach towards vaccine policy with the goal of ensuring adequate domestic manufacturing capacity to address infectious outbreaks ^.

Thailand's NHSO sets national immunization policy, independent of its Ministry of Public Health (MOPH) and of other government entities ^. Established under the National Health Security Act of 2002, the NHSO manages provisions of universal health coverage (UHC), as well as Thailand's National Health Security Fund (119). The NHSO's decisions regarding Thailand's influenza program reflect extensive collaboration with multiple agencies, including the ACIP, the National Institute of Health (NIH), the Department of Disease Control (DDC) and the MOPH (119).

Thailand's ACIP, equivalent to a NITAG, has been instrumental in developing influenza immunization policies that prioritize national security (118). The committee, which meets at least annually to review the country's immunization program, is responsible for making recommendations on the inclusion of vaccines within the EPI, on immunization policies and on vaccine-related research (118). Although not bound by ACIP's recommendations, the Thai government (NHSO and MOPH) routinely accepts and acts them (e.g., expanding risk groups for influenza vaccination; see Figure 11) (117,118).

Figure 11: Expansion of risk groups for influenza vaccination in Thailand

Regional leadership, global engagement. Thailand's regional leadership in influenza policy translates its recognition of pandemic influenza as a national security threat into effective action ^. Through collaboration and partnership with international entities including WHO and US CDC, and by its regional capacity-building efforts through the Association of Southeast Asian Nations (ASEAN), Thailand has positioned itself as a regional leader in influenza immunization. The country has made significant to the World Health Assembly—the decision-making body of WHO—and has provided vaccines and additional resources to other countries in the region ^.

Early in the COVID-19 pandemic, Thailand coordinated with WHO to provide materials to neighboring countries that enabled them to test before commercial kits became available ^. Thailand's Government Pharmaceutical Company (GPO), a national manufacturing resource, aims to increase domestic production capacity for influenza vaccines with the goal of providing sufficient vaccine to meet domestic and regional needs in the event of an outbreak with pandemic potential ^ (120). In pursuit of this goal, the GPO has forged a partnership with Sanofi Pasteur and secured technology transfer agreements with the Russian Institute of Experimental Medicine (IEM) and the US Biomedical Advanced Research and Development Authority (BARDA) ^ (120).

Thailand's policies align with WHO's Global Influenza Strategy 2019-2030 for the expansion of national capacity for influenza prevention, detection and treatment, and with the Global Action Plan for Influenza Vaccines, which targets anticipated shortfalls in pandemic vaccine supplies ^ (121,122) .

Economic Determinants

Financial independence. Thailand's national government is the sole funder of its influenza program ^ (123). Its investments are informed by a unique body, the Health Intervention and Technology Assessment Program (HITAP) ^. A semi-autonomous unit of the MOPH, HITAP evaluates influenza burden, assesses interventions and identifies risk groups for vaccination ^ (123) .

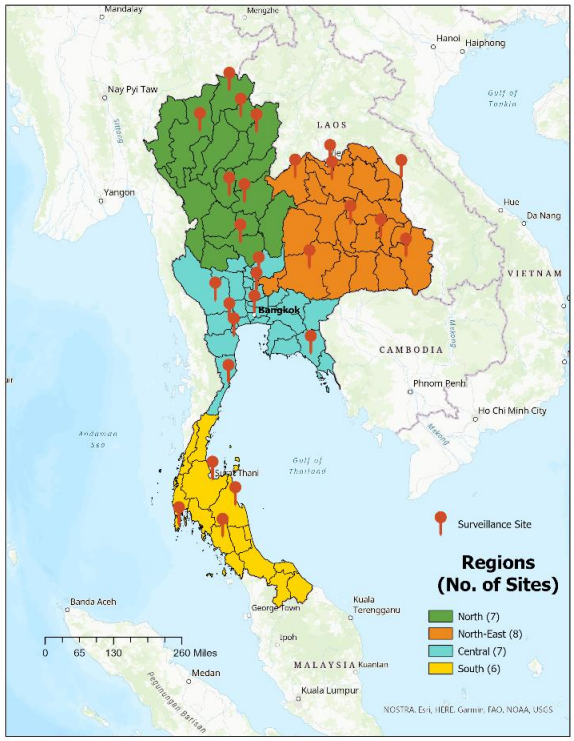
Prioritizing pandemic influenza. For Thailand, according to one KI, "investing in influenza vaccines is something like buying state-of-the-art arms or submarines...for the security preparedness in relation to health security" ^. While Thailand has prioritized preparedness for pandemic influenza, the same cannot be said for its procurement of seasonal influenza vaccine. In 2021, Thailand received about four million doses of trivalent vaccine for its eligible population of 11 million, resulting in low coverage among all risk groups except HWs and people aged 65 years or older (124,125). Decision makers have cited lack of evidence of influenza vaccine effectiveness and low uptake rates as justification for Thailand's procurement status ^. A KI reported that a planned increase to six million doses in 2020 was cancelled due to a forecast of low demand and coincident with the emergence of COVID-19 ^.

National health insurance. Thailand's national health insurance plan (NHIP), established in 2002, covers immunization services and preventive and curative services for nearly every citizen ^ (118) ; these services are provided by the public sector and NHIP-participating private health centers and practitioners. For those who are not risk group members, influenza vaccination costs approximately 350 baht (US$10) in public hospitals and 700 baht (US$21) in private hospitals (126). A KI estimated that fewer than five percent of influenza immunizations take place in private hospitals ^.

Distribution network. Influenza vaccines are provided primarily at district hospitals (121) and also at public and private primary health centers in Thailand ^. Primary health centers, which serve every province and sub-district in Thailand, are located within 30 minutes of most households (125,126); government-sponsored mobile immunization sites also serve some remote locations ^. Procedures introduced since 2009 to improve timeliness of vaccine delivery and reduce wastage have improved the effectiveness of Thailand's vaccine distribution system ^ (119) .

Surveillance. Forty sentinel surveillance sites, managed by the Thai NIH in collaboration with the US CDC, collect epidemiological and virological data throughout the country and provide weekly national reports (Figure 12) (129,130). These sites monitor ILI in outpatients, conduct SARI surveillance of hospitalized patients and now also conduct COVID-19 surveillance and testing (131). Thailand contributes to the WHO GISRS(132).

Figure 12: Sentinel surveillance sites across four regions in Thailand



Monitoring uptake and adverse events. Thailand's NHSO maintains an electronic record of vaccine uptake data. Each vaccine recipient is assigned a unique identification number linked to data that include date of birth, date of vaccination, risk group category (as determined by vaccine administrator), province of residency and type of health insurance (117). Health workers and pregnant women receive the quadrivalent vaccine; other risk group members receive the trivalent vaccine ^. The NHSO shares vaccine coverage data with WHO, but not publicly. In 2020, WHO reported 100 percent of Thais aged 65 years and older had received an influenza vaccine, along with 64 percent of HWs, 29 percent of pregnant women and 23 percent of children six months to two years of age (133).

According to a KI, published VCR data for Thailand may reflect inadequate and unreliable measures of risk group populations ^. In 2016, an independent study assessing influenza vaccine implementation processes in Thailand determined VCRs that were markedly lower for certain risk groups than those reported by WHO (125).

Thailand's adverse event following immunization (AEFI) reporting system has been part of its immunization program—including for influenza vaccination—since 2003 ^ (134) . AEFI, which informs awareness and risk communication programs, gathers its data solely from passive reporting by HWs (135). A 2019 study reported there were had been no adverse events following immunization in the previous four years (125).

Fruitful collaboration. To improve governance of its influenza program and to generate evidence for framing and improving policy on influenza and other immunizations, Thailand collaborates with research institutions and universities including the London School of Tropical Medicine, John Hopkins University and the Mahidol Oxford Tropical Medicine Research Unit (136). In partnership with WHO and the US CDC, Thailand conducts the Field Epidemiology Training Program (FETP), a residency in preventive medicine and epidemiology (137). The FETP successfully has responded to and controlled multiple public health threats in Thailand including avian influenza, severe acute respiratory syndrome (SARS) and Middle East Respiratory Syndrome (MERS) (137).

Communication and Educational Determinants

Multilevel campaigns. The inclusion of influenza in Thailand's EPI program provides an effective platform for vaccination awareness and educational campaigns ^. Each district develops strategies to increase local awareness through methods that include general educational programs, training village health volunteers (VHVs) and mobile outreach efforts (138). Most public and private hospitals run their own influenza campaigns ^.

Socio-behavioral Determinants

Risk group awareness. Publicly available information on influenza awareness in Thailand is derived entirely from independent surveys that reveal disparate levels of understanding among its various risk groups. Surveys have identified HWs as having the highest levels of influenza awareness (92 percent), followed by children's caregivers (77 percent) and people aged 65 years or older (76 percent) (124,139,140). A survey of pregnant women receiving antenatal care at public clinics in Thailand found that two out of three had heard about the influenza vaccine (141).

HW attitudes and awareness. Most Thai HWs are broadly supportive of immunization. A 2013 survey of physicians determined that while 75 percent of them favored the immunization of pregnant women, only 25 percent reported routinely recommending influenza vaccine in their current practice (142). This discrepancy could reflect a lack of physician awareness of MOPH risk group recommendations for influenza vaccination (142). A KI also observed that Thailand's influenza vaccination recommendations lack clarity ^. On the other hand, a KI reported, the experience of administering COVID-19 vaccines caused many physicians to view other adult vaccinations—including influenza—more favorably ^ (142).

Impact of the Influenza Program on COVID-19 Response

Repurposed surveillance. Thailand leveraged existing EPI infrastructure for COVID-19 surveillance by integrating acute respiratory infection (ARI) and ILI surveillance capacities with COVID-19 surveillance ^. Non-pharmaceutical interventions (NPIs) taken to slow the spread of COVID-19 appeared to reduce influenza cases in Thailand, along with demand for influenza vaccine ^. At the same time, gaining access to COVID-19 vaccination in small health centers appears to have increased awareness of adult vaccination among Thai HWs and the general population. These strategies could lead to increased influenza vaccine uptake in the future ^^.

The value of volunteers.

Responding to COVID-19, Thailand leveraged an existing network of more than one million village health volunteers established during the avian influenza epidemic of 2004 (143,144). Recognized as critical to the early detection and control of influenza, these volunteer ranks were expanded through recruitment and training during the COVID-19 pandemic, when they contributed significantly to surveillance and contact tracing, public awareness and community-level education (143,144). Thailand has also recruited and trained

A Health Network, One Million Strong

Since 1970, Village Health Volunteers (VHVs) have offered community-based public health and delivered an array of primary care services in Thailand. In nearly every village in the country, more than one million Thai VHVs connect their neighbors with the country's formal health (396,397). VSVs provide basic health services and medications, disseminate information and collect data. They have supported a broad range of health services including nutrition, immunization, maternal and child health, dental care, mental health, AIDS prevention and pandemic surveillance (WHO report). Also, to serve Thailand's aging population, VHVs now support care for the elderly that includes health screenings and improvement of living conditions (397).

In 2004, Thailand's VHVs were called upon to support nation-wide avian influenza surveillance. The periodic household surveys they conducted to evaluate the health of both humans and animals provided essential information to the country's early warning system (WHO report). As noted in our case study, VHVs recently contributed to Thailand's COVID-19 response, having been recruited and trained in surveillance and contact tracing, and in techniques for increasing public awareness and education (143,144).

Thailand's VHV program, founded on cultural constructs of volunteerism, aimed to recruit people willing to serve their communities, and especially those considered to be community leaders. The first VSVs did not receive compensation other than free health services for themselves and their immediate families (396) . Today, however, each VSV receives a monthly stipend of 1,000 Thai baht (equivalent to approximately US$32) and, during the COVID-19 pandemic, an additional 500 baht (142). The monthly stipend for Thai VSVs is slated to increase to 2,000 baht beginning in October 2023 in recognition of their increased responsibilities in the pandemic's aftermath (397).

members of its migrant populations from Myanmar, Laos and Cambodia to conduct contact tracing and raise awareness of COVID-19 precautions including vaccination within their communities ^^.

KEY FINDINGS AND CONCLUSIONS

Our case studies of seasonal influenza vaccination programs in Albania, Bolivia, Brazil, South Africa and Thailand highlight their many successes, as well as lessons learned from which such successes are achieved. The case studies describe how these MICs are building and sustaining resilient and response-ready influenza programs in the face of new and emerging public health threats, including the COVID-19 pandemic. Table 9, which summarizes our analysis of case study findings on most key determinants for increasing and sustaining influenza VCRs in each country, highlights consistent indicators of positive program trajectories and response readiness across the five case-study countries.

Indicators of Response Readiness and Resiliency

Locally relevant surveillance and research informs evidence-based policymaking. Investment in locally focused data generation efforts can drive effective policy change and continuous program improvement. Health policy makers can maximize investment of local resources when their decisions are informed by surveillance and burden of disease data, and by determinations of the efficacy and cost effectiveness of potential interventions. Measures of vaccine efficacy and cost effectiveness can justify funding the creation or expansion of immunization programs or increased vaccine procurement. Disease surveillance and burden data can also be leveraged to identify emerging priorities and/or the need to revise risk group categorizations. Knowledge, attitude, and practice (KAP) studies can aid in the development and evaluation of demand generation campaigns.

Further, by collaborating with regional and international institutions, national governments gain opportunities to frame and improve influenza policy: for example, by evaluating and adapting research findings from countries with similar health and population demographics. Active and reliable advisory bodies comprised—like many NITAGs—of experts representing diverse fields can assist in translating data into policy and can advocate for effective, efficient, and evidence-based decision making.

