





CORONAVIRUS VULNERABILITIES AND INFORMATION DYNAMICS RESEARCH AND MODELLING

# D5.5 Baseline Report Public Health Responses – update M23



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	Factor Social Consultoria em Psicossociologia e Ambiente LDA (FS), Portugal			
	Austrian Red Cross (AUTRC), Austria			
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	Societatea Natională de Cruce Rosie Din România – Romanian Red Cross (SNCRR), Romania			
	University of Antwerp (UANTWERPEN), Belgium			
	Sapienza University of Rome (SAPIENZA), Italy			
	University Rey Juan Carlos (URJC), Spain			
	Swansea University (SU), UK			
	Gotenborg University (UGOT), Sweden			

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Author	Jil Molenaar, UANTWERPEN
Contributors	Lore Van Praag, UANTWERPEN Hannah Robinson, UANTWERPEN Carina Pussnig, AUTRC Danka Schmidt, AUTRC Vanessa Moser, SYNYO Viktoria Adler, SYNYO Diotima Bertel, SYNYO Rojin Bagheri, SYNYO Zainab Mehdi, TRI Niamh Aspell, TRI Emma Posch, SINUS Henry Polania, SINUS
	Ilya Sogolov, SINUS Marva Arabatzi, KEMEA Ioannis Bagkatzounis, KEMEA Anna Tsekoura, KEMEA Effrosyni Dima, KEMEA Itamar Laist, MDA Chaim Rafalowski, MDA Elena Ambrosetti, SAPIENZA Sara Miccoli, SAPIENZA Gloria Anderson, UCSC Madalena Ricoca-Peixoto, FS Dalila Antunes, FS Andreea Furtuna, SNCRR Daniel Modoaca, SNCRR

	Raluca Buzea, SNCRR		
	Isabel Bazaga Fernández, URJC		
	Diego Castellanos Rodríguez, URJC		
	Roraima Estaba Amaiz, URJC		
	Francisco Javier Acebedo Esteban, SAMUR		
	Daniel Muñoz Rodríguez, SAMUR		
	Paloma Rey Paterna, SAMUR		
	Marina Ghersetti, UGOT		
	Bengt Johansson, UGOT		
	Diana Beljaard, SU		
	Sergei Shubin, SU		
	Louise Condon, SU		
Reviewers	Maria Herica La Valle, UCSC		
	Massimo Fantoni, UCSC		
	Lorenzo Marchesi, UCSC		
	Gloria Anderson, UCSC		

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### **Executive Summary**

This report provides a cross-country synthesis of **pandemic preparedness plans** and **evaluations** of specific COVID-19 public health responses. Based on insights from 15 countries, it analyses the extent to which lessons learned about best practices and missed opportunities have been documented in formal evaluations and other relevant documents. In line with the COVINFORM project's focus, the analysis pays particular attention to how COVID-19 responses have been adapted or diversified to meet the needs of groups in society that have been disproportionately impacted by the crisis.

Prior to the outbreak of the COVID-19 pandemic, **14 out of 15** countries had a publicly available pandemic preparedness plan. However, there is considerable variation in the **scope** and **approach** of the plans, as well as the extent to which they have been **updated** over time. Comparison of countries' pandemic preparedness plans highlighted that many plans lacked **specificity** with regards to the need to tailor pandemic responses to different groups in society. When plans mentioned the disproportionate impact a potential pandemic would likely have on specific groups, they often focused heavily on **medical vulnerability**.

Available evaluations of COVID-19 responses suggest that pre-existing pandemic preparedness structures were **not adequate** to manage the global shock posed by the COVID-19 pandemic. **Responsibilities** were not clearly defined, and **insufficient resources** and other structural factors hampered implementation of the actions outlined in national plans. In addition, the plans were not designed for the **broad and long-term impact** posed by the COVID-19 pandemic. Many countries are currently planning or carrying out **changes to their pandemic preparedness structure** based on the lessons learned during the COVID-19 pandemic. At a national level, changes to pandemic preparedness, and an increased focus on capability development, simulations, and promoting institutional memory.

The analysis also found that the extent to which **testing & tracing** efforts have been formally evaluated differs significantly between national contexts. Available evaluation documents typically have a heavy focus on **technical** and **logistical** aspects of testing and tracing, rather than a focus on broader lessons learned and societal considerations. Common challenges and lessons learned identified across documents related to capacity; compliance; contact tracing apps; (de)centralisation and local expertise; improvisation and agility. Diversification and specific actions for vulnerable groups received limited attention across available evaluations of testing and tracing strategies. However, a key lesson learned across COVINFORM countries is the importance of the **combination of national oversight and local expertise** to adapt testing and tracing strategies to the needs of different groups in society.

Finally, the cross-country analysis compared evaluations of COVID-19 **vaccination campaigns**. Although most countries have (technical) reports available that document vaccination progress, only a few countries have published evaluations that go beyond reporting quantitative coverage outcomes. A review of the available evaluations showed that key challenges and lessons learned relate to mandatory COVID-19 certification; vaccination hesitancy; and coordination between stakeholders at different geographical levels. Vaccination campaigns were structured and diversified to reach different population groups at different time points and in various ways, particularly when initial scarcity concerns subsided and sufficient vaccines became available for the entire population. Available evaluations and strategy documents highlight the need to prioritise not just **accessibility** of vaccination (in terms of distance, time, cost, and administrative barriers), but also **acceptability** (perceptions of need, relevance and risks) and **trust** in the vaccine and the wider healthcare system. Finally, the analysis showed that despite efforts to adapt and target COVID-19 vaccination strategies to specific groups, vaccination uptake remains heterogeneous. Continuous efforts to address these inequities are required.

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Term	Description	
BMG	Federal Ministry of Health (Germany)	
СС	Corona Commission (Sweden)	
COVID-19	Coronavirus Disease 2019	
DoH	Department of Health (Ireland)	
ECDC	European Centre for Disease Prevention and Control	
EU	European Union	
EWRS	Early Warning and Response System	
FOPH	Federal Office of Public Health (Switzerland)	
GDPR	General Data Protection Regulation	
HERA	European Health Emergency Preparedness and Response Authority	
HIV	Human Immunodeficiency Virus	
HSE	Health Service Executive	
IHR	International Health Regulations	
NAO	National Audit Office (England)	
NFP	National Focal Point	
NHS	National Health Service (UK)	
NSRA	National Security Risk Assessment (UK)	
РНА	Public Health Agency (Sweden)	
PHE	Public Health England	
PHW	Public Health Wales	
PIEG	Pandemic Influenza Expert Group (Ireland)	
PPE	Personal Protective Equipment	