Alternative procurement solutions ensure timely and affordable vaccines. Multiple KIs reported that vaccines often are not delivered until after the influenza season has already begun, and that these delays reduce vaccine confidence and uptake in their communities. To prevent such delays, countries must be able to communicate their requests for doses to vaccine manufacturers on a schedule that permits the timely procurement and distribution of influenza vaccines. Doing so would benefit both parties, much as advanced market commitments enable governments to properly plan effective immunization campaigns and pharmaceutical companies to anticipate and deliver expected quantities of vaccines when they can be most effectively deployed. PAHO's Revolving Fund provides such dual assurance through the pooled procurement of vaccines for Latin American countries including Bolivia.

Frontline health workers drive vaccine uptake. As trusted members of their communities and ultimate providers of 'shots in arms', HWs exert unmatched influence on patients' vaccination decisions—and thereby on VCRs. Investment in regular trainings and workshops that educate HWs on vaccine efficacy and benefits, and that teach strategies for dispelling mis- and disinformation, can empower HWs toward more powerful vaccine advocacy. Incentives of small prizes and peer recognition can increase HW vaccine administration rates, yielding abundant return on modest investment. WHO's Immunization Awareness Week provides an occasion to offer HW training and/or reward champions of vaccination. Medical professional societies (e.g., laboratorians, obstetricians, pediatricians, cardiologists and other chronic disease physician and nursing

groups) can create field-specific training and communication strategies to emphasize the benefits of influenza vaccination for patients at high risk from influenza.

Community-tailored demand generation efforts boost vaccine confidence and uptake. MICs must carefully balance supply and demand for influenza immunization. Over-procurement results in dose wastage, which can undermine political support for continued investment in influenza programming. Undersupply can reduce public confidence in immunization and lead to lower coverage rates. Among the five countries we studied, we observed several examples of creative and community-tailored approaches that increase both confidence and uptake of influenza vaccines:

- Mascots and slogans broadcast via TV, radio and print ads that effectively targeted specific risk groups and reached most locations and socioeconomic strata.
- Social media campaigns promoting influenza vaccination that featured celebrities, social media influencers and government dignitaries.
- Festivals and other celebratory events at the start of influenza season where people were encouraged to be vaccinated and could easily do so (unfortunately, these kinds of events had to be suspended during the COVID-19 pandemic in favor of mass vaccination efforts designed to limit, rather than encourage, mingling in large groups).
- Messaging broadcast in sub-national and tribal languages, developed in partnership with community leaders from remote or minority populations.
- Campaigns targeting HWs and hospital staff and intended to build a sense of common purpose in reducing the burden of influenza.
- Efforts to train and collaborate with local media to improve the quality of health reporting and encourage vaccination, particularly against influenza and COVID-19.

Life course immunization as pandemic preparedness. For MICs seeking to allocate limited resources among competing health priorities, assets and infrastructure positioned to address both the ongoing burden of seasonal influenza and the threat of infectious outbreaks (not limited to influenza) offer outstanding return on investment. Our findings offer evidence that investment in life course and influenza vaccination infrastructure improves pandemic preparedness. In the countries we studied, infrastructure built for seasonal influenza vaccination was successfully leveraged to deliver COVID-19 vaccines. Conversely, investments in COVID-19 vaccine development, manufacturing, delivery and health communications can be harnessed to sustain and expand influenza vaccination programming and coverage. Influenza and COVID-19 immunization programs can provide a firm foundation for sustainable life course infrastructure, which in turn offers abundant health and economic benefits as compared with siloed immunization programming (53,111).

Table 10: Select key determinants for increasing and sustaining influenza VCRs in case-study countries (communication, education and socio-behavioral determinants, discussed above, defy direct comparison). Light Blue = Well-developed and/or active and/or available; Light Orange = Partially developed and/or active and/or available; Grey = Not yet developed and/or available or not enough evidence.

	Influenza Vaccination Policy and Program Elements	 Albania	 Bolivia	 Brazil	 South Africa	 Thailand
Political	Influenza vaccination program or policy established	Policy (2007)	Policy (2011)	Program (1999)	Program (2010)	Policy (2005)

	Pandemic influenza preparedness plan established	Yes (2009)	Yes (2005)	Yes (2006)	Yes (2006)	Yes (2013)
	NITAG or equivalent	Yes	Yes	Disbanded 2019; Reinstated 2023	Yes	Yes
	Influenza vaccination is recommended for at-risk populations	Yes	Yes	Yes	Yes	yes
Economic	Influenza vaccination is provided free for at-risk populations	Yes	Yes	Yes	Yes	Yes
Structural	Local capacity to manufacture influenza vaccines	No	Biolyse Pharma (COVID-19 vaccines)	Instituto Butantan	BioVac	Government Pharmaceutical Organization (GPO)
	Presence of sentinel surveillance	Sentinel ILI surveillance at 2 facilities in Tirana; universal ARI surveillance in all health facilities; sentinel SARI surveillance at 11 hospitals	Sentinel surveillance at 9 SARI and 1 ILI sites	Works with WHO/PAHO on SARI and ILI surveillance; reports to FluNet and FluID	NICD manages national surveillance for respiratory pathogens; Viral Watch provides sentinel surveillance for patients with reported ILI	Sentinel ILI and SARI surveillance at 40 hospitals
	Adverse Events Reporting/Surveillance	Yes	Yes	Yes	Yes	Yes
COVID-19[1]	COVID-19 Fully Vaccinated Rate (as of October 2022)	45%	50%	80%	33%	75%

[1] *Our World in Data* (21).

LIMITATIONS

The general limitations of this study include that we were only able to reach stakeholders for mapping outreach via email. Non-response bias occurred in both scoping surveys and interviews, which engaged stakeholders who received and responded positively to our email invitation. While the scoping survey was semi-structured in nature, many questions were closed-ended; this may have produced fewer valid responses.

Language barriers undoubtedly limited access to information at several stages. Our literature review was conducted in English and most KI invitations were also written in English. This may have excluded significant published information and likely reduced the number of potential KIs.

Our scoping surveys and KIs failed to fill information gaps that remained following the literature survey. For example, standardized data were not reported (or found) across all countries, prohibiting direct comparisons on such key statistics as annual influenza VCRs across risk groups, national-level procurement amounts, among others, which perhaps introducing subjective bias. In addition, certain literature reports of VCRs exceeding 100 percent defied interpretation.

The Bolivia case study lacked official representation and data, as noted above. In addition, individual case studies presented the following specific limitations:

- Brazil: lack of KI diversity; non-engagement by active government officials
- Bolivia: no KIs representing the MOH, although they did include members of its immunization advisory body (CNI)
- South Africa: does not collect national data on influenza vaccine; lack of response from BioVac Institute
- Thailand: does not publicly share vaccine coverage data; available VCR data may reflect inadequate and unreliable measures of risk group populations.

In considering the above limitations, readers should recognize that we conducted our research during the COVID-19 pandemic. Most (if not all) participating KIs were heavily involved in the pandemic response; several stakeholders who might otherwise have engaged with us reported that their work during this global crisis did not allow time for anything else.

CONCLUSION

Despite limitations in data discovery and collection, we were able to obtain and curate sufficient high-quality data to build case studies of exemplary influenza immunization in five MICs. Methodological framework analysis of case-study findings revealed six key indicators associated with the successful development of sustainable seasonal influenza programs, and of the ability of these programs to strengthen pandemic response readiness and resilience.

These evidence-informed principles provide examples of investment and program design that may benefit other MICs as they seek to reduce their burden of seasonal influenza. Our findings could also provide a foundation for further investigation and application toward the development of a playbook for MICs that currently lack effective programs for influenza prevention and response. In the wake of the COVID-19 pandemic, as MICs struggle to reverse recent (and in some cases precipitous) declines in all vaccinations, such evidence-based, actionable solutions could be particularly useful.

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APPENDICES

Appendix A. Study Team and Advisory Committee Bios

Study Team

Nick Boehman, *Associate, Vaccine Acceptance & Demand, Sabin Vaccine Institute*

Nick Boehman is an Associate with Sabin's Vaccine Acceptance & Demand Initiative. Nick provides programmatic support and assists with research needs across the VAD team. He earned his BA in International Relations from Saint Joseph's University in Philadelphia. Prior to joining Sabin, Nick worked as a Program Associate with a CGFNS International, a global health NGO, in a role that was highly research and reporting focused. Prior to that, he interned with the International Campaign to Abolish Nuclear Weapons (ICAN) in Austria, where he gained experience in relationship building with external programmatic stakeholders, and researched, designed, and implemented ICAN's first, major social media campaign to raise awareness of ICAN's mission. Having also obtained a minor in film, Nick is creative by nature, and seeks to use that creativity in his everyday work to advance Sabin's mission.

Danielle Countryman, *Intern, Vaccine Acceptance & Demand, Sabin Vaccine Institute*

Danielle is currently an intern within Sabin's Vaccine Acceptance & Demand Initiative and is attending George Washington University's Milken Institute of Public Health to complete an MPH in Global Health Policy. Her interests and prior experience relate to reproductive health, nutrition and food systems, and vaccine equity particularly in Latin America.

Meredith Dockery, *Associate, Vaccine Acceptance & Demand, Sabin Vaccine Institute*

Meredith Dockery is an Associate with the Sabin Vaccine Institute's Vaccine Acceptance & Demand Initiative. Prior to joining Sabin, Meredith completed a six-month internship with the Pan American Health Organization (PAHO). At PAHO, Meredith split time between the COVID-19 Incident Management Support Team and the Public Affairs Team. Meredith received her BA from the University of North Carolina at Chapel Hill in Public Policy and Business Journalism with a minor in Spanish for the professions. Meredith was a member of the UNC Health and Human Rights Working Group through which she conducted research examining human rights frameworks and global health governance at the intersection of international law, public policy and global health as well as contributed to the UNC COVID-19 Health & Human Rights Monitor. Meredith also contributed to Type 1 Diabetes research studying the impact of specific goal setting on glycemic control during her time at UNC by coding goal setting sessions.

Dr. Kate Hopkins*, Director of Research, Vaccine Acceptance & Demand, Sabin Vaccine Institute*

Kate Hopkins leads Sabin's Vaccine Acceptance & Demand programming, an initiative supporting knowledge-generation and recommendations on strategies to increase vaccine acceptance and uptake globally. Kate oversees a Social and Behavioral Research effort which includes an annual global grant program currently in its third iteration, the Vaccination Acceptance Research Network (VARN) and Sabin's headquarters-based research portfolio. She leads Sabin's efforts to cultivate inter-disciplinary research regarding the drivers of vaccine uptake in low- and middle-income countries by convening stakeholders across the disciplines of social and behavioral research, immunization, the broader global health community, multilateral institutions, national policy makers, partners and donors. Prior to joining Sabin, Kate worked at the Perinatal HIV Research Unit at the Chris Hani Baragwanath Hospital in Soweto, Johannesburg South Africa. There, she co-directed the Key Populations Division and was responsible for the Division's mixed-methods research portfolio which focused on identifying effect strategies for HIV prevention and treatment among at-risk key populations. She provided technical assistance to clinical research sites conducting HIV and COVID-19 vaccine trials and supported both the HIV Vaccine Trials Network and COVID-19 Vaccine Prevention Network. Kate holds a PhD in Public Health from the University of the Witwatersrand South Africa, and a Master of Public Health from Boston University.

Cassidy Howell, *Manager of Knowledge Translation, Vaccine Acceptance & Demand, Sabin Vaccine Institute*

Cassidy Howell has worked for the past three years with the Sabin Vaccine Institute to translate scientific research findings and evidence into tailored and accessible messages for a variety of key audiences including pandemic policy & decision makers, funders, health professionals, thought leaders, students, and educators. The primary workstreams she has supported at Sabin are Influenza Vaccine Innovation and Vaccine Acceptance and Demand. For these projects, Cassidy co-developed the white paper, "Lessons from COVID-19: Advancing Development of Universal Influenza Vaccines" by compiling findings from survey and KOL interview data analysis and literature review. Prior to her work with Sabin Cassidy held global health program monitoring and evaluation positions with Global Health Corps and International Medical Corps while working in Guinea and Malawi. Cassidy received her MPH from George Washington University and her BA in International Studies, with a focus in Anthropology from the University of Florida. Her expertise includes infectious diseases, vaccines, medical anthropology, strategic communications, qualitative data analysis, literature review, and stakeholder engagement.

Stacey Knobler, *Vice President, Global Immunization & Vaccine Innovation, Sabin Vaccine Institute*

Stacey Knobler has more than 20 years' experience developing and disseminating strategic recommendations related to public health, the management of health systems, vaccines and vaccination. As VP, Vaccine Innovation & Global Immunization at Sabin, Stacey leads Sabin's strategic planning efforts across organizational programming; convenes global experts to recommend strategies for accelerating and transforming vaccine development and delivery; assesses changing policies and practices across the vaccine development, regulatory and response landscape; and reviews how emerging technologies can benefit future vaccine development. With the Fogarty International Center, Stacey supported strategic planning and program direction for the Division on International Epidemiology and Population Studies, inclusive of the Multinational Influenza Seasonal Mortality Study initiative. At the National Academy of Sciences Institute of Medicine (IOM), she was the founding director of the Forum on Emerging Infections, led multiple projects related to global public health priorities and developed a partnership effort between the IOM and 8 African Academies of Science (ASADI). Stacey holds a Masters of Science degree in Public Health from the London School of Hygiene & Tropical Medicine in the UK. She is a steering committee member for the CIDRAP Influenza Vaccine Roadmap and the Global Funders Consortium for Universal Influenza Vaccine Development.