# Acronyms & Abbreviations

RKI	Robert Koch Institute (Germany)
RMG	Risk Management Group (Belgium)
ТТР	Test, Trace, Protect (Wales)
WHO	World Health Organisation
WP	Work Package

# **1. Introduction**

The COVINFORM project examines how vulnerability is defined and addressed in response to the COVID-19 outbreak. Through an intersectional approach, the project analyses the impact that different national, regional, and local responses have had on vulnerable and marginalised groups, exploring the interconnection between different factors and how these may exacerbate vulnerability and marginalisation. COVINFORM will also develop solutions, guidelines, and recommendations to ensure that the needs of vulnerable and marginalised groups are appropriately considered in potential further waves of COVID-19 and future pandemics. The current report is part of Work Package (WP) 5 of the COVINFORM project. WP5 analyses COVID-19 impacts and responses from a public health perspective, with a specific focus on health inequality and vulnerability. Key dimensions of analysis are definitions and operationalisations of health vulnerabilities and inequalities; influences of social and cultural factors, as well as institutional, legal, and data collection factors on public health responses; public health communication impacts; and COVID-19 impacts on health care workers.

#### **Previous WP5 outputs**

The current report is the fifth deliverable written within the scope of WP5. The first deliverable, **D5.1**, took a comprehensive desk-based approach in assessing the public health responses to the COVID-19 pandemic across COVINFORM partner countries. Within the broader theme of public health responses, the report tackled a range of subtopics, including an overview of partner countries' health system structures; epidemiological outcomes over the course of the COVID-19 pandemic; governance, decision-making and consultation in the COVID-19 response; legal factors influencing the COVID-19 pandemic; data collection factors influencing the COVID-19 pandemic; public health information and communication strategies; impacts of COVID-19 on health care workers; demographic and social network factors influencing the COVID-19 pandemic; and conceptualizations of vulnerability in the COVID-19 pandemic. D5.1 provided a comprehensive insight in key similarities and divergences in various dimensions of public health responses to the COVID-19 pandemic across COVINFORM partner countries.

**D5.2** outlined the research design of the empirical research activities for WP5. This included the overarching research questions; a description of the research methods used for data collection; the WP5 sampling plan; and guidance on data analysis. The aim of D5.2 was to streamline the empirical research that will take place across study sites and provide a clear set of expectations and guidelines. Based on extensive conversations with COVINFORM partners, the deliverable linked with other deliverables to ensure coordination and consistency across the project's work packages and empirical research sites.

For **D5.3**, various COVINFORM partners wrote thematic chapters based on preliminary findings from the WP5 expert interviews, as well as an additional desk-based review. The four chapters in the report tackled the following four topics:

- Comparative definitions and operationalization of health vulnerabilities
- Institutional, legal, and data collection factors influencing public health responses
- Communication around vaccines and vaccination campaigns
- Impacts of COVID-19 on health care workers: preliminary findings from a qualitative analysis

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**D5.4** was based on the full transcripts of the WP5 expert interviews with health care workers and public health decision- and policymakers. We synthesised and interpreted the findings of the interviews conducted in 10 COVINFORM countries: Austria, Belgium, Spain, Wales, England, Sweden, Greece, Portugal and Germany. Given the huge diversity of these countries' health systems, the evolution of the pandemic, and the specific public health responses, we could not make country-specific comparisons. Instead, we grouped together common findings and experiences across all countries. The interview findings provided greater understanding of decision-making processes during the COVID-19 pandemic, shed light on the impacts experienced by public health practitioners and policymakers in the 10 partner countries, and elucidated promising practices. The findings are useful to inform (future) policy makers and health care workers, to better organise health care and reflect upon work cultures in specific professions or sectors and the working conditions of health care workers.

#### The scope of this report

This report (D5.5) is an update to the WP5 baseline report D5.1 and builds upon the other WP5 deliverables. To ensure relevance to the current pandemic context, D5.5 is narrower in scope than D5.1 was. D5.5 provides a cross-country analysis of **pandemic preparedness plans** and **evaluations** of specific public health responses. The research question guiding D5.5 is: *What are the key lessons learned from evaluations of pandemic preparedness plans and COVID-19 public health responses in COVINFORM countries?* 

This report started from the assumption that more than two years into the pandemic, COVINFORM countries have learned important lessons about best practices and missed opportunities, as well as how these should be incorporated in future preparedness structures. Through a comparative analysis, we aimed to explore to what extent such lessons learned have been documented in formal evaluations and other relevant documents. In line with the COVINFORM project's focus, this report pays particular attention to how some groups in society have been disproportionately impacted by the crisis and assesses to what extent this has been acknowledged in evaluations of COVID-19 responses. By comparing contents of pandemic preparedness plans and evaluation reports across countries, we reflect on key similarities and differences in lessons learnt and promising practices.

This comparative report was written on the basis of country reports. To guide COVINFORM partners in writing their country reports, a template was provided containing detailed information on the scope of the analysis and the search strategy, as well as on the required subsections of the report and the expected length of each section. The main sub-topics partners were asked to discuss in their country reports were:

- National pandemic plans and structures which were in place prior to the COVID-19 pandemic
- Evaluations of how the pre-existing national pandemic preparedness structure functioned during the COVID-19 pandemic
- Evaluations of COVID-19 public health responses, in particular a) testing and tracing efforts and b) vaccination.

Partners searched for pandemic preparedness plans and evaluation documents using (academic) search engines, using search terms such as "COVID-19", "evaluation", and "pandemic preparedness plan". Evaluation documents had to be published between March 2020 and June 2022. Partners were encouraged to focus on 'official' evaluations conducted and published by government-appointed or

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government-affiliated institutions, bodies, and committees. When these were not available and/or to complement these formal evaluations, partners also relied on academic publications to write their country reports.

The country reports revealed that the extent to which formal evaluations have been conducted and made publicly available differs significantly between countries. Whereas some national governments appointed evaluation committees or task forces early on in the pandemic (e.g. Sweden, Belgium, Switzerland), in other countries no formal evaluations have been planned or conducted to date.

This report is structured into different chapters. In **Chapter 2**, we provide a general description of the pandemic preparedness plans and protocols that were in place in COVINFORM countries prior to the COVID-19 crisis. This includes an overview of the main organisations and/or governmental entities designated with a coordinating role in pandemic preparedness structures, as well as a comparison of pandemic preparedness plans in terms of communication strategies; specific actions for vulnerable groups; recovery and transition activities; and methodologies to evaluate pandemic mitigation measures.