Alison Mack, *Technical Science Writer*

Alison Mack is a freelance science writer and editor who has worked with Sabin's Influenza Vaccine Innovation Team since 2019. Trained as a scientist, she studied plant ecology and plant molecular biology and worked for two biotech companies before transitioning to her present role in 1995. Her writing has appeared in a variety of scientific, trade and lay publications, including The Scientist and The Dallas Morning News, and she co-authored the book, *Marijuana as Medicine? The Science Beyond the Controversy* (2001). From 2003 to 2015, Mack was a frequent rapporteur for the Forum on Microbial Threats, Board on Global Health of the National Academy of Medicine (formerly Institute of Medicine).

Marissa Malchione, *Manager, Research & Analysis, Influenza Vaccine Innovation, Sabin Vaccine Institute*

Marissa Malchione's research focuses on driving innovation and harnessing interdisciplinary scientific and technological advances to accelerate the development of next-generation universal influenza vaccines. Currently, she is helping to assess how the COVID-19 pandemic is informing and changing practice and policy across the science and technology landscape, vaccine development and regulatory science, health security and pandemic preparedness. The team is considering how COVID-related changes and scientific breakthroughs may impact the development of other pandemic-prevention vaccines, making them more equitably accessible to communities worldwide. To that end, she has supported a global survey of 200+ individuals from across these sectors, publication of the first in a series of white papers framing early learnings from COVID-19, and the on-going development of an interview and documentary video series. Prior to her work at Sabin, as a Fellow in Quality of Medical Products, Marissa reviewed a selection of National Action Plans on antimicrobial resistance (AMR). She identified quality-related initiatives aiming to prevent, detect, and respond to substandard or falsified antimicrobials and the potential role of poor-quality antimicrobials in contributing to AMR. Marissa holds a Master of Science in Public Health Microbiology and Emerging Infectious Diseases from the George Washington University.

Dr. Ben McCormick, *Research Fellow, Rowett Institute, University of Aberdeen*

Ben McCormick has worked as a consultant analyst at the Fogarty International Center (FIC), Penn State University, Johns Hopkins University and the Sabin Vaccine Institute. He spent 10 years at the FIC studying the impacts of malnutrition on child growth and development. He was one of the principal analysts for the MAL-ED Study, an international network of over 100 researchers. His involvement spanned each of the technical groups within the project, and included modelling enteric pathogens, biomarkers of gut dysfunction, growth and cognitive development. He has taught on data visualization and analysis for researchers in low- and middle-income countries and mentored junior researchers in taking their analyses through to publication. More recently, he has returned to decision-support platforms, working first on EPIPOI, an accessible tool for researchers to conduct spatio-temporal analyses with their own data rather than relying on external experts and then on the PriorityVax (and its antecedent, SMART Vaccines) to support national and sub-national prioritization decisions for vaccine introduction and delivery. He designed and advanced the tool to a user-friendly and accessible web-based platform, liaising with stakeholders to pilot the tool and provide training on its use within their evidence-to-recommendation processes. Following his work on methods for vaccine prioritization, he joined the Technical Advisory Committee for the WHO Total Systems Evaluation project and was engaged as an observer of WHO R&D Blueprint prioritization meetings. Ben is an expert committee member for NHS Research Ethics and has over 45 peer review publications. Ben trained as an ecologist at the University of Oxford (BA Biological Sciences, DPhil Zoology), studying the environmental determinants of vector-borne disease distributions; and the Scottish Agricultural College where he constructed decision-support tools to integrate epidemiological models and economics to assist veterinary experts and farmers managing endemic livestock diseases.

Dr. Theresa Sommers, *Senior Manager of Research, Vaccine Acceptance & Demand, Sabin Vaccine Institute*

Theresa Sommers is an expert in mixed-methods research, with experience in quantitative and qualitative methods. Theresa leads Sabin's Social and Behavioral Research Grants program – a global, interdisciplinary research partnership focused on vaccine acceptance and demand in low- and middle-income countries. She previously lead Sabin's Surveillance of Enteric Fever in Asia Project (SEAP), managing data collection and data quality control across study sites in Bangladesh, Nepal and Pakistan. As part of this effort, she designed and carried out a qualitative study of COVID-19 stigma among project field staff. Prior to joining Sabin, Theresa was a project manager for the Tufts University USAID OneHealth Workforce project. There, she built capacity in Uganda and Thailand for research design, qualitative information gathering and proposal development. She also monitored and synthesized MEL data and findings from across the project. At the African Centre for Migration and Society in Witwatersrand South Africa, Theresa designed and implemented a community-based qualitative research study of the social determinants of health among migrants in Johannesburg. This project included conducting 75 semi-structured key informant interviews, participant observation and an assessment in collaboration with the

International Organization for Migration. Theresa earned her PhD in Global Governance and Human Security from the University of Massachusetts Boston and her MPH from Boston University.

Joel Tinkler, *Intern, Influenza Vaccine Innovation, Sabin Vaccine Institute*
Joel is an intern for Sabin's Influenza Vaccine Innovation team, and is a current MPH in Health Policy candidate at Harvard University. His focus of study is on the role of evidence-based public policies in promoting global health security and public health emergency preparedness. Prior to graduate school, he worked in state and federal government across several public health topics, including value-based payment arrangements, substance use, and human trafficking.

Dr. Angus Thomson, *Consultant Senior Social Scientist, Demand for Immunization, UNICEF*
Angus Thomson is Principal of Irimi Company, an organization concentrated on building public trust in public health programs, with a particular focus on immunization. He is a technical expert on vaccine demand and uptake in UNICEF. Angus conceived and is currently spearheading the Vaccination Demand Observatory, a global UNICEF-led collaboration aiming to provide countries with a capacity strengthening package for social listening and engagement, initially focused on vaccine misinformation. He co-authored the Vaccine Misinformation Management Field Guide (12,000+ downloads) and the Vaccine Messaging Guide and is leading the Digital Information Environment workstream of the Vaccination Demand Hub. Angus has published over 20 peer-reviewed opinion pieces, research papers, and book chapters on vaccine confidence and coverage, and co-edited an 18-paper Special Issue on Vaccine Confidence in Vaccine. He lectures on Vaccine Confidence for the VaxinLive Master's Program in Lyon and serves on the advisory council of the Vaccine Confidence Fund.

Vishakh Unnikrishnan, *Intern, Influenza Vaccine Innovation, Sabin Vaccine Institute*
Vishakh is an intern for Sabin's Influenza Vaccine Innovation team and a Masters candidate at the George Washington University Milken Institute School of Public Health, concentrating in epidemiology. His

interests and work lie in the field of environmental health, epidemiology, air pollution and climate change. Vishakh holds a graduate degree from National Law University, Delhi with a post-graduate diploma in environmental law and policy. He also holds a diploma in Journalism from Asian College of Journalism and a bachelor's degree in journalism, developmental studies and political science.

Advisory Committee

Dr. Silvia Bino, *Head of Department of Epidemiology and Control of Infectious Disease, Institute of Public Health, Albania*

Silva Bino, MD, Ph.D, is the Head of the Control of Infectious Diseases Department of the Institute of Public Health and an Associate Professor of Infectious Diseases at the Faculty of Medicine, Tirana University, Albania. She was the Director of National Public Health Institute from 2000-2006, and has devoted her career to novel strategies to control infectious diseases and strengthen surveillance systems in resource poor countries. Dr. Bino coordinated surveillance, diagnostic, and response activities for pandemic influenza A (H1N1) 2009 in Albania. She is also in the national group for IHR implementation, and has been involved in IHR implementation in Southeastern Europe. Dr Bino has been the Regional Coordinator of the network to strengthen surveillance and control of communicable diseases in South-eastern Europe, which has fostered strengthening of early warning systems, policy development, preparedness and response, applied epidemiology training and expert and institutional collaboration. Since 2000 she has been coordinating the Immunization program and helped to establish a syndromic Early Warning System in Albania. She has authored articles on infectious diseases published in professional and scientific journals and has participated in the writing of different guidelines, books and reports related to infectious diseases, influenza and public health surveillance. She has served as consultant to WHO and other UN agencies. Dr Bino was a member of Strategic Advisory Group of Experts on Immunization until April 2009, a member of review committee on the functioning of the international health regulations (2005) and on pandemic influenza A (H1N1) 2009 until 2011 and served as a member of PIP Advisory group until 2014. She earned her medical and doctoral degrees from Tirana University and followed with postgraduate training on infectious diseases, microbiology, epidemiology and public health in Switzerland, Belgium, the United Kingdom and the USA.

Dr. Malembe Ebama, *Associate Director, Center for Vaccine Equity, The Task Force for Global Health*

Dr. Malembe Ebama is a senior epidemiologist for the Partnership for Influenza Vaccine Introduction (PIVI), a program of the Task Force for Global Health. In this role since 2016, she provides technical support to PIVI partner countries, Ministries of Health, and local stakeholders, in gathering programmatic evidence to inform vaccine policy decision making and support sustained government investment in influenza immunization programs. Her work also includes supporting National Immunization Technical Advisory Group (NITAG) strengthening initiatives funded by the U.S. CDC Global Immunization and Influenza Divisions - to strengthen evidence-based vaccine policy recommendations - through coordinating the development of training materials, resource tools, and capacity building workshops for low-and-middle-income countries. Since the COVID-19 pandemic, she has collaborated with PIVI partner countries in leveraging their experiences with influenza and influenza vaccination to respond to the pandemic. This work has included defining areas of technical support needs and facilitating annual workplan and budget development for COVID vaccine program support. As of March 2022, she serves as interim Director of Project Implementation for the COVID-19 Vaccination Implementation Program (COVIP) at the Task Force. Prior to joining the Task Force, Dr. Ebama worked in state government, for the Office of HIV/AIDS at the Georgia Department of Public Health. She was the HIV Prevention Data and Evaluation Team lead, where she led the development of the Georgia HIV Perinatal Transmission Case Review, using the Fetal-Infant-Mortality-Review (FIMR) model. Her work helped inform Georgia's perinatal HIV prevention strategy and the draft of the state House Bill for third-trimester HIV testing. Dr. Ebama holds a Master's and Doctoral degree in Public Health from the University of North Texas Health Science Center, and a Bachelor of Science degree in Biology from Seton Hall University.

Dr. Benjamin Kagina, *Senior Research Officer, Vaccines for Africa, Institute of Infectious Disease and Molecular Medicine, University of Cape Town, South Africa*

Dr. Kagina is the Director of a newly established NITAGs Support Hub (NiSH) and Co-Director of VACFA, both based at UCT. He has the following postgraduate training: MSc in Epidemiology (KEMRI, Kenya), PhD in Clinical Sciences & Immunology (UCT, South Africa) and Postdoctoral fellowship in Immunology and Vaccinology (UCT, South Africa). Dr. Kagina joined UCT's VACFA group in 2014. Dr. Kagina's research work at VACFA is focused on addressing policy relevant vaccinology questions, by utilizing diverse methods among which is the application of the principles of Evidence-Based Vaccinology (EBV). He has several publications in the fields of immunology, public health, and EBV. While conducting research, Dr. Kagina's work also include leading activities aimed at developing vaccinology expertise in Africa. Dr. Kagina give lectures on vaccines and immunization to diverse audience, trains and mentors postgraduate

students, and he co-convenes VACFA's annual African vaccinology course (AAVC). Dr. Kagina is now leading a 5-year Wellcome funded project that aims to provide Evidence-Informed Decision-Making (EIDM) support for vaccines and immunization in the WHO Africa region.

Dr. Erin Kennedy, *Chief Science Officer, Immunization Systems Branch, Global Immunizations Division, Centers for Disease Control and Prevention, USA*

Dr. Kennedy is a Medical Officer within the Immunization Services Division at the CDC and has been working in the field of vaccine preventable diseases since 2002. Her work involves vaccination coverage assessment, evaluation of methods designed to increase immunization rates, and pandemic preparedness. She is the lead for the Rapid Flu Survey to collect influenza vaccination coverage and KAB data nationally and in 20 local areas. She is currently leading a project to examine discrepancies between CMS influenza vaccination claims data and MDS data. Prior, she lead a national investigation of 2009 H1N1-associated hemorrhagic pneumonitis to identify risk factors and determine what treatment and prevention strategies should be targeted to persons at risk. Dr. Kennedy has experience coordinating national surveillance and case finding activities and developed a national study to investigate 2009 H1N1-related deaths, including development of the survey methodology, data collection instrument and data management system. Dr. Kennedy has a DVM and MS from Colorado State University and an MPH in epidemiology from Emory University. She was an Epidemic Intelligence Service Officer in CDC's Influenza Division during the 2009 H1N1 influenza pandemic.

Dr. Marie Mazur, *Director, Ready2Respond*

Appointed in 2020, Marie provides leadership on the development and execution of Ready2Respond's program goals and actions, while optimizing cross-sector partnerships to ensure cost-effective implementation of identified initiatives. Marie brings more than 20 years of experience in the vaccine industry. Prior to joining Ready2Respond, she headed up the Pandemic Response Solutions unit for Seqirus, a CSL Company. During her tenure, Seqirus became the global market leader in pandemic influenza vaccine response. In her prior role as President of the bioCSL unit, Marie led the commercial due diligence effort that resulted in the Novartis Influenza Business acquisition. Seqirus is now the only vaccine company focused on the prevention of seasonal and pandemic influenza. In 2018-2019, Marie was Co-Chair of the Bio-Defense Policy Advisory Committee at the Biotechnology Innovation Organization. Prior to joining CSL, Marie held successive global commercial leadership positions at Sanofi Pasteur, 3M Pharmaceuticals and GlaxoSmithKline Biologicals, in Europe and in the United States.

Marie received her doctorate in Pharmacy, and her master's degree in Regulatory Affairs, from Paris University in France. She is also a graduate from INSEAD Business School.

Dr. Holly Seale, *Associate Professor, School of Population Health, University of New South Wales, Sydney, Australia*

Associate Professor Holly Seale is an infectious diseases social scientist based at the School of Population Health, University of New South Wales. Holly has over 17 years of research experience in immunisation and infectious diseases. She has been undertaking pandemic related research focused on community and clinical based settings since 2007 and has published over 25 papers on the topic. Holly has conducted clinical, behavioural, and data-based research, has published 174 journal papers and is a past member of the World Health Organisation, Behavioural and Social Drivers of Vaccination Working Group. Her work focuses on improving awareness, acceptance, and demand of immunisation with a focus on special at-risk groups including children and adults with comorbid conditions, refugees and migrants (travellers) and health workers. Holly uses social science to drive quality and safety improvements in the healthcare sector, domestically and internationally, including in China, Indonesia, Pakistan, Vietnam, and Bangladesh. She is currently the Deputy Chair for the Collaboration on Social Science and Immunisation.

Appendix B. Comprehensive List of Search Terms and Sources for Narrative Literature Review

Category	Search Terms [country name] + term
Political	• Influenza vaccine policy • Influenza vaccine program • National Immunization Technical Advisory Group (NITAG) • Ministry of Health • Immunization policy • Seasonal influenza vaccination • Vaccination strategy • Influenza in middle-income countries
Economic	• Funding • Budget • Ministry of Finance • Influenza vaccine procurement • Influenza dose forecasting • Cost-effectiveness analysis • Influenza program cost analysis • Influenza vaccine manufacturing
Structural	• Influenza surveillance • Influenza disease burden • Adverse events surveillance • Adverse events reporting • Influ8enza vaccine coverage • Influenza vaccine uptake • Health System • Influenza vaccine distribution
Communications & Education	• Influenza vaccine demand • Influenza vaccination campaign • Physicians' perception • Vaccinator
Socio-behavioral	• Knowledge, attitudes and practices (KAP) • Predictors of influenza • Perception of influenza • Influenza vaccine effectiveness • Vaccine trust • Trust in healthcare
COVID-19 specific	• Pandemic preparedness plan • Avian influenza pandemic • COVID-19 vaccine uptake
Literature sources and databases searched	

• PubMed
• Google Scholar
• Google
• Google News
	• Social media
	  ○ Facebook
	  ○ Twitter
	  ○ LinkedIn
	• Key informant-provided data

Appendix C. Landscaping of Shortlisted Middle-Income Countries

Category	Albania	Algeria	Bhutan
Year Influenza Vaccination Program/Policy Established	Policy (2007)	Program (Not Publicly Available [NPA])	Program (2020)
Governmental Authority Involved in Influenza Policy/Program Decision-making	Institute of Public Health (IPH) in the Ministry of Health and Social Protection (MOHSP)	Ministry of Health, Population and Hospital Reform	Ministry of Health (MOH), Bhutan Health Trust Fund (BHTF)
NITAG or Equivalent	Yes	Yes	Yes
Defined Risk Groups	Children (6 mos - 18 yrs), adults (60+), chronic conditions, obesity, health workers (HWs), pregnant women, teachers	Elderly, chronic conditions, HWs, pregnant women, religious pilgrims	Children (6-23 mos), adults (65+), chronic conditions, HWs, pregnant women
Important Partners for Program Implementation	CDC, PIVI, WHO EURO, Ending Pandemics	NPA	PIVI, districts, Thromdes
Source of Funding and Doses	PIVI provides doses and technical support. National budget for influenza established in 2018, after which IPH began procuring doses for at-risk groups and covering other program costs.	MOH purchases the vaccine.	While PIVI has provided some doses, BHTF funds the program.
Local Capacity to Manufacture Vaccines	No	The Pasteur Institute can manufacture vaccines. Sanofi Pasteur has also signed an agreement to fill influenza vaccines in Algeria.	No
Influenza Vaccine Costs	Free for at-risk groups, approximately $18 USD for others	Free for at-risk groups, but private insurance pays 80% of costs for others	Free
Access Points for Influenza Vaccines	District health centers, private clinics, pharmacies	Pharmacies	Offered at health centers and in respective zones in Thromdes areas, per regional microplans
Influenza Disease Burden Surveillance	Sentinel ILI surveillance at 2 facilities in Tirana, universal ARI surveillance in all health facilities, and sentinel SARI surveillance at 11 hospitals	The Algerian Influenza Sentinel Surveillance Network Site operates in 9 provinces. GPs and pediatricians report all ILIs weekly to the National Institute of Public Health.	The Royal Center for Disease Control and MOH worked with the Armed Forces Research Institute of Medical Sciences on sentinel surveillance for ILI in outpatients, and the CDC on

			surveillance for hospitalized patients with SARI.
Vaccine Uptake Data Collection/Reporting System	Vaccinators report to the immunization information system	NPA	The Bhutan Vaccine System (BVS) allows for real-time monitoring of vaccine coverage. BVS was developed for COVID-19 vaccination management.
Adverse Events Reporting/Surveillance	Yes	NPA	Yes
Pandemic Influenza Preparedness Plan	Yes (2009)	Yes (2009)	Yes (2011)
COVID-19 Fully Vaccinated Rate (as of 9/4/22)	44%	16%	88%

Category	Bolivia	Brazil	Cote d'Ivoire
Year Influenza Vaccination Program/Policy Established	Policy (2011)	Program (1999)	Policy (2018)
Governmental Authority Involved in Influenza Policy/Program Decision-making	National Committee on Immunization, Pan American Health Organization (PAHO)	Brazilian National Immunization Program (PNI)	Ministry of Health and Public Hygiene
NITAG or Equivalent	Yes	No, NITAG recently disbanded	Yes
Defined Risk Groups	Children (6-24 mos), adults (60+), chronic conditions, HWs, pregnant women	Children (6 mos - 5 yrs), adults (60+), chronic conditions, HWs, pregnant women, indigenous, incarcerated	Young children, elderly, underlying medical conditions, HWs
Important Partners for Program Implementation	PAHO, International Federation of Red Cross and Red Crescent Societies Country Cluster Support Team, Bolivian Red Cross, Departmental Health Service	Sanofi, Butantan Institute	NPA

Source of Funding and Doses	MOH, district departments, and Servicio Departamental de Salud (SEDES) implement program and fund campaigns, administration, communications. MOH buys vaccines for the SEDES facilities and health facilities. They receive doses from the PAHO Revolving Fund.	Sistema Único de Saúde covers vaccinations through the social security budget. MOH procures doses and Butantan Institute produces doses.	The country receives doses through donations (i.e., via PIVI). PIVI also has provided technical assistance, such as a NITAG training.
Local Capacity to Manufacture Vaccines	Biolyse Pharma has the capability to produce COVID-19 vaccines.	Butantan Institute produces trivalent influenza vaccines for the public system.	NPA
Influenza Vaccine Costs	Free for at-risk groups	Free for at-risk groups	NPA
Access Points for Influenza Vaccines	Regional health departments, mobile teams, health fairs, community markets, select employers, health facilities	Health clinics and pharmacies	Public and private sectors
Influenza Disease Burden Surveillance	Sentinel surveillance at 9 SARI and 1 ILI sites	Work with WHO/PAHO on SARI and ILI surveillance, as well as FluNet Reporting and FluID Reporting	MOH worked with CDC, the National Institute for Public Health, and the Pasteur Institute on a national sentinel surveillance network.
Vaccine Uptake Data Collection/Reporting System	The expanded program on immunization operates an electronic immunization registry. Uptake tracked via software distributed across the healthcare system; data is reported to Bolivia's national health information system, which reports to PAHO and WHO.	PNI's electronic immunization registry enables real-time monitoring of vaccination data.	NPA
Adverse Events Reporting/Surveillance	Yes	Yes	NPA
Pandemic Influenza Preparedness Plan	Yes (2005)	Yes (2006)	Yes (2009)
COVID-19 Fully Vaccinated Rate (as of 9/4/22)	53%	81%	34%
Category	**Indonesia**	**Laos**	**Malaysia**
Year Influenza Vaccination Program/Policy Established	Policy (2009)	Program (2012)	NPA

Governmental Authority Involved in Influenza Policy/Program Decision-making	MOH	MOH's National Immunization Program (NIP)	MOH
NITAG or Equivalent	Yes	Yes	Yes
Defined Risk Groups	Elderly, chronic conditions, HWs, Hajj pilgrims	Adults (60+), chronic conditions, HWs, pregnant women	Adults (50+), adults with comorbid conditions, HWs, pregnant women, institutionalized, religious pilgrims
Important Partners for Program Implementation	BARDA, PT Bio Farma, Biken Institute	PIVI, CDC, WHO	Malaysian Influenza Working Group
Source of Funding and Doses	There's a publicly-funded program for Hajj pilgrims. PT Bio Farma manufactures some doses.	Since 2021, NIP has assumed all costs. PIVI has supported a cost-effectiveness study and a multi-year vaccine sustainability plan.	There's limited public funding to subsidize influenza vaccination.
Local Capacity to Manufacture Vaccines	Manufacture influenza vaccines through the state-owned PT Bio Farma	No	No
Influenza Vaccine Costs	Subsidized for Hajj pilgrims, otherwise costs range from $10.50-$35.00 USD	Free for at-risk groups	Costs range from $10-$24 USD
Access Points for Influenza Vaccines	Public and private sectors	Primarily distributed in provincial and district hospitals, but can also be received in public sector hospitals, after-hours clinics, private pharmacies, and antenatal care clinics	Readily available at private clinics and hospitals, limited distribution at government clinics
Influenza Disease Burden Surveillance	Worked with the CDC on its national surveillance system that monitors ILI in 26 centers and SARI in 6 hospitals, and regional testing facilities for seasonal and avian influenza	MOH has worked with the CDC and WHO to expand its surveillance system. The National Influenza Center (NIC) conducts lab surveillance, subtypes viruses, and contributes virus isolates and surveillance data to the WHO.	Surveillance consists of primary care and hospital sentinel schemes. Results from are provided on a weekly basis to the NIC.
Vaccine Uptake Data Collection/Reporting System	Basic immunization coverage captured in national report of data collected from immunization registers at community health centers and national surveys.	MOH registered COVID-19 vaccine doses using DHIS2.	NPA

Adverse Events Reporting/Surveillance	Yes	Yes	Yes
Pandemic Influenza Preparedness Plan	Yes (2006)	Yes (2006)	Yes (2006)
COVID-19 Fully Vaccinated Rate (as of 9/4/22)	63%	73%	86%

Category	Mongolia	Morocco	Philippines
Year Influenza Vaccination Program/Policy Established	Policy (NPA)	Policy (2006)	Program (2011)
Governmental Authority Involved in Influenza Policy/Program Decision-making	MOH	MOH's Department of Epidemiology & Disease Control and Department of Population	Department of Health (DOH)
NITAG or Equivalent	Yes	Yes	Yes
Defined Risk Groups	Children, elderly, chronic conditions, HWs, pregnant women	Adults (65+), chronic conditions, HWs, Hajj pilgrims	Adults (60+)
Important Partners for Program Implementation	PIVI, UNICEF	PIVI, WHO, CDC	NPA
Source of Funding and Doses	While PIVI and UNICEF have donated doses, the government purchases most of the doses. PIVI has supported communications, education, trainings, monitoring, and evaluation.	MOH covers doses for HCWs, while costs from private sector procurement are reimbursed by the National Health Insurance. They have received doses from PIVI.	DOH purchases doses for seniors.
Local Capacity to Manufacture Vaccines	NPA	CDMO Recipharm has received roughly half a billion in commitments for a fill-finish factory. The country has also signed an agreement to manufacture COVID-19 vaccines.	No
Influenza Vaccine Costs	Free for HWs and children under age 9	MOH subsidizes costs for HWs and the National Health Insurance reimburses costs from private sector procurement	Free for adults 60+, otherwise costs range from $9.80-$29.40 USD
Access Points for Influenza Vaccines	Clinics, HWs have reached nomadic herders on horseback	MOH physicians and private sector	Efforts have been made to make vaccines available at all health centers

Influenza Disease Burden Surveillance	Worked with CDC to build its surveillance network. ILI data collected at all outpatient sites, reported weekly to the 9 district and 21 provincial health departments, and then forwarded to the National Centre for Communicable Diseases.	375 health units across the country are involved in influenza surveillance and 16 regional hospitals are involved in SARI surveillance. MOH is in the process of establishing national influenza surveillance.	The country's NIC received a grant from the CDC to establish a National Influenza Surveillance Network.
Vaccine Uptake Data Collection/Reporting System	MOH developed an electronic immunization register to record PCV13 doses administered. If successful, will expand to include other vaccines. They have also developed a COVID-19 immunization registry.	The National Vaccination Registry is an electronic health record system that records complete vaccination histories.	The national Vaccine Information Management System allows DOH to monitor vaccine coverage.
Adverse Events Reporting/Surveillance	Yes	Yes	Yes
Pandemic Influenza Preparedness Plan	Yes (2007)	Yes (2006)	Yes (2005)
COVID-19 Fully Vaccinated Rate (as of 9/4/22)	67%	64%	67%
Category	**Romania**	**South Africa**	**Thailand**
Year Influenza Vaccination Program/Policy Established	Program (2008)	Program (2010)	Policy (2005)
Governmental Authority Involved in Influenza Policy/Program Decision-making	MOH	National Department of Health (NDOH), National Institute for Communicable Disease (NICD)	Ministry of Public Health (MoPH), Advisory Committee on Immunization Practice under the Thai National Vaccine Committee, National Health Security Office
NITAG or Equivalent	No, NITAG disbanded	Yes	Yes
Defined Risk Groups	Adults (65+), comorbid conditions, HWs, pregnant women, institutionalized, social workers	Adults (65+), underlying medical conditions, HIV/AIDS, HWs, pregnant women	Children (6-23 mos), adults (65+), chronic conditions, HWs, pregnant women, mental health disorders, poultry cullers
Important Partners for Program Implementation	National Centre for Communicable Diseases Surveillance and Control, District Public Health Authorities	Pharmaceutical companies contracted by the NDOH	WHO, BARDA, Sanofi, Institute of Experimental Medicine in Saint Petersburg, Russia