**Chapter 3 is** based on evaluations of how the pre-existing national pandemic preparedness structure functioned during the COVID-19 pandemic. It presents our cross-country findings relating to the use of pre-existing national pandemic (influenza) plans; division of responsibilities in pandemic preparedness structures; preparedness in long-term care facilities; and structural challenges. We also describe how countries are planning or carrying out changes to their pandemic preparedness structure based on the lessons learned during the COVID-19 pandemic.

**Chapter 4** provides an overview of the relevant evaluations and other reports published by government-appointed or government-affiliated institutions, bodies, and committees that were identified by COVINFORM partners in their desk research. The focus is on two types of public health responses: a) testing and tracing efforts and b) vaccination. These two topics are tackled in depth in chapters 5 and 6, respectively.

**Chapter 5** tackles commonly identified challenges and weaknesses in evaluations of testing and tracing efforts, organized into the subthemes of capacity; compliance; contact tracing apps; (de)centralisation and local expertise; improvisation and agility. The last part of the chapter considers the limited attention to diversification and specific actions for vulnerable across available evaluations of testing and tracing strategies.

**Chapter 6** discusses key themes emerging from available evaluations of COVID-19 vaccination campaigns. It considers the success of vaccination campaigns in relation to vaccination coverage targets, and offers comparative reflections on mandatory COVID-19 certification and the key challenge of vaccination hesitancy. It also goes into organisational aspects of COVID-19 vaccination campaigns; the challenges associated with the coordination between stakeholders at different geographical levels; and how vaccination campaigns were structured and diversified to reach different population groups at different time points and in various ways. Finally, **chapter 7** provides key conclusions.

## 2. Pre-COVID-19 pandemic preparedness

Most countries had pandemic preparedness structures in place before the COVID-19 pandemic. In the first two decades of the 21<sup>st</sup> century, national preparedness plans and protocols were drafted or updated across national contexts. These developments should be seen in the light of repeated avian influenza outbreaks in the late 1990s and early 2000s, which called attention to the challenges of novel influenza viruses and the importance of having country-specific pandemic plans in place (Snacken et al., 1999). The growing recognition of the need for EU-level responses to international health threats was also reflected in the establishment of the European Centre for Disease Prevention and Control (ECDC) in 2005 (Greer, 2012). Another important milestone was the adoption of the International Health Regulations (IHR) by the 58th World Health Assembly in 2005 (WHO, 2008). The IHR constitute a legal framework that defines national core capacities for the management of public health events of national or international concern. As the implementation of the IHR required countries to develop national IHR plans, the years following 2005 witnessed a boost in pandemic preparedness activities in many countries (Droogers et al., 2019). The global pandemic caused by the influenza A (H1N1) strain in 2009, also referred to as the swine flu pandemic, presented the first major public health emergency after the IHR implementation.

#### Main actors in pandemic preparedness

The IHR require that countries designate a National Focal Point (NFP) to facilitate information sharing about relevant health events with the WHO (Wilson et al., 2021). Typically, the body or organization appointed as NFP has a leading role in pandemic preparedness planning overall. Indeed, Ministries of Health and their various branches and institutions are normally key actors in preparedness structures, and often take up the NFP responsibilities. For example, in Austria, the Austrian Ministry of Health is the official Austrian NFP for the IHR, as well as for the Early Warning Response System (EWRS) of the European Commission. In many other countries, it is public health institutions operating under the mandate of the Ministry of Health that have a leading role in pandemic preparedness, such as Public Health England in the UK, the National Public Health Organization in Greece, and the Public Health Agency in Sweden.

Although Ministries of Health and affiliated bodies are normally the main actors designated with a coordinating role in pre-COVID-19 pandemic preparedness structures, in some countries other governmental entities are also assigned key responsibilities. In Sweden, for instance, the Swedish Civil Contingencies Agency (*Myndigheten för samhällsskydd och beredskap, MSB*) is an important actor organized under the Ministry of Justice. The MSB was established in 2009 as a direct consequence of failing government capacity to handle the tsunami disaster in 2004 when more than 500 Swedes died (Broms, 2012). Similarly, the Federal Crisis and Disaster Management (*Staatliches Krisen- und Katastrophenschutzmanagement*, SKKM) is a key entity in Austria that formally belongs to the Austrian Ministry of Interior (Jachs, 2011). Israel is a unique case, as it is the Israeli Ministry of Defense that oversees national preparedness and response during advanced phases of a severe influenza pandemic and in unusual biologic incidents, rather than the Ministry of Health (Kohn et al., 2010). It is also worth noting that depending on the level of decentralization, sub-national entities may have designated roles in pandemic preparedness. For example, the Autonomous Communities Health Departments and Regional Health Services in Spain have far-reaching responsibilities (Articles 148 and 149 of the Spanish Constitution, 1978).

#### Pandemic preparedness plans across COVINFORM countries

Following the IHR implementation in 2005, the predominant view in many countries was that standalone preparedness plans were needed for pandemic influenza (Droogers et al., 2019). As such, most countries have a pandemic preparedness plan that focuses specifically on a potential influenza epidemic. Table 1 presents an overview of pandemic preparedness plans in the COVINFORM countries.

Country	Title of plan (English translation)	Publishing institution(s)	Publication year	Latest update (year)
Austria	Influenza Pandemieplan – Strategie für Österreich (Influenza Pandemic plan – Strategy for Austria)	(Former) Federal Ministry for Women and Health	2006	N/A
Belgium	Belgisch noodplan voor een grieppandemie (Belgian emergency plan for an influenza epidemic)	Interministerial influenza commissariat	2006	N/A
Cyprus	N/A: no publicly available plan	N/A	N/A	N/A
England	UK Influenza Pandemic Preparedness Strategy 2011	Pandemic Influenza Preparedness Team (collaboration governments of England, Wales, Scotland, and Northern Ireland)	2005	2011
Germany	Nationaler Pandemieplan (National pandemic plan)	Robert Koch Institute (RKI)	2005	2017
Greece	Εθνικό Σχέδιο Δράσης για την Αντιμετώπιση Πανδημίας Γρίπης (National Influenza Pandemic Action Plan)	Ministry of Health and Social Solidarity, Hellenic Centre for Disease Control and Prevention (HCDCP)	2005	2009
Ireland	National Pandemic Influenza Plan	Health Service Executive (HSE) and Department of Health and Children	2007	2009
Israel	היערכות מערכת הבריאות למגפת שפעת עולמית (The healthcare system preparedness for influenza pandemic)	Knesset Research and Information Center	2004	2006
Italy	Piano italiano multifase d'emergenza per una pandemia influenzale (Italian	Italian Ministry of Health	2002	2006

Table 1: Overview national pandemic preparedness plans in COVINFORM target countries

	Multiphase Emergency Plan for an Influenza Pandemic)			
Portugal	Plano De Contingência Nacional Do Sector Da Saúde Para A Pandemia De Gripe (National Health Sector Contingency Plan for the Influenza Pandemic)	General Health Directorate (DGS)	2007	N/A
Romania	Planul national de intervenție pentru prevenirea îmbolnăvirii în masă a populației generate de epidemii și pandemii (National intervention plan for the prevention of mass illness of the population generated by epidemics and pandemics)	Government of Romania	2013	N/A
Spain	Plan Nacional de respuesta ante la gripe (National flu response plan)	Spanish Ministry of Health	2005	2006
Sweden	Beredskapsplanering för en pandemisk influensa (Contingency planning for a pandemic influenza)	National Board of Health and Welfare	2005	2019
Switzerland	<i>Swiss Influenza Pandemic Plan. Strategies and measures to prepare for an influenza pandemic</i>	Federal Office of Public Health (FOPH)	2004	2019
Wales	UK Influenza Pandemic Preparedness Strategy <sup>1</sup>	Pandemic Influenza Preparedness Team (collaboration governments of England, Wales, Scotland, and Northern Ireland)	2005	2011

Apart from Cyprus, all countries under study had a publicly available pandemic preparedness plan prior to the outbreak of the COVID-19 pandemic. As highlighted in a comparative review of European pandemic influenza preparedness plans that were available in 2016 (Droogers et al., 2019), there is considerable variation in the scope and approach of the plans. Some plans go into extensive detail in describing what should be done in the event of a pandemic, whereas others are action plans that focus on describing *preparations* for a potential pandemic. In most countries the plan is a single document,

<sup>&</sup>lt;sup>1</sup> Note: although this UK plan is the most recent plan available, Wales also has its own guidance document on preparing for pandemic influenza, which was published in 2007.

yet in some countries (e.g., Sweden) the strategy is set out in various operational documents, for instance providing a separate document outlining communication strategies.

As demonstrated by the publication dates in Table 1, most countries developed their initial plans in the period of the IHR implementation. Indeed, all plans under study except the Italian and Romanian plans were first published in the period 2004-2007. The majority of COVINFORM countries published one or several updates of their plans in the following years, but four countries (Austria, Belgium, Portugal, and Romania) never updated their plans prior to the outbreak of the COVID-19 pandemic. It should be noted that in Portugal, some aspects of pandemic influenza preparedness were later included in Seasonal Health Contingency Plans, which have yearly updates (SNS, 2019).

In the following sections, we compare pandemic preparedness plans in more detail on the following four issues:

- Communication strategies
- Specific actions for vulnerable groups
- Recovery and transition activities
- Methodology to evaluate pandemic mitigation measures

#### **Communication strategies**

All plans refer to the importance of a communication strategy in the event of a pandemic. In some countries (e.g. Belgium, Italy, Ireland), the communication strategies are differentiated per pandemic phase. Another common element is reference to toolkits with templates that can be adapted in case of a pandemic. Plans typically list various communication channels that should be used. The Italian plan, for example, differentiates between "one-way" communication channels such as websites and media, and "two-way means" including "dedicated telephone lines and face-to-face communication between citizens and operators in differentiated spaces and times" (Ministero della Salute, 2006, p. 22) The main target audiences identified in the plans are typically the main public and professional target groups. Only some of the more recent plans (e.g. the 2019 Swedish plan) elaborate on the importance of social media as a communication channel in crisis times.

Some plans also discuss the need for communication strategies to reach specific vulnerable groups. For example, the Belgian plan defines these groups as "minority groups, and people who do not have an internet connection, a PC, a television set or cable connection, and who do not buy newspapers" (ICI, 2006, p. 41). However, the Belgian plan does not specify *how* these groups should be reached with specific communication strategies, stating simply that these groups "should be reachable". This lack of specificity was in fact critiqued by the Belgian Advisory Committee on Bioethics, which issued advice regarding the operational pandemic influenza plan in 2009. They pointed out that "communication with non-native speakers is necessary, just as communication is needed with the not insignificant part of the population that does not watch television news and hardly ever listens to the radio or reads a newspaper" (Belgisch Raadgevend Comité voor Bio-ethiek, 2009, p. 23). Similar to the Belgian plan, the Irish plan highlights that the information on risk and risk avoidance should be "tailored to different target populations in a communications context. The lack of specificity in communication strategies and concrete steps for implementation suggest a lack of preparedness to reach these specific target groups.

Sweden is a noteworthy case, as the Swedish Public Health Agency (PHA) wrote a 26-page guide specifically on communication in the event of a pandemic (PHA, 2019). The planning document's target audience included communication managers and communicators in national, regional and local authorities, as well as emergency planners and other relevant professional groups. A number of different target groups were identified in the plan, including the general public; the media; medical risks groups; and professional groups. 'Groups with specific needs' were considered to include elderly, parents, people travelling, people who do not speak Swedish and people with disabilities that affect their information retrieval. Although the Swedish plan does not elaborate on the specific strategies required to reach these various groups, it does emphasize the importance of approaching and collaborating with key stakeholders and local leaders "to align and assure quality messages" who can "disseminate information within their own networks".

#### Specific actions for vulnerable groups

Specific actions for vulnerable groups in the case of a pandemic is a thematic area that does not receive much attention across the plans. This echoes findings by Droogers et al. (2019), who identified this topic as a key opportunity for improvement in European influenza preparedness planning. When plans do mention sensitive, vulnerable or marginalized populations, there is typically considerable definitional ambiguity. For example, the Austrian influenza pandemic plan stresses that "it is necessary to protect particularly sensitive or predisposed population groups from an influenza infection" (BMGF, 2006, p. 51), but does not further describe or define the groups which should be considered sensitive or predisposed. Other plans, such as national plans in Greece and Italy, focus on people at high risk of severe or fatal complications from an influenza infection. In Italy, this includes people aged over 65 years old, people with chronic diseases or diabetes or HIV positives, pregnant women, and children under 14 years old (Ministero della Salute, 2002). In both the Greek and Italian plans, these categories are also used to provide guidelines on the order of prioritisation in vaccination strategies. Similarly, the Irish Pandemic Influenza Expert Group (PIEG) advice prioritises certain groups for antiviral drugs if stockpiles are insufficient to treat all symptomatic persons, as well as during the initial administration of vaccines (PIEG, 2009b). Furthermore, healthcare workers are seen as potentially vulnerable in the context of employment or deployment because of theirs or their family members' exposure to the virus in many preparedness plans. By extension, healthcare workers are seen as potential vectors of disease that can pose a risk to vulnerable patients: "under these circumstances it would not be appropriate to expose these patients to a staff member known to have been exposed to patients infected with influenza" (Welsh Assembly Government, 2007, pp. 33–34).