Source of Funding and Doses	MOH covers vaccine costs for at-risk groups, while the National Institute of Public Health covers monitoring and evaluation efforts. The Cantacuzino Institute manufactures some doses.	Provincial health departments procure vaccine through NDOH. Then, provincial health departments implement the program. There's also independent private sector procurement.	MoPH funds the entire campaign. The nationwide immunization program procures the doses.
Local Capacity to Manufacture Vaccines	Manufacture influenza vaccines through the Cantacuzino Institute	Some pharmaceutical companies can fill and finish vaccines. A South African consortium was also selected to lead a global hub for producing mRNA vaccines.	The Government Pharmaceutical Organization has the capability to produce influenza vaccines.
Influenza Vaccine Costs	Free for at-risk groups	Free through the public system, otherwise costs range from 70-100 rand ($4.00-5.75 USD). Some private health insurance schemes cover vaccines for high-risk members.	Free for at-risk groups, otherwise costs range from around 350 baht ($9.57 USD) in public hospitals to around 700 baht ($19.15 USD) in private hospitals
Access Points for Influenza Vaccines	GPs and pharmacies	Public sector for at-risk groups, private sector for others, pharmacies, workplaces, antenatal clinics	Available in public and private health centers, but most vaccinations occur at district healthcare centers and other primary care facilities
Influenza Disease Burden Surveillance	Collect yearly prospective data from patients hospitalized for SARI	NICD manages national surveillance for respiratory pathogens. The viral watch programme is a sentinel surveillance system for patients with reported ILI.	Sentinel ILI and SARI surveillance at 40 hospitals
Vaccine Uptake Data Collection/Reporting System	Prior to COVID-19, the National Electronic Registry for Vaccinations was used for childhood immunizations, but was then used for COVID-19 immunizations.	NPA	Immunizations are required to be reported to a central immunization database, called the Ministry of Public Health Immunization Center.
Adverse Events Reporting/Surveillance	Yes	Yes	Yes
Pandemic Influenza Preparedness Plan	Yes (2009)	Yes (2006)	Yes (2013)
COVID-19 Fully Vaccinated Rate (as of 9/4/22)	42%	33%	77%

Category	Turkey	Vietnam

Year Influenza Vaccination Program/Policy Established	Program (NPA)	Program (2017)
Governmental Authority Involved in Influenza Policy/Program Decision-making	MOH, the Social Security Institution	MOH
NITAG or Equivalent	Yes	Yes
Defined Risk Groups	Adults (65+), chronic conditions, HWs, pregnant women, nursing home residents, immune deficiency or receiving immunosuppressive treatment, salicylic acid users (6 mos - 18 yrs)	HWs
Important Partners for Program Implementation	NPA	PIVI, PATH, CDC, BARDA, WHO, UPS Foundation, Institute of Vaccines and Medical Biologicals (IVAC)
Source of Funding and Doses	MOH promotes and funds vaccines for those in at-risk groups. Pharmaceutical companies have procured doses at the request of the MOH.	The government receives doses from PIVI and UPS Foundation,and works with PIVI and CDC on monitoring.
Local Capacity to Manufacture Vaccines	No	Manufacture influenza vaccines through the state-owned IVAC
Influenza Vaccine Costs	MOH reimburses for at-risk groups, otherwise private insurance coverage is limited	Costs range from $5.20-$7.80 USD for local vaccines and $11.90-$14.40 USD for imported vaccines
Access Points for Influenza Vaccines	Primary care settings and pharmacies	Mostly sold through private clinics and vaccination centers, but generally not available through hospitals
Influenza Disease Burden Surveillance	Sentinel ILI surveillance at 220 family physician centers and sentinel surveillance for patients with SARI at 10 hospitals	Routine monitoring for ILI in 15 provinces and SARI in hospital settings in 11 provinces
Vaccine Uptake Data Collection/Reporting System	Immunization data is collected by MOH using the national registry system.	Relies on a paper-based system to administer, monitor, and report vaccines -- difficult to obtain vaccine distribution data.

Adverse Events Reporting/Surveillance	Yes	Yes
Pandemic Influenza Preparedness Plan	Yes (2019)	Yes (2011)
COVID-19 Fully Vaccinated Rate (as of 9/4/22)	64%	86%

Landscaping References

(22–26,28,30–32,34,36,37,39,41,43,47,49–51,145–159) Albania, (160–164) Algeria, (165–175) Bhutan, (2,65,176–192) Bolivia, (74,75,85,176,177,193–205) Brazil, (160,206–215) Cote d'Ivoire, (216–232) Indonesia, (28,233–241) Laos, (242–252) Malaysia, (253–266) Mongolia, (161,162,267–270) Morocco, (271–281) Philippines, (282–299) Romania, (160,162,178,300–339) South Africa, (112–121,123,124,129,130,134,139–142,217,268,340–351) Thailand, (44,352–377) Turkey, (28,193,217,342,378–389) Vietnam

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Appendix D. Hierarchical Code Book

Key	
0	Parent code
1	Child code 1
2	Child code 2
3	Child code 3

Depth	Title	Description
0	Cross-cutting	Includes cross-cutting, broad insights/trends emerging from multiple countries
1	Quotes_general	Quotes that speak to the issues at-large, not just for a specific country
1	Challenges_general	Challenges that speak to the issues at-large, not just for a specific country
1	COVID-19	Includes discussion on lessons or perspectives from COVID-19 vaccination, including influenza and COVID-19 preparedness
1	Success_general	Successes or best practices noted from multiple countries
0	South Africa	
1	SA_COVID-19	Includes discussion on lessons, influence, or perspectives from COVID-19 vaccination experience in-country
1	SA_Demand Generation, Comms, Edu	How South Africa supports building demand for influenza vaccination.
2	SA_Comms campaigns	How is public messaging shaped and created to support seasonal flu vax campaigns? Are there campaigns?
3	SA_Dissemination	How are messages disseminated? What avenues/channels are used for dissemination (radio, tv, social media, mailers, etc.)
3	SA_Targeting + evaluation	Includes key audiences (HCWs, risk groups, general) and data collection/evaluation of effectiveness. What are they targeted for and how? Is effectiveness evaluated? How?
2	SA_HCW's role + support	Includes role of health workers in demand generation and communication to provide and promote flu vaccination among patients and public.
3	SA_Training	Is there training and support for HCWS to provide/promote influenza vaccination? How often is this training/curriculum updated. Does it include guidance for outreach to risk groups?
2	SA_Other_demand	
2	SA_Quotes_demand	Good quotes speaking to demand generation, communications efforts, and education
2	SA_Stakeholders_DemandComms	Any stakeholders, agencies, entities, coalitions involved in demand generation for influenza vaccination program, including communication, outreach, education, and promotion.

3	SA_Messengers	Where are the messages coming from? Includes agencies, entities, coalitions, influencers, etc. and methods/strategies/platforms for dissemination of messages.
2	SA_Success_DemandComms	Successes, best practice, or lessons related to demand generation, communication, campaigns, education, outreach related to the influenza vaccination program. What efforts and strategies have worked well?
1	SA_Economic determinants	Includes funding, procurement, and OOP costs. How South Africa procures doses of the influenza vaccine each year focusing on dose forecasting, pricing negotiations, and logistics for transport and storage.
2	SA_Procurement entities	Who or which sectors/entities procure seasonal flu vaccines? Successes, best practices, or lessons related to economic determinants of the influenza vaccination program. How their investment and funding mechanisms have worked well to increase flu vaccine uptake and coverage rates.
2	SA_Health system	Includes influenza vax program elements within the public and private sectors, where influenza vaccination is covered (in full or partial), in which system can the public access flu vaccines, differences in approach or resources among private and public systems (insurance, clinics, etc.). Which groups can only access supply from the private sector health system or private insurance?
3	SA_Funding	How is the seasonal influenza vaccination program funded? Describes all the sources of funding that are directly allocated to the seasonal influenza vaccination program, and what each bit of that funding covers in the program. - Does funding cover only the cost of purchasing vaccine doses? - Does funding also include support for delivery and/or general public or targeted messaging campaigns?
3	SA_Insurance	Includes discussion of insurance schemes including national and private and how/if they provide free or subsidized flu vaccines. Is there a national health insurance scheme, and if so does it cover seasonal influenza vaccination (in full, in part)?
3	SA_OOP cost	What, if any, out-of-pocket costs exist for individuals in identified risk or recommended groups v. general population? For which groups does the government subsidize costs?
3	SA_Outreach	Are there different strategies or resources for influenza vaccine promotion between private and public systems?
2	SA_Other_econ	
2	SA_Procurement	Includes sectors/entities that procure, where vaccines are obtained from, where they are produced, manufacturers, agreement details and negotiations, and timeline.
3	SA_Agreements	Agreement details. How often is the agreement negotiated and which entities in your country are involved in that negotiation? Is this the responsibility of the Ministry of Health, or another agency within the government or outside the government?
3	SA_Forecasting	Which entity or entities are responsible for forecasting (or estimating) how much influenza vaccine South Africa will purchase each year?
3	SA_Source/manufacturing	Where are vaccines obtained from? Where are influenza vaccines produced and manufactured?
3	SA_Timeline	Information on the influenza vaccination timeline – from procurement to distribution
2	SA_Quotes_econ	

2	SA_Stakeholders econ	Any stakeholders, agencies, entities, and coalitions involved in economic determinants – finance agencies, public-private partnerships, etc.
2	SA_Success_econ	Successes, best practices, or lessons related to economic determinants of the influenza vaccination program. How their investment and funding mechanisms have worked well.
1	SA_Political determinants	Includes recommendations, risk groups, policies, policy and decision-makers. Implementation of recommendations and policies that create or support the country's seasonal influenza vaccination program.
2	SA_Flu priority vs other diseases	- Given other health priorities/domains, is the perception of disease risk high? - Influenza burden and severity may be lower than other priority diseases, making it a lower priority for government stakeholders and the public
2	SA_Labor/workplace policy	Labor/workplace policies that allow for time off or enforce mandates (e.g. for health sector or government personnel)?
3	SA_Mandates	Includes any groups that are mandated to receive influenza vaccination like health care workers. Any policy for influenza vaccine requirements in certain settings.
2	SA_Other_policy	Any other policies, if any, that support South Africa's seasonal influenza vaccination efforts. - Labor/workplace policies that allow for time off or enforce mandates (e.g. for health sector or government personnel)?
2	SA_Quotes_policy	
2	SA_Risk groups-recommendations	How are risk groups prioritized to receive influenza vaccination? Can include subsidies, supply, additional messaging at outreach.
3	SA_Risk group implementation	How are risk groups prioritized to receive influenza vaccination? Can include subsidies, targeted supply, additional messaging at outreach.
2	SA_Stakeholder_policy	What stakeholder influence or make influenza vaccination policy and recommendations? Government ministries, advisory groups, endorsing agencies (NITAGs).
2	SA_Success_policy	Successes, best practices, or lessons related to policy making and implementation of the influenza vaccination program. How their policies have worked well to increase flu vaccine uptake and coverage rates.
1	SA_Soc. Beh. Determinants	Social and behavioral drivers of seasonal influenza vaccine acceptance, demand, and uptake.
2	SA_Flu risk perception	Includes discussion on perception of risk of moderate or severe influenza in the population or among vaccine stakeholders/decision makers. - Given other health priorities/domains, is the perception of disease risk high? - Does this perception vary within different population segments? If so, in what way?
2	SA_Other_soc.beh.	
2	SA_Quotes_soc.beh.	
2	SA_Success_soc.beh.	Successes, best practice, or lessons for social and behavioral interventions relates to influenza vaccination
2	SA_Vax accept & demand	Does the population have willingness/desire to be vaccinated? - Would you categorize the majority of the population as refusers, hesitant, or acceptant of influenza vaccination, and why?
3	SA_Vax uptake	Information on vaccine uptake, if people are able to and receive vaccination from available supply

2	SA_Vax hesitancy	Information on vaccine hesitancy among population
3	SA_Barriers to implementation	What are the social and behavioral barriers to implementation in South Africa of the seasonal influenza vaccination program, if any? - Infodemic
3	SA_Flu vax safety/efficacy	From your perspective, does the population trust in the safety and efficacy of influenza vaccines? - Are there public concerns about the safety and efficacy of influenza vaccines? If so, what are they, and do concerns differentiate by population sub-group? - Is there concern about side effects? - Is there concern about low effectiveness of the seasonal influenza vaccine (why get this vaccine if I have to get it annually?)?
3	SA_Trust in govt/health system	Includes perspectives on public trust in the government and health system/messaging and factors that affect this trust. Do you think there is broad trust from the public in government and, by extension, the health system? Can you explain why you think there is or is not strong trust? - Are there segments of the population in South Africa that have limited trust in government and/or health systems? If so, which segment(s) of the population, and why do you think their trust is limited? (e.g., religious and/or ethnic minority groups, other vulnerable populations) - Is there any historical or current reason that the population would distrust health messaging or recommendations from the public health sector?
1	SA_Structural determinants	Structural aspects of South Africa's seasonal influenza vaccination program. Includes any existing vaccination program infrastructure (e.g., EPI program), distribution of the influenza vaccine, data collection and storage related to vaccine uptake and adverse events.
2	SA_Adverse events monitoring + alerts	How are adverse events resulting from the seasonal influenza vaccination handled? Is there a system for monitoring adverse events?
2	SA_EPI program for flu	Description of whether, and how, the EPI program in South Africa is utilized for the seasonal influenza vaccination program.
3	SA_Life-course/adult vax linkage	Are there other life-course or adult immunization programs to which influenza vaccination is linked/leveraged?
2	SA_Other_structure	
2	SA_eval	Is there on-going evaluation or efforts to improve of the influenza vaccine program over time? (data collection, goals, evidence to inform program or policy).
2	SA_Quotes_structure	
2	SA_Stakeholders_structure	Any stakeholders, agencies, entities, coalitions involved in structural determinants
2	SA_Success_structural	Successes, best practices, or lessons on structural aspects of implementing the influenza vaccine program - data management, supply, distribution, access, evaluation
2	SA_Vax access	Information on vaccine accessibility for the population/risk groups. Is there adequate supply and accessibility for people to receive vaccination?
2	SA_Vax data collection + use	Information on vaccine, virus, and program data collection and use

3	SA_Data btw public & private sector	If vaccines are procured by non-governmental entities, such as the private sector, is vaccine procurement and distribution data reported to the MOH? Are related vaccination services/vaccine administration tracked?
3	SA_Flu surveillance/burden of disease	Data on influenza circulation, disease burden among the general population or risk groups, rates of hospitalization and death from flu. Are there sentinel surveillance data collected on influenza cases/case rates (published or unpublished)? How is it collected? How do you use it?
3	SA_Vax effectiveness	Includes discussion of influenza vaccine effectiveness and data on VE for the country/flu season. Seasonal influenza vaccines are historically not highly effective, reducing public confidence and political prioritization.
3	SA_Vax uptake data	Data on flu vaccine uptake among the population or risk groups/vaccination coverage rates
2	SA_distribution	Includes where supply is delivered to, events, mass vaccinations, schools, workplaces. - How supply is delivered and who is responsible - Special access for high risk groups
3	SA_Stakeholders	Stakeholders involved in vaccine distribution
3	SA_chain	How is supply delivered, stored, and distributed?
0	Albania	
1	AL_COVID-19	Includes discussion on lessons, influence, or perspectives from COVID-19 vaccination experience in-country
1	AL_Demand Generation, Comms, Edu	How Albania supports building demand for influenza vaccination.
2	AL_Comms campaigns	How is public messaging shaped and created to support seasonal flu vax campaigns? Are there campaigns?
3	AL_Dissemination	How are messages disseminated? What avenues/channels are used for dissemination (radio, tv, social media, mailers, etc.)
3	AL_Targeting + evaluation	Includes key audiences (HCWs, risk groups, general) and data collection/evaluation of effectiveness. What are they targeted for and how? Is effectiveness evaluated? How?
2	AL_HCW's role + support	Includes role of health workers in demand generation and communication to provide and promote flu vaccination among patients and public.
3	AL_Incentives	Are there specific incentives for health workers to provide / promote influenza vaccines?
3	AL_Training	Is there training and support for HCWS to provide/promote influenza vaccination? How often is this training/curriculum updated. Does it include guidance for outreach to risk groups?
2	AL_Other_demand	
2	AL_Quotes_demand	Good quotes speaking to demand generation, communications efforts, and education
2	AL_Stakeholders_DemandComms	Any stakeholders, agencies, entities, coalitions involved in demand generation for influenza vaccination program, including communication, outreach, education, and promotion.
3	AL_Messengers	Where are the messages coming from? Includes agencies, entities, coalitions, influencers, etc. and methods/strategies/platforms for dissemination of messages.
2	AL_Success_DemandComms	Successes, best practice, or lessons related to demand generation, communication, campaigns, education, outreach related to the influenza vaccination program. What efforts and strategies have worked well?
1	AL_Economic determinants	Includes funding, procurement, and OOP costs. How Albania procures doses of the influenza vaccine each year focusing on dose

		forecasting, pricing negotiations, and logistics for transport and storage.
2	AL_Procurement entities	Who or which sectors/entities procure seasonal flu vaccines? Successes, best practices, or lessons related to economic determinants of the influenza vaccination program. How their investment and funding mechanisms have worked well to increase flu vaccine uptake and coverage rates.
2	AL_Health system	Includes influenza vax program elements within the public and private sectors, where influenza vaccination is covered (in full or partial), in which system can the public access flu vaccines, differences in approach or resources among private and public systems (insurance, clinics, etc.). Which groups can only access supply from the private sector health system or private insurance?
3	AL_Funding	How is the seasonal influenza vaccination program funded? Describes all the sources of funding that are directly allocated to the seasonal influenza vaccination program, and what each bit of that funding covers in the program. - Does funding cover only the cost of purchasing vaccine doses? - Does funding also include support for delivery and/or general public or targeted messaging campaigns?
3	AL_Insurance	Includes discussion of insurance schemes including national and private and how/if they provide free or subsidized flu vaccines. Is there a national health insurance scheme, and if so does it cover seasonal influenza vaccination (in full, in part)?
3	AL_OOP cost	What, if any, out-of-pocket costs exist for individuals in identified risk or recommended groups v. general population? For which groups does the government subsidize costs?
3	AL_Outreach	Are there different strategies or resources for influenza vaccine promotion between private and public systems?
2	AL_Procurement	Includes sectors/entities that procure, where vaccines are obtained from, where they are produced, manufacturers, agreement details and negotiations, and timeline.
3	AL_Agreements	Agreement details. How often is the agreement negotiated and which entities in your country are involved in that negotiation? Is this the responsibility of the Ministry of Health, or another agency within the government or outside the government?
3	AL_Forecasting	Which entity or entities are responsible for forecasting (or estimating) how much influenza vaccine Albania will purchase each year?
3	AL_Source/manufacturing	Where are vaccines obtained from? Where are influenza vaccines produced and manufactured?
3	AL_Timeline	Information on the influenza vaccination timeline – from procurement to distribution
2	AL_Quotes_econ	
2	AL_Stakeholders econ	Any stakeholders, agencies, entities, and coalitions involved in economic determinants – finance agencies, public-private partnerships, etc.
2	AL_Success_econ	Successes, best practices, or lessons related to economic determinants of the influenza vaccination program. How their investment and funding mechanisms have worked well.
1	AL_Political determinants	Includes recommendations, risk groups, policies, policy and decision-makers. Implementation of recommendations and policies that create or support the country's seasonal influenza vaccination program.
2	AL_Flu priority vs other diseases	- Given other health priorities/domains, is the perception of disease risk high?

		- Influenza burden and severity may be lower than other priority diseases, making it a lower priority for government stakeholders and the public
2	AL_Other_policy	Any other policies, if any, that support Albania's seasonal influenza vaccination efforts. - Labor/workplace policies that allow for time off or enforce mandates (e.g. for health sector or government personnel)?
2	AL_Quotes_policy	
2	AL_Risk groups-recommendations	How are risk groups prioritized to receive influenza vaccination? Can include subsidies, supply, additional messaging at outreach.
3	AL_Risk group implementation	How are risk groups prioritized to receive influenza vaccination? Can include subsidies, targeted supply, additional messaging at outreach.
2	AL_Stakeholder_policy	What stakeholder influence or make influenza vaccination policy and recommendations? Government ministries, advisory groups, endorsing agencies (NITAGs).
2	AL_Success_policy	Successes, best practices, or lessons related to policy making and implementation of the influenza vaccination program. How their policies have worked well to increase flu vaccine uptake and coverage rates.
1	AL_Soc. Beh. Determinants	Social and behavioral drivers of seasonal influenza vaccine acceptance, demand, and uptake.
2	AL_Stakeholders_soc.beh.	Any stakeholders, agencies, entities, coalitions involved in social and behavioral determinants, such as social scientists, advisors, and groups involved in interventions to improve vaccine confidence.
2	AL_Flu risk perception	Includes discussion on perception of risk of moderate or severe influenza in the population or among vaccine stakeholders/decision makers. - Given other health priorities/domains, is the perception of disease risk high? - Does this perception vary within different population segments? If so, in what way?
2	AL_Success_soc.beh.	Successes, best practice, or lessons for social and behavioral interventions relates to influenza vaccination
2	AL_Vax accept & demand	Does the population have willingness/desire to be vaccinated? - Would you categorize the majority of the population as refusers, hesitant, or acceptant of influenza vaccination, and why?
3	AL_Vax uptake	Information on vaccine uptake, if people are able to and receive vaccination from available supply
2	AL_Vax hesitancy	Information on vaccine hesitancy among population
3	AL_Barriers to implementation	What are the social and behavioral barriers to implementation in Albania of the seasonal influenza vaccination program, if any? - Infodemic
3	AL_Flu vax safety/efficacy	From your perspective, does the population trust in the safety and efficacy of influenza vaccines? - Are there public concerns about the safety and efficacy of influenza vaccines? If so, what are they, and do concerns differentiate by population sub-group? - Is there concern about side effects? - Is there concern about low effectiveness of the seasonal influenza vaccine (why get this vaccine if I have to get it annually?)?
3	AL_Trust in govt/health system	Includes perspectives on public trust in the government and health system/messaging and factors that affect this trust. Do you think there is broad trust from the public in government and, by extension, the health system? Can you explain why you think there is or is not strong trust?

		- Are there segments of the population in Albania that have limited trust in government and/or health systems? If so, which segment(s) of the population, and why do you think their trust is limited? (e.g., religious and/or ethnic minority groups, other vulnerable populations) - Is there any historical or current reason that the population would distrust health messaging or recommendations from the public health sector?
1	AL_Structural determinants	Structural aspects of Albania's seasonal influenza vaccination program. Includes any existing vaccination program infrastructure (e.g., EPI program), distribution of the influenza vaccine, data collection and storage related to vaccine uptake and adverse events.
2	AL_Adverse events monitoring + alerts	How are adverse events resulting from the seasonal influenza vaccination handled? Is there a system for monitoring adverse events?
2	AL_EPI program for flu	Description of whether, and how, the EPI program in Albania is utilized for the seasonal influenza vaccination program.
3	AL_Life-course/adult vax linkage	Are there other life-course or adult immunization programs to which influenza vaccination is linked/leveraged?
2	AL_Other_structure	
2	AL_Program eval	Is there on-going evaluation or efforts to improve of the influenza vaccine program over time? (data collection, goals, evidence to inform program or policy).
2	AL_Quotes_structure	
2	AL_Stakeholders_structure	Any stakeholders, agencies, entities, coalitions involved in structural determinants
2	AL_Success_structural	Successes, best practices, or lessons on structural aspects of implementing the influenza vaccine program - data management, supply, distribution, access, evaluation
2	AL_Vax access	Information on vaccine accessibility for the population/risk groups. Is there adequate supply and accessibility for people to receive vaccination?
2	AL_Vax data collection + use	Information on vaccine, virus, and program data collection and use
3	AL_Data btw public & private sector	If vaccines are procured by non-governmental entities, such as the private sector, is vaccine procurement and distribution data reported to the MOH? Are related vaccination services/vaccine administration tracked?
3	AL_Flu surveillance/burden of disease	Data on influenza circulation, disease burden among the general population or risk groups, rates of hospitalization and death from flu. Are there sentinel surveillance data collected on influenza cases/case rates (published or unpublished)? How is it collected? How do you use it?
3	AL_Vax effectiveness	Includes discussion of influenza vaccine effectiveness and data on VE for the country/flu season. Seasonal influenza vaccines are historically not highly effective, reducing public confidence and political prioritization.
3	AL_Vax uptake data	Data on flu vaccine uptake among the population or risk groups/vaccination coverage rates
2	AL_Vax distribution	Includes where supply is delivered to, events, mass vaccinations, schools, workplaces. - How supply is delivered and who is responsible - Special access for high risk groups
3	AL_Events	Information on events where influenza vaccines have been distributed- mass vaccinations, annual events, etc.
3	AL_Outside healthcare	Are vaccines distributed in places other than pharmacies/clinics? Schools, workplaces, grocery stores, etc.
3	AL_Stakeholders	Stakeholders involved in vaccine distribution

3	AL_Supply chain	How is supply delivered, stored, and distributed?
0	Brazil	
1	BR_COVID-19	Includes discussion on lessons, influence, or perspectives from COVID-19 vaccination experience in-country
1	BR_Demand Generation, Comms, Edu	How Brazil supports building demand for influenza vaccination.
2	BR_Comms campaigns	How is public messaging shaped and created to support seasonal flu vax campaigns? Are there campaigns?
3	BR_Dissemination	How are messages disseminated? What avenues/channels are used for dissemination (radio, tv, social media, mailers, etc.)
3	BR_Targeting + evaluation	Includes key audiences (HCWs, risk groups, general) and data collection/evaluation of effectiveness. What are they targeted for and how? Is effectiveness evaluated? How?
2	BR_HCW's role + support	Includes role of health workers in demand generation and communication to provide and promote flu vaccination among patients and public.
3	BR_Incentives	Are there specific incentives for health workers to provide / promote influenza vaccines?
3	BR_Training	Is there training and support for HCWS to provide/promote influenza vaccination? How often is this training/curriculum updated. Does it include guidance for outreach to risk groups?
2	BR_Other_demand	
2	BR_Quotes_demand	Good quotes speaking to demand generation, communications efforts, and education
2	BR_Stakeholders_DemandComms	Any stakeholders, agencies, entities, coalitions involved in demand generation for influenza vaccination program, including communication, outreach, education, and promotion.
3	BR_Messengers	Where are the messages coming from? Includes agencies, entities, coalitions, influencers, etc. and methods/strategies/platforms for dissemination of messages.
2	BR_Success_DemandComms	Successes, best practice, or lessons related to demand generation, communication, campaigns, education, outreach related to the influenza vaccination program. What efforts and strategies have worked well?
1	BR_Economic determinants	Includes funding, procurement, and OOP costs. How Brazil procures doses of the influenza vaccine each year focusing on dose forecasting, pricing negotiations, and logistics for transport and storage.
2	BR_Health system	Includes influenza vax program elements within the public and private sectors, where influenza vaccination is covered (in full or partial), in which system can the public access flu vaccines, differences in approach or resources among private and public systems (insurance, clinics, etc.). Which groups can only access supply from the private sector health system or private insurance?
3	BR_Funding	How is the seasonal influenza vaccination program funded? Describes all the sources of funding that are directly allocated to the seasonal influenza vaccination program, and what each bit of that funding covers in the program. - Does funding cover only the cost of purchasing vaccine doses? - Does funding also include support for delivery and/or general public or targeted messaging campaigns?
3	BR_Insurance	Includes discussion of insurance schemes including national and private and how/if they provide free or subsidized flu vaccines. Is there a national health insurance scheme, and if so does it cover seasonal influenza vaccination (in full, in part)?