Few plans consider other types of vulnerable groups, such as people of low socio-economic status, migrants, homeless people, and people living with disability. When plans mention such groups, they typically consider vulnerability in terms of probability of infection, such as in closed (care) settings. For example, the Welsh Assembly Government (2007) *Guidance for Pandemic Influenza: Infection Control in Hospitals and Primary Care Settings* lists the following people as requiring a specific strategy to protect them from the effects of a dangerous virus spreading: people in residential homes and prisons, asylum seekers, people in mental health and learning disability units, military bases, schools, and nursing homes, as well as "immigrants" (p. 47). Broader socio-economic vulnerability is not typically acknowledged in the pandemic preparedness plans. In the Belgian case, this lack was critiqued by the Belgian Advisory Committee on Bioethics, which pointed out that the influenza plan focuses heavily on

hospital-based responses and does not outline specific actions for people facing socio-economic vulnerability:

"Exposure to the virus also depends on the quality of people's general living and housing conditions. This facet is not given much attention in the emergency plan. What about the homeless? What about the 14% of Belgians who live below the poverty line and probably do not have the possibility of stocking up on foodstuffs and medicines, such as antipyretics, in the longer term?" (Belgisch Raadgevend Comité voor Bio-ethiek, 2009, p. 23).

#### **Recovery and transition**

With regards to mention of recovery and transition phases after a pandemic has peaked, there was great diversity in the level of detail offered in the different plans. The plans of some countries, such as Italy, Portugal and Spain, do not mention recovery and transition activities at all. Other plans do mention this phase, but rather vaguely, such as the German plan's mention of the need for "situation-dependent" examination of which measures should be continued (RKI, 2017, p. 24). In other plans, descriptions of the recovery and transition phase mostly focus on the residual impact on health services. For example, the Irish plan's description of this phase underlines the importance of making people aware that health services may take a long time to recover to pre-pandemic service levels (HSE, 2007, p. 25). Similarly, the Welsh plan takes into account the lasting effects of a pandemic on healthcare pressures on provision and staff shortages. It is recognised that NHS staff "have been working under acute pressure for prolonged periods and are likely to require rest and continuing support" (Welsh Assembly Government, 2007, p. 50). Also "[o]ther sectors and services are likely to face similar problems and may also experience difficulties associated with income loss, changes in competitive position, loss of customer base, lack of raw materials, the potential need for plant start-up, etc" (ibid.).

In the Belgian pandemic influenza plan's brief paragraph on the 'post-crisis phase', the main focus is on providing psychosocial support:

"After the crisis is over, a lot of problems will arise to get normal everyday life back on track. A number of people may face practical and/or psychological problems in the aftermath of the crisis. To remind people that it is not abnormal for them to have certain feelings, the FPS Health, Food Chain Safety and Environment has drawn up a folder to provide psychosocial support. This folder is also a basic document that will need to be updated." (ICI, 2006, p. 43)

In addition, the Belgian plan also has a brief section on 'long-term communication' which emphasizes basic communication messages which should "go beyond influenza", such as the importance of basic hygiene and leading an active lifestyle.

#### **Evaluation**

Related to recovery and transition activities, some plans also specify how evaluations of the pandemic preparedness and management of the pandemic should be carried out. In most cases, plans point out the importance of an evaluation, but do not offer a concrete methodology or plan for such evaluations. For example, the German plan simply states such an evaluation should be carried out "in order to embed the new insights and experiences in a further pandemic plan" (RKI, 2017, p. 24). Similarly, in the Greek plan the evaluation report is described to cover "an overall assessment of the response to the pandemic and the measures implemented" (HCDCP, 2009, p. 47). The Swedish plan provides the

most details on a methodology to evaluate the pandemic mitigation measures (PHA, 2019, pp. 35–36). The plan states that a structured review of the course of events and the measures and actions taken should be conducted and that it is important to identify different stakeholders' experiences. Examples of actions that should be evaluated include the monitoring and coordination of the various measures taken to deal with the pandemic (e.g., vaccination). The impact of the measures, both in short and long term, are also described as having to be included in the Swedish evaluation.

### 3. Evaluations of pandemic preparedness

More than two years into the COVID-19 crisis, various countries have carried out evaluations of their pandemic responses. In most countries, there has been some reflection on the strengths and weaknesses of specific COVID-19 responses, such as testing and tracing strategies and vaccination campaigns - these will be discussed in chapters 4 and 5. However, our cross-country analysis found that only a few evaluations specifically consider how pre-existing national pandemic preparedness structures functioned during the COVID-19 pandemic. In countries where such evaluations are publicly available, they are typically released by specific committees or groups appointed to evaluate governmental COVID-19 responses. More information on the evaluation committees formed in Belgium, Germany, Sweden and Switzerland is provided in Box 1. In Austria, the Rechnungshof (Austrian Court of Auditors) published an evaluation which focuses mostly on financial and legislative aspects of the performance of national health authorities. Apart from the aforementioned countries, official evaluations of governmental COVID-19 responses have not (yet) taken place to the same extent, or they have not been made publicly available. As government-mandated evaluations were not available for most countries, relevant information about strengths and weaknesses of countries' preexisting pandemic preparedness structures in academic publications and other documents were also included in our analysis.

The overall consensus arising from available evaluation documents is that pre-existing pandemic preparedness structures were not adequate to manage the global shock posed by the COVID-19 pandemic. Insufficient resources and other structural factors hampered implementation of the actions outlined in national plans, and the plans were not sufficiently relevant for the specific context of a pandemic coronavirus. In addition, pandemic preparedness plans were typically not designed for the broad and long-term impact posed by the pandemic. For instance, the Belgian evaluation committee stressed how pandemic preparedness in Belgium had not been sufficiently multidisciplinary, and decision-making structures "were not prepared for the long-term and broad social impact that the COVID-19 pandemic would have" (De Kamer, 2021, p. 125). Indeed, the Pan-European Commission on Health and Sustainable Development concluded that "the devastating consequences of COVID-19 have revealed just how unprepared many countries in the WHO European Region were". Even though most countries had prepared plans, "they may not have updated or rehearsed them or put in place the necessary arrangements" (PEC HSD, 2021). In this chapter, we present our cross-country findings relating to the use of pre-existing national pandemic (influenza) plans; division of responsibilities in pandemic preparedness structures; preparedness in long-term care facilities; and structural challenges. Finally, we describe how countries are planning or carrying out changes to their pandemic preparedness structure based on the lessons learned during the COVID-19 pandemic.