3	BR_OOP cost	What, if any, out-of-pocket costs exist for individuals in identified risk or recommended groups v. general population? For which groups does the government subsidize costs?
3	BR_Outreach	Are there different strategies or resources for influenza vaccine promotion between private and public systems?
2	BR_Other_econ	
2	BR_Procurement	Includes sectors/entities that procure, where vaccines are obtained from, where they are produced, manufacturers, agreement details and negotiations, and timeline.
3	BR_Agreements	Agreement details. How often is the agreement negotiated and which entities in your country are involved in that negotiation? Is this the responsibility of the Ministry of Health, or another agency within the government or outside the government?
3	BR_Forecasting	Which entity or entities are responsible for forecasting (or estimating) how much influenza vaccine Brazil will purchase each year?
3	BR_Source/manufacturing	Where are vaccines obtained from? Where are influenza vaccines produced and manufactured?
3	BR_Timeline	Information on the influenza vaccination timeline – from procurement to distribution
2	BR_Quotes_econ	
2	BR_Stakeholders econ	Any stakeholders, agencies, entities, and coalitions involved in economic determinants – finance agencies, public-private partnerships, etc.
3	BR_Procurement entities	Who or which sectors/entities procure seasonal influenza vaccines
2	BR_Success_econ	Successes, best practices, or lessons related to economic determinants of the influenza vaccination program. How their investment and funding mechanisms have worked well.
1	BR_Political determinants	Includes recommendations, risk groups, policies, policy and decision-makers. Implementation of recommendations and policies that create or support the country's seasonal influenza vaccination program.
2	BR_Flu priority vs other diseases	- Given other health priorities/domains, is the perception of disease risk high? - Influenza burden and severity may be lower than other priority diseases, making it a lower priority for government stakeholders and the public
2	BR_Labor/workplace policy	Labor/workplace policies that allow for time off or enforce mandates (e.g. for health sector or government personnel)?
2	BR_Other_policy	Any other policies, if any, that support Brazil's seasonal influenza vaccination efforts. - Labor/workplace policies that allow for time off or enforce mandates (e.g. for health sector or government personnel)?
2	BR_Quotes_policy	
2	BR_Risk groups-recommendations	How are risk groups prioritized to receive influenza vaccination? Can include subsidies, supply, additional messaging at outreach.
3	BR_Risk group implementation	How are risk groups prioritized to receive influenza vaccination? Can include subsidies, targeted supply, additional messaging at outreach.
2	BR_Stakeholder_policy	What stakeholder influence or make influenza vaccination policy and recommendations? Government ministries, advisory groups, endorsing agencies (NITAGs).
2	BR_Success_policy	Successes, best practices, or lessons related to policy making and implementation of the influenza vaccination program. How their policies have worked well to increase flu vaccine uptake and coverage rates.
1	BR_Soc. Beh. Determinants	Social and behavioral drivers of seasonal influenza vaccine acceptance, demand, and uptake.

2	BR_Flu risk perception	Includes discussion on perception of risk of moderate or severe influenza in the population or among vaccine stakeholders/decision makers. - Given other health priorities/domains, is the perception of disease risk high? - Does this perception vary within different population segments? If so, in what way?
2	BR_Other_soc.beh.	
2	BR_Quotes_soc.beh.	
2	BR_Success_soc.beh.	Successes, best practice, or lessons for social and behavioral interventions relates to influenza vaccination
2	BR_Vax accept & demand	Does the population have willingness/desire to be vaccinated? - Would you categorize the majority of the population as refusers, hesitant, or acceptant of influenza vaccination, and why?
3	BR_Vax uptake	Information on vaccine uptake, if people are able to and receive vaccination from available supply
2	BR_Vax hesitancy	Information on vaccine hesitancy among population
3	BR_Barriers to implementation	What are the social and behavioral barriers to implementation in Brazil of the seasonal influenza vaccination program, if any? - Infodemic
3	BR_Flu vax safety/efficacy	From your perspective, does the population trust in the safety and efficacy of influenza vaccines? - Are there public concerns about the safety and efficacy of influenza vaccines? If so, what are they, and do concerns differentiate by population sub-group? - Is there concern about side effects? - Is there concern about low effectiveness of the seasonal influenza vaccine (why get this vaccine if I have to get it annually?)?
3	BR_Trust in govt/health system	Includes perspectives on public trust in the government and health system/messaging and factors that affect this trust. Do you think there is broad trust from the public in government and, by extension, the health system? Can you explain why you think there is or is not strong trust? - Are there segments of the population in Albania that have limited trust in government and/or health systems? If so, which segment(s) of the population, and why do you think their trust is limited? (e.g., religious and/or ethnic minority groups, other vulnerable populations) - Is there any historical or current reason that the population would distrust health messaging or recommendations from the public health sector?
1	BR_Structural determinants	Structural aspects of Brazil's seasonal influenza vaccination program. Includes any existing vaccination program infrastructure (e.g., EPI program), distribution of the influenza vaccine, data collection and storage related to vaccine uptake and adverse events.
2	BR_Adverse events monitoring + alerts	How are adverse events resulting from the seasonal influenza vaccination handled? Is there a system for monitoring adverse events?
2	BR_Other_structure	
2	BR_Program eval	Is there on-going evaluation or efforts to improve of the influenza vaccine program over time? (data collection, goals, evidence to inform program or policy).
2	BR_Quotes_structure	
2	BR_Stakeholders_structure	Any stakeholders, agencies, entities, coalitions involved in structural determinants

2	BR_Success_structural	Successes, best practices, or lessons on structural aspects of implementing the influenza vaccine program - data management, supply, distribution, access, evaluation
2	BR_Vax access	Information on vaccine accessibility for the population/risk groups. Is there adequate supply and accessibility for people to receive vaccination?
2	BR_Vax data collection + use	Information on vaccine, virus, and program data collection and use
3	BR_Data btw public & private sector	If vaccines are procured by non-governmental entities, such as the private sector, is vaccine procurement and distribution data reported to the MOH? Are related vaccination services/vaccine administration tracked?
3	BR_Flu surveillance/burden of disease	Data on influenza circulation, disease burden among the general population or risk groups, rates of hospitalization and death from flu. Are there sentinel surveillance data collected on influenza cases/case rates (published or unpublished)? How is it collected? How do you use it?
3	BR_Vax effectiveness	Includes discussion of influenza vaccine effectiveness and data on VE for the country/flu season. Seasonal influenza vaccines are historically not highly effective, reducing public confidence and political prioritization.
3	BR_Vax uptake data	Data on flu vaccine uptake among the population or risk groups/vaccination coverage rates
2	BR_Vax distribution	Includes where supply is delivered to, events, mass vaccinations, schools, workplaces. - How supply is delivered and who is responsible - Special access for high risk groups
3	BR_Events	Information on events where influenza vaccines have been distributed- mass vaccinations, annual events, etc.
3	BR_Outside healthcare	Are vaccines distributed in places other than pharmacies/clinics? Schools, workplaces, grocery stores, etc.
3	BR_Stakeholders	Stakeholders involved in vaccine distribution
3	BR_Supply chain	How is supply delivered, stored, and distributed?
0	Thailand	
1	TH_COVID-19	Includes discussion on lessons, influence, or perspectives from COVID-19 vaccination experience in-country
1	TH_Demand Generation, Comms, Edu	How Thailand supports building demand for influenza vaccination.
2	TH_Comms campaigns	How is public messaging shaped and created to support seasonal flu vax campaigns? Are there campaigns?
3	TH_Dissemination	How are messages disseminated? What avenues/channels are used for dissemination (radio, tv, social media, mailers, etc.)
3	TH_Targeting + evaluation	Includes key audiences (HCWs, risk groups, general) and data collection/evaluation of effectiveness. What are they targeted for and how? Is effectiveness evaluated? How?
2	TH_HCW's role + support	Includes role of health workers in demand generation and communication to provide and promote flu vaccination among patients and public.
3	TH_Incentives	Are there specific incentives for health workers to provide / promote influenza vaccines?
3	TH_Training	Is there training and support for HCWS to provide/promote influenza vaccination? How often is this training/curriculum updated. Does it include guidance for outreach to risk groups?
2	TH_Quotes_demand	Good quotes speaking to demand generation, communications efforts, and education
2	TH_Stakeholders_DemandComms	Any stakeholders, agencies, entities, coalitions involved in demand generation for influenza vaccination program, including communication, outreach, education, and promotion.

2	TH_Success_DemandComms	Successes, best practice, or lessons related to demand generation, communication, campaigns, education, outreach related to the influenza vaccination program. What efforts and strategies have worked well?
1	TH_Economic determinants	Includes funding, procurement, and OOP costs. How Thailand procures doses of the influenza vaccine each year focusing on dose forecasting, pricing negotiations, and logistics for transport and storage.
2	TH_Health system	Includes influenza vax program elements within the public and private sectors, where influenza vaccination is covered (in full or partial), in which system can the public access flu vaccines, differences in approach or resources among private and public systems (insurance, clinics, etc.). Which groups can only access supply from the private sector health system or private insurance?
3	TH_Funding	How is the seasonal influenza vaccination program funded? Describes all the sources of funding that are directly allocated to the seasonal influenza vaccination program, and what each bit of that funding covers in the program. - Does funding cover only the cost of purchasing vaccine doses? - Does funding also include support for delivery and/or general public or targeted messaging campaigns?
3	TH_Insurance	Includes discussion of insurance schemes including national and private and how/if they provide free or subsidized flu vaccines. Is there a national health insurance scheme, and if so does it cover seasonal influenza vaccination (in full, in part)?
3	TH_OOP cost	What, if any, out-of-pocket costs exist for individuals in identified risk or recommended groups v. general population? For which groups does the government subsidize costs?
3	TH_Outreach	Are there different strategies or resources for influenza vaccine promotion between private and public systems?
2	TH_Other_econ	
2	TH_Procurement	Includes sectors/entities that procure, where vaccines are obtained from, where they are produced, manufacturers, agreement details and negotiations, and timeline.
3	TH_Agreements	Agreement details. How often is the agreement negotiated and which entities in your country are involved in that negotiation? Is this the responsibility of the Ministry of Health, or another agency within the government or outside the government?
3	TH_Forecasting	Which entity or entities are responsible for forecasting (or estimating) how much influenza vaccine Thailand will purchase each year?
3	TH_Source/manufacturing	Where are vaccines obtained from? Where are influenza vaccines produced and manufactured?
3	TH_Timeline	Information on the influenza vaccination timeline – from procurement to distribution
2	TH_Stakeholders econ	Any stakeholders, agencies, entities, and coalitions involved in economic determinants – finance agencies, public-private partnerships, etc.
2	TH_Success_econ	Successes, best practices, or lessons related to economic determinants of the influenza vaccination program. How their investment and funding mechanisms have worked well.
1	TH_Political determinants	Includes recommendations, risk groups, policies, policy and decision-makers. Implementation of recommendations and policies that create or support the country's seasonal influenza vaccination program.
2	TH_Flu priority vs other diseases	- Given other health priorities/domains, is the perception of disease risk high?

		- Influenza burden and severity may be lower than other priority diseases, making it a lower priority for government stakeholders and the public
2	TH_Labor/workplace policy	Labor/workplace policies that allow for time off or enforce mandates (e.g. for health sector or government personnel)?
2	TH_Other_policy	Any other policies, if any, that support Thailand's seasonal influenza vaccination efforts. - Labor/workplace policies that allow for time off or enforce mandates (e.g. for health sector or government personnel)?
2	TH_Quotes_policy	
2	TH_Risk groups-recommendations	How are risk groups prioritized to receive influenza vaccination? Can include subsidies, supply, additional messaging at outreach.
3	TH_Risk group implementation	How are risk groups prioritized to receive influenza vaccination? Can include subsidies, targeted supply, additional messaging at outreach.
2	TH_Stakeholder_policy	What stakeholder influence or make influenza vaccination policy and recommendations? Government ministries, advisory groups, endorsing agencies (NITAGs).
2	TH_Success_policy	Successes, best practices, or lessons related to policy making and implementation of the influenza vaccination program. How their policies have worked well to increase flu vaccine uptake and coverage rates.
2	TH_Stakeholders_soc.beh.	Any stakeholders, agencies, entities, coalitions involved in social and behavioral determinants, such as social scientists, advisors, and groups involved in interventions to improve vaccine confidence.
2	TH_Flu risk perception	Includes discussion on perception of risk of moderate or severe influenza in the population or among vaccine stakeholders/decision makers. - Given other health priorities/domains, is the perception of disease risk high? - Does this perception vary within different population segments? If so, in what way?
2	TH_Success_soc.beh.	Successes, best practice, or lessons for social and behavioral interventions relates to influenza vaccination
2	TH_Vax accept & demand	Does the population have willingness/desire to be vaccinated? - Would you categorize the majority of the population as refusers, hesitant, or acceptant of influenza vaccination, and why?
3	TH_Vax uptake	Information on vaccine uptake, if people are able to and receive vaccination from available supply
2	TH_Vax hesitancy	Information on vaccine hesitancy among population
3	TH_Barriers to implementation	What are the social and behavioral barriers to implementation in Thailand of the seasonal influenza vaccination program, if any? - Infodemic
3	TH_Flu vax safety/efficacy	From your perspective, does the population trust in the safety and efficacy of influenza vaccines? - Are there public concerns about the safety and efficacy of influenza vaccines? If so, what are they, and do concerns differentiate by population sub-group? - Is there concern about side effects? - Is there concern about low effectiveness of the seasonal influenza vaccine (why get this vaccine if I have to get it annually?)?
1	TH_Structural determinants	Structural aspects of Thailand's seasonal influenza vaccination program. Includes any existing vaccination program infrastructure (e.g., EPI program), distribution of the influenza vaccine, data collection and storage related to vaccine uptake and adverse events.

2	TH_Adverse events monitoring + alerts	How are adverse events resulting from the seasonal influenza vaccination handled? Is there a system for monitoring adverse events?
2	TH_EPI program for flu	Description of whether, and how, the EPI program in Thailand is utilized for the seasonal influenza vaccination program.
2	TH_Other_structure	
2	TH_Program eval	Is there on-going evaluation or efforts to improve of the influenza vaccine program over time? (data collection, goals, evidence to inform program or policy).
2	TH_Stakeholders_structure	Any stakeholders, agencies, entities, coalitions involved in structural determinants
2	TH_Success_structural	Successes, best practices, or lessons on structural aspects of implementing the influenza vaccine program - data management, supply, distribution, access, evaluation
2	TH_Vax access	Information on vaccine accessibility for the population/risk groups. Is there adequate supply and accessibility for people to receive vaccination?
2	TH_Vax data collection + use	Information on vaccine, virus, and program data collection and use
3	TH_Data btw public & private sector	If vaccines are procured by non-governmental entities, such as the private sector, is vaccine procurement and distribution data reported to the MOH? Are related vaccination services/vaccine administration tracked?
3	TH_Flu surveillance/burden of disease	Data on influenza circulation, disease burden among the general population or risk groups, rates of hospitalization and death from flu. Are there sentinel surveillance data collected on influenza cases/case rates (published or unpublished)? How is it collected? How do you use it?
3	TH_Vax effectiveness	Includes discussion of influenza vaccine effectiveness and data on VE for the country/flu season. Seasonal influenza vaccines are historically not highly effective, reducing public confidence and political prioritization.
3	TH_Vax uptake data	Data on flu vaccine uptake among the population or risk groups/vaccination coverage rates
2	TH_Vax distribution	Includes where supply is delivered to, events, mass vaccinations, schools, workplaces. - How supply is delivered and who is responsible - Special access for high risk groups
3	TH_Outside healthcare	Are vaccines distributed in places other than pharmacies/clinics? Schools, workplaces, grocery stores, etc.
3	TH_Stakeholders	Stakeholders involved in vaccine distribution
3	TH_Supply chain	How is supply delivered, stored, and distributed?
0	Bolivia	
1	BO_COVID-19	Includes discussion on lessons, influence, or perspectives from COVID-19 vaccination experience in-country
1	BO_Demand Generation, Comms, Edu	How Bolivia supports building demand for influenza vaccination.
2	BO_Comms campaigns	How is public messaging shaped and created to support seasonal flu vax campaigns? Are there campaigns?
3	BO_Dissemination	How are messages disseminated? What avenues/channels are used for dissemination (radio, tv, social media, mailers, etc.)
3	BO_Targeting + evaluation	Includes key audiences (HCWs, risk groups, general) and data collection/evaluation of effectiveness. What are they targeted for and how? Is effectiveness evaluated? How?
2	BO_HCW's role + support	Includes role of health workers in demand generation and communication to provide and promote flu vaccination among patients and public.

3	BO_Incentives	Are there specific incentives for health workers to provide / promote influenza vaccines?
3	BO_Training	Is there training and support for HCWS to provide/promote influenza vaccination? How often is this training/curriculum updated. Does it include guidance for outreach to risk groups?
2	BO_Other_demand	
3	BO_Low literacy/education	
2	BO_Stakeholders_DemandComms	Any stakeholders, agencies, entities, coalitions involved in demand generation for influenza vaccination program, including communication, outreach, education, and promotion.
3	BO_Messengers	Where are the messages coming from? Includes agencies, entities, coalitions, influencers, etc. and methods/strategies/platforms for dissemination of messages.
2	BO_Success_DemandComms	Successes, best practice, or lessons related to demand generation, communication, campaigns, education, outreach related to the influenza vaccination program. What efforts and strategies have worked well?
1	BO_Economic determinants	Includes funding, procurement, and OOP costs. How Bolivia procures doses of the influenza vaccine each year focusing on dose forecasting, pricing negotiations, and logistics for transport and storage.
2	BO_Procurement entities	Who or which sectors/entities procure seasonal flu vaccines? Successes, best practices, or lessons related to economic determinants of the influenza vaccination program. How their investment and funding mechanisms have worked well to increase flu vaccine uptake and coverage rates.
2	BO_Health system	Includes influenza vax program elements within the public and private sectors, where influenza vaccination is covered (in full or partial), in which system can the public access flu vaccines, differences in approach or resources among private and public systems (insurance, clinics, etc.). Which groups can only access supply from the private sector health system or private insurance?
3	BO_Funding	How is the seasonal influenza vaccination program funded? Describes all the sources of funding that are directly allocated to the seasonal influenza vaccination program, and what each bit of that funding covers in the program. - Does funding cover only the cost of purchasing vaccine doses? - Does funding also include support for delivery and/or general public or targeted messaging campaigns?
3	BO_Insurance	Includes discussion of insurance schemes including national and private and how/if they provide free or subsidized flu vaccines. Is there a national health insurance scheme, and if so does it cover seasonal influenza vaccination (in full, in part)?
3	BO_OOP cost	What, if any, out-of-pocket costs exist for individuals in identified risk or recommended groups v. general population? For which groups does the government subsidize costs?
2	BO_Other_econ	
2	BO_Procurement	Includes sectors/entities that procure, where vaccines are obtained from, where they are produced, manufacturers, agreement details and negotiations, and timeline.
3	BO_Agreements	Agreement details. How often is the agreement negotiated and which entities in your country are involved in that negotiation? Is this the responsibility of the Ministry of Health, or another agency within the government or outside the government?

3	BO_Forecasting	Which entity or entities are responsible for forecasting (or estimating) how much influenza vaccine Bolivia will purchase each year?
3	BO_Source/manufacturing	Where are vaccines obtained from? Where are influenza vaccines produced and manufactured?
3	BO_Timeline	Information on the influenza vaccination timeline – from procurement to distribution
2	BO_Stakeholders econ	Any stakeholders, agencies, entities, and coalitions involved in economic determinants – finance agencies, public-private partnerships, etc.
3	BO_Procurement entities	Who or which sectors/entities procure seasonal influenza vaccines
1	BO_Political determinants	Includes recommendations, risk groups, policies, policy and decision-makers. Implementation of recommendations and policies that create or support the country's seasonal influenza vaccination program.
2	BO_Flu priority vs other diseases	- Given other health priorities/domains, is the perception of disease risk high? - Influenza burden and severity may be lower than other priority diseases, making it a lower priority for government stakeholders and the public
2	BO_Labor/workplace policy	Labor/workplace policies that allow for time off or enforce mandates (e.g. for health sector or government personnel)?
3	BO_Mandates	Includes any groups that are mandated to receive influenza vaccination like health care workers. Any policy for influenza vaccine requirements in certain settings.
2	BO_Other_policy	Any other policies, if any, that support Bolivia's seasonal influenza vaccination efforts. - Labor/workplace policies that allow for time off or enforce mandates (e.g. for health sector or government personnel)?
2	BO_Risk groups-recommendations	How are risk groups prioritized to receive influenza vaccination? Can include subsidies, supply, additional messaging at outreach.
3	BO_Risk group implementation	How are risk groups prioritized to receive influenza vaccination? Can include subsidies, targeted supply, additional messaging at outreach.
2	BO_Stakeholder_policy	What stakeholder influence or make influenza vaccination policy and recommendations? Government ministries, advisory groups, endorsing agencies (NITAGs).
1	BO_Soc. Beh. Determinants	Social and behavioral drivers of seasonal influenza vaccine acceptance, demand, and uptake.
2	BO_Other_soc.beh.	
2	BO_Quotes_soc.beh.	
2	BO_Success_soc.beh.	Successes, best practice, or lessons for social and behavioral interventions relates to influenza vaccination
2	BO_Vax accept & demand	Does the population have willingness/desire to be vaccinated? - Would you categorize the majority of the population as refusers, hesitant, or acceptant of influenza vaccination, and why?
3	BO_Vax uptake	Information on vaccine uptake, if people are able to and receive vaccination from available supply
2	BO_Vax hesitancy	Information on vaccine hesitancy among population
3	BO_Barriers to implementation	What are the social and behavioral barriers to implementation in Bolivia of the seasonal influenza vaccination program, if any? - Infodemic
3	BO_Flu vax safety/efficacy	From your perspective, does the population trust in the safety and efficacy of influenza vaccines? - Are there public concerns about the safety and efficacy of influenza vaccines? If so, what are they, and do concerns differentiate by population sub-group? - Is there concern about side effects?

		- Is there concern about low effectiveness of the seasonal influenza vaccine (why get this vaccine if I have to get it annually?)?
3	BO_Trust in govt/health system	Includes perspectives on public trust in the government and health system/messaging and factors that affect this trust. Do you think there is broad trust from the public in government and, by extension, the health system? Can you explain why you think there is or is not strong trust? - Are there segments of the population in Albania that have limited trust in government and/or health systems? If so, which segment(s) of the population, and why do you think their trust is limited? (e.g., religious and/or ethnic minority groups, other vulnerable populations) - Is there any historical or current reason that the population would distrust health messaging or recommendations from the public health sector?
1	BO_Structural determinants	Structural aspects of Bolivia's seasonal influenza vaccination program. Includes any existing vaccination program infrastructure (e.g., EPI program), distribution of the influenza vaccine, data collection and storage related to vaccine uptake and adverse events.
2	BO_Adverse events monitoring + alerts	How are adverse events resulting from the seasonal influenza vaccination handled? Is there a system for monitoring adverse events?
2	BO_EPI program for flu	Description of whether, and how, the EPI program in Bolivia is utilized for the seasonal influenza vaccination program.
2	BO_Other_structure	
2	BO_Program eval	Is there on-going evaluation or efforts to improve of the influenza vaccine program over time? (data collection, goals, evidence to inform program or policy).
2	BO_Stakeholders_structure	Any stakeholders, agencies, entities, coalitions involved in structural determinants
2	BO_Success_structural	Successes, best practices, or lessons on structural aspects of implementing the influenza vaccine program - data management, supply, distribution, access, evaluation
2	BO_Vax access	Information on vaccine accessibility for the population/risk groups. Is there adequate supply and accessibility for people to receive vaccination?
2	BO_Vax data collection + use	Information on vaccine, virus, and program data collection and use
3	BO_Data btw public & private sector	If vaccines are procured by non-governmental entities, such as the private sector, is vaccine procurement and distribution data reported to the MOH? Are related vaccination services/vaccine administration tracked?
3	BO_Flu surveillance/burden of disease	Data on influenza circulation, disease burden among the general population or risk groups, rates of hospitalization and death from flu. Are there sentinel surveillance data collected on influenza cases/case rates (published or unpublished)? How is it collected? How do you use it?
3	BO_Vax uptake data	Data on flu vaccine uptake among the population or risk groups/vaccination coverage rates
2	BO_Vax distribution	Includes where supply is delivered to, events, mass vaccinations, schools, workplaces. - How supply is delivered and who is responsible - Special access for high risk groups
3	BO_Events	Information on events where influenza vaccines have been distributed- mass vaccinations, annual events, etc.
3	BO_Outside healthcare	Are vaccines distributed in places other than pharmacies/clinics? Schools, workplaces, grocery stores, etc.

3	BO_Stakeholders	Stakeholders involved in vaccine distribution
3	BO_Supply chain	How is supply delivered, stored, and distributed?

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