#### Box 1: Government-appointed evaluation committees in Belgium, Germany, Sweden, and Switzerland

#### Belgium

In Belgium, an evaluation of the governmental COVID-19 response has been carried out by the "Special Committee In Charge Of Investigating Belgium's Handling Of The COVID-19 Epidemic" appointed by the federal government, referred to in shorthand as the Special Committee. It was decided in June 2020 that the Special Committee would be composed of 17 members, appointed by the House of Representatives from among its members in accordance with the proportional representation of the political parties. The Special Committee organized numerous (public) hearings with key stakeholders and reviewed meeting minutes and other relevant documents. The Special Committee describes its main goal as follows: "The Special Committee's task is to identify policy insights and organisational innovations that will enable our country to face the next crisis or pandemic – that will arise sooner or later – with improved preparedness and with better equipped institutions" (De Kamer, 2021, p. 123). The Special Committee brought out an extensive report (581 pages) outlining its conclusions in September 2021 (De Kamer, 2021).

#### Germany

The German Federal Ministry of Health appointed a Committee of Experts (Sachverständigenausschuss) to conduct an "Evaluation of the Legal Foundation and Measures of Pandemic Policies". The objective of the Committee was to reach an understanding of how successful COVID-19 measures and restrictions in Germany were, as well as of what can be learnt for future pandemics, in order to give decision-makers in politics and administration an informed and solid basis for future measures and strategies. The Committee was led by law Professor Dr. Stefan Huster, and consisted of experts with backgrounds ranging from virology, bioethics and public health to sociology and economics. The Committee's final 149-page report was published in June 2022.

#### Sweden

Following a request of the Swedish Parliament, the Swedish government appointed the so-called Corona Commission (CC) in June 2020. This independent commission was charged with evaluating the measures taken by the Government, the administrative agencies concerned, the regions and the municipalities to limit the spread of the virus that causes the disease COVID-19 and the effects of its spread. The CC was chaired by the judge Mats Melin, and was formed of 15 experts from different sectors. Since it was established in June 2020, the CC has published several reports. The first two reports were both published in October 2021, and focused on 'transmission and infection control' (Volume 1) and 'healthcare and public health' (Volume 2). The CC published its final outputs in February 2022. These were again subdivided into two volumes: Volume 1 focusing on economic considerations at the levels of individuals, businesses and society, and Volume 2 entitled 'preconditions, choices and evaluation'. The latter 550-page report was of most relevance for the scope of this deliverable.

#### Switzerland

In Switzerland, the Federal Office of Public Health appointed an external working group in spring 2020 to conduct an evaluation covering both pandemic planning and appropriateness and effectiveness of COVID-19 public health responses. The evaluation process was led by a team consisting of members from two independent research firms, as well as academic partners from different universities. The evaluation covers the time frame up to June 2021, and is based on both population surveys, online surveys, literature analyses and interviews with stakeholders. The eventual 137-page report was published in February 2022.

#### Pre-existing national pandemic (influenza) plans

As noted in the previous chapter, only a few countries – Germany, Sweden and Switzerland – updated their pandemic preparedness plans in the five years preceding the outbreak of the COVID-19 pandemic. In some countries, attention had in fact been drawn to the need to update the plan prior to the COVID-19 crisis. In Austria, for example, an evaluation published in 2012 by the National Health Planning and Research Institute Gesundheit Österreich GmbH following the 2009 Influenza pandemic already identified an urgent need to update the plan. A draft update was finalized several years later, in August 2019, yet it was rejected as it did not adhere to the latest standards of the WHO. This meant that the pandemic preparedness plan in place in Austria at the time of the COVID-19 outbreak was still the Influenza plan from 2006 (Austrian Court of Auditors, 2022, p. 47).

Similarly, in Belgium, the Special Committee in charge of investigating Belgium's handling of the COVID-19 epidemic considers it a failure that there was no up-to-date pandemic plan in place in Belgium when the COVID-19 pandemic broke out. In their report, they state that "despite repeated requests from the Health Cabinet, there has been a failure to keep a pandemic plan up-to-date, in which strategic and operational aspects could have been further developed or refined in tempore non suspecto, starting from the aforementioned influenza plan." (De Kamer 2021, 168).

Besides a lack of updates, another shortcoming of pandemic preparedness plans that was identified is that the actions outlined in the plans to improve preparedness were not always implemented in practice. For example, many actions envisaged by the 2006 Italian National Plan for Preparation and Response to an Influenza Pandemic remained largely unfulfilled (Bosa et al., 2021). The Italian regions failed to update and enforce the preparedness protocols (Carinci, 2020), which should be seen in the light of the low allocation of funding for prevention activities like pandemic preparedness planning. In Switzerland, it was noted that although various crisis management plans and handbooks were in place, authorities were not typically well aware of their contents when the COVID-19 pandemic broke out (Balthasar et al., 2022).

In some countries, pandemic plans and protocols were actually tested in simulation exercises prior to the COVID-19 pandemic. These exercises typically simulated a pandemic influenza outbreak, but in some countries different types of pathogens have also been simulated. In the UK, Public Health England (PHE) undertook 'Exercise Alice' in 2016, which simulated an outbreak of MERS-CoV, another coronavirus (McKee, 2021). This exercise predicted the importance of isolating patients, contact tracing, PPE provision, trained personnel and adequate NHS beds. Yet the report documenting Exercise Alice's insights remained unpublished until October 2021, when it was released under freedom of information laws to a clinician named Moosa Qureshi, a doctor campaigning for improved transparency around governmental pandemic preparedness planning. It appears the government purposely decided not to publish the file, as it contradicted previous claims by government ministers that pre-COVID pandemic planning had focused more on flu, and had therefore not prepared the UK for the demands a coronavirus places on hospitals, care homes and PPE (Booth, 2021b). Further commentary on exercise Alice includes a prominent but unnamed virologist stating that the exercise could have been "completely relevant" to COVID-19 response, which was shaped by flu pandemic plans in the first few weeks. An anonymous senior government adviser on respiratory disease described it as "odd" that details of the exercises had not been provided to key advisory committees (Booth, 2021a).

#### **Division of responsibilities**

In countries where evaluations of the functioning of pandemic preparedness plans in the COVID-19 context were carried out, a key critique related to the way the division of responsibilities among different actors was outlined in these plans. Indeed, evaluations conclude that the way responsibilities were divided in preparedness plans did not always function well in the context of the COVID-19 pandemic. More specifically, a lack of clarity about how responsibilities are coordinated between different actors and across geographical levels impeded effective crisis response. In Sweden, for example, the evaluation by the Corona Commission pointed out that the Swedish system of preparedness is based on geographical responsibility for specific areas, and it turned out to be challenging to coordinate this dispersed responsibility into a unified national crisis management. The Corona Commission explains that "this arrangement can become unclear in a crisis centred on health care and disease prevention and control. At a regional level, area responsibility rests on county administrative boards, while health care and disease control are handled by regional councils in the same geographical areas" (Coronakommissionen, 2022, p. 37).

A similar challenge was identified in Switzerland. The Swiss evaluation committee pointed out that the central governmental crisis bodies did not carry out their role as outlined in the preparedness plans, leaving the understaffed FOPH to pull more weight than it was able to manage. Echoing the recommendations by the Swedish Corona Commission, the Swiss evaluation therefore posits that there is great need for improvement regarding the organisation, structure, and leadership in crisis management (Balthasar et al. 2022).

#### Preparedness in long-term care facilities

Another topic that came up across available evaluations of pandemic preparedness was how hospitals were typically better prepared for a pandemic than other care settings, in particular long-term care facilities. In Belgium, Amnesty International published a report in November 2020 examining the impact of the first COVID-19 wave on Belgian residential care homes. Entitled "Residential care centres in the blind spot", the critical report examines the crisis from a human rights perspective. The report describes how the lack of pandemic preparedness in residential care homes can be attributed to the low priority to the residential care centres in the Belgian national health system. "Despite warnings, studies and pilot projects, residential care centres in Belgium were relatively unprepared for the COVID-19 outbreak - in clear contrast to hospitals" (Amnesty International België, 2020, p. 20). The Amnesty International report points out that there was a 2008 report explaining in detail how Belgian residential care homes could logistically and technically prepare to control infectious outbreaks, but argues that this plan was not sufficiently operationalised. The authors of the report links this to the 2014 state reform, which transferred powers for residential care centres to the regional government. The plan was never fully implemented because of budgetary reasons (Amnesty International België, 2020, p. 20).

Similarly, the Swedish Corona Commission concluded that "elderly care was unprepared and illequipped to deal with a pandemic" and that "the strategy to protect the elderly has failed" (Coronakommissionen, 2020, p. 242). In its report, the Corona Commission concluded that the PHA and National Board of Health and Welfare had an insufficient overview of key shortcomings and problems at the municipal level prior to the COVID-19 pandemic, which meant guidance and support for elderly care was delayed in early stages of the pandemic. Fragmentation thus impeded preparedness, and the lack of established communication channels between national and local-level actors prevented a rapid response.

#### Structural challenges

Evaluations in different countries also stressed how pandemic preparedness was hindered by various structural challenges, including the economic situation as well as previous healthcare investments. Although such challenges are felt in all countries, they were not highlighted to the same extent in the evaluations. In Greece, for example, the prolonged economic recession since 2018 caused considerable challenges relating to financing, organization and delivery of health services, which negatively impacted capacity for pandemic preparedness. As pointed out by Kousi et al. (2021):

"the principal consequences of the economic recession included decreases in public health budgets with declines in the number of the healthcare workforce and their salaries, decreases in pensions, drop in purchase of medical goods, reforms in the pharmaceutical and social insurance sector, merging of healthcare units, rise of access and corruption problems and inadequate primary healthcare services".

In Ireland, a 2018 Department of Health (DOH) report had already pointed out that the diminished investment in the country's public healthcare system would hinder capacity to deliver a surge response in the case of a critical health threat (DOH, 2018). In the face of a lack of funding, recommendations made by the National Pandemic Influenza Expert Group following the 2009 swine flu outbreak, such as the development of an electronic national contact tracing system, were not implemented prior to the outbreak of COVID-19. Under such circumstances, Ireland "was in a state of poor preparedness prior to the COVID-19 pandemic" (O'leary et al., 2021).

#### Adaptations and changes to pandemic preparedness structures

Many countries are planning or carrying out changes to their pandemic preparedness structure based on the lessons learned during the COVID-19 pandemic. For EU countries, this is typically happening in linkage with the newly established European Health Emergency preparedness and Response Authority (HERA). The HERA was launched by the European Commission in September 2021 to coordinate EU spending of almost 30 billion euros to prepare for a future pandemic. The new crisis body will assess potential health threats, promote research, and play a coordinating role if a new health crisis were to strike (Reuters, 2021).

At a national level, changes to pandemic preparedness structures typically involve alteration of the division of responsibility for emergency preparedness. In Sweden, the Corona Commission suggested that a new body for clear national crisis management needs to be established. In addition, it proposes that the Public Health Agency should be split in the future, to avoid that the same agency deals with infection control and broader public health concerns, which are at times conflicting responsibilities (Coronakommissionen, 2022). The UK government's response to a report published by the House of Lords Select Committee on Risk Assessment and Risk Planning also acknowledges the importance of risk management and preparedness structures. It affirms that rather than merely producing and updating a National Risk Assessment (NSRA), risks "should be linked to emergency plans, simulations, capability development and proposed mitigations" (Cabinet Office, 2022, p. 20). As recommended by the House of Lords Risk Assessment and Risk Planning Committee, there should also be the establishment of an "institutional memory bank, in the form of a digital library, which contains

resilience literature and the lessons learned of all major exercises and emergencies. This should be made available to designated set of users including central Government officials, local responders, the devolved administrations, and parliamentarians" (Cabinet Office, 2022, p. 9). In Belgium, a new national pandemic preparedness plan is expected to be published by the end of 2022 by the FPS Health, supported by the National Crisis Centre and in consultation with the federal states and various local-level public health stakeholders.

## 4. Overview evaluations of COVID-19 public health responses

In addition to evaluations of pandemic preparedness plans, this deliverable also provides a crosscountry analysis of how countries' public health *responses* have been evaluated. More specifically, we focus on two types of public health responses: a) testing and tracing efforts and b) vaccination. These two topics are tackled in depth in chapters 5 and 6, respectively.

In this chapter, we provide an overview of the relevant evaluations and other reports that were identified by COVINFORM partners in their desk research. Please note that Table 2 lists only reports and documents published by **government-appointed or government-affiliated** institutions, bodies, and committees.

Country	Scope/ focus	Title	Translated title	Author	Publicati on date
Austria	COVID-19 responses (broadly)	Pandemiemanagement der Gesundheitsbehörden im ersten Jahr der COVID-19-Pandemie	Pandemic management of health authorities in the first year of the COVID-19 pandemic	Austrian Court of Auditors	June 2022
Austria	COVID-19 contact tracing	Contact tracing in the COVID-19 pandemic: Opinion of the Bioethics Commission	N/A	Austrian Bioethics Commission	June 2020
Belgium	COVID-19 responses (broadly)	Verslag bijzondere commissie belast met het onderzoek naar de aanpak van de COVID- 19-epidemie door België	Report special committee charged with investigating Belgium's handling of the COVID-19 epidemic	Belgian Chamber of Representatives	September 2021
Belgium	COVID-19 vaccination	Thematisch verslag: vaccinatiegraad en epidemiologische impact van de COVID-19 vaccinatiecampagne in België	Thematic report: vaccination coverage and epidemiological impact of the COVID- 19 vaccination campaign in Belgium	Sciensano (National Public Health institute)	October 2021
Belgium	COVID-19 testing	Evaluation of the SARS- CoV-2 testing policy in	N/A	European Centre for Disease	February 2022

#### Table 2: Evaluations and other relevant reports analysed

		Belgium from June to December 2021		Prevention and Control (ECDC)	
Belgium	COVID-19 testing and tracing	Testing, isolatie en quarantaine: een (middel)lange termijn strategie	Testing, Isolation and Quarantine: A Medium to Long- Term Strategy	Risk Management Group (RMG), FPS Public health	March 2022
Belgium	COVID-19 vaccination	Prioritaire inenting van personen met een verhoogd risico tijdens de COVID-19 pandemie in 2021 in België	Priority vaccination of persons at risk during the COVID-19 pandemic in 2021 in Belgium	Task Force Vaccination	March 2022
England	COVID-19 preparedness	The government's preparedness for the COVID-19 pandemic: lessons for government on risk management	N/A	National Audit Office	November 2021
England	COVID-19 vaccination	The rollout of the COVID-19 vaccination programme in England	N/A	National Audit Office	February 2022
England	COVID-19 testing & tracing	The government's approach to test and trace in England – interim report	N/A	National Audit Office	December 2020
England	COVID-19 testing & tracing	COVID-19: Test, track and trace (part 1) - Forty-Seventh Report of Session 2019–21	N/A	House of Commons Public Accounts Committee	March 2021
Germany	COVID-19 responses (broadly)	Evaluation der Rechtsgrundlagen und Maßnahmen der Pandemiepolitik. Bericht des Sachverständigenaussch usses nach §5 Abs. 9 IFSG	Evaluation of the legal bases and measures of pandemic policy. Report of the Committee of Experts in accordance with §5 (9) IFSG	Federal Ministry of Health (BMG)	June 2022
Germany	COVID-19 testing & tracing	Angepasste Teststrategie	Adapted Testing Strategy	Federal Ministry of Health (BMG)	February 2022
Israel	COVID-19 testing & tracing	מערך הדגימות ובדיקות המעבדה לאבחון קורונה	The sampling and laboratory testing for COVID-19	The State Comptroller Office	August 2021
Israel	COVID-19 testing & tracing	חקירות אפידמיולוגיות לקטיעת שרשרות הדבקה בנגיף הקורונה	Epidemiological investigations for cutting the chains of infection in COVID-19	The State Comptroller Office	August 2021

Italy	COVID-19 vaccination	COVID-19: sorveglianza, impatto delle infezioni ed efficacia vaccinale. Aggiornamento nazionale: 31 maggio 2022	COVID-19: surveillance, impact of infections and vaccine efficacy. National update on 31 May 2022	Italian National Institute of Health	June 2022
Italy	COVID-19 vaccination	Impatto della vaccinazione COVID-19 sul rischio di infezione da SARS-CoV-2 e successivo ricovero e decesso in Italia (27.12.2020 - 29.08.2021)	Impact of COVID-19 vaccination on the risk of SARS-CoV-2 infection and hospitalization and death in Italy (27.12.2020 - 29.08.2021)	Italian National Institute of Health; Ministry of Health	September 2021
Portugal	COVID-19 vaccination	Efetividade e Cobertura Vacinal – Impacto da Vacinação Contra a COVID-19 nas Medidas de Saúde Pública	Vaccination Effectiveness and Coverage - Impact of Vaccination Against COVID-19 on Public Health Measures	Vaccination Technical Commission Against COVID- 19 (CTVC - DGS)	June 2021
Spain	COVID-19 technologies	Piloto Radar COVID. Informe de Conclusiones. Utilizando Ias últimas tecnologías para contener la pandemia COVID-19.	COVID Radar Pilot. Conclusions Report. Using the latest technologies to contain the COVID-19 pandemic.	Government of Spain; Secretary of State for Digitalisation and Artificial Intelligence.	January 2021
Spain	COVID-19 vaccination	Análisis de la efectividad de la vacunación frente a COVID-19 en España: Estudio por el método de screening Estimaciones desde abril de 2021 a febrero de 2022	Analysis of the effectiveness of vaccination against COVID-19 in Spain: A screening method study Estimates from April 2021 to February 2022	COVID-19 Vaccination Effectiveness Working Group (VEWG)	April 2022
Sweden	COVID-19 responses (broadly)	Sverige under pandemin. Volym 1. Smittspridning och smittskydd	Sweden during the pandemic. Volume 1. infection transmission and infection control	The Corona Commission	October, 2021
Sweden	COVID-19 responses (broadly)	Sverige under pandemin, Volym 2. Sjukvård och folkhälsa	Sweden during the pandemic. Volume 2. healthcare and public health	The Corona Commission	October, 2021
Sweden	COVID-19 responses (broadly)	Sverige under pandemin, förutsättningar, vägval och utvärdering	Sweden during the pandemic, preconditions, choices, and evaluation	The Corona Commission	February, 2022

Sweden	COVID-19 and elderly care	Delbetänkande: Äldreomsorgen under pandemin	Elderly care during the pandemic	The Corona Commission	December, 2020
Sweden	Local COVID- 19 responses (broadly)	Godkänt, men med förbehåll – Västra Götalandsregionens hantering av coronapandemin. En utvärdering med fokus på styrning, organisation och ledning.	Approved, but with reservations - Västra Götaland Region's handling of the corona pandemic. An evaluation focusing on governance, organisation and management.	KFI (Municipal Research Institute)	2021

### 5. Evaluations of testing & tracing efforts

Testing & tracing strategies have been key non-pharmaceutical interventions to respond to the COVID-19 pandemic across COVINFORM countries. By confirming positive cases, infectious carriers can be isolated from the community and their recent close contacts can be identified and quarantined, hereby breaking chains of transmission (Ashcroft et al., 2022). The extent to which testing & tracing efforts have been formally evaluated differs between national contexts. In countries where governmentcommissioned evaluations were carried out (see Box 1 in chapter 3), some aspects of testing & tracing strategies were typically covered in these evaluations. Some countries have conducted and published audits or reports specific to testing and tracing strategies, such as the Test, Trace, Protect in Wales: An Overview of Progress to Date by Audit Wales (2021). Other countries have not conducted specific evaluations, but have 'living' strategy documents that have been updated over time to reflect lessons learned, such as the Spanish Strategy for the early detection, surveillance and control of COVID-19 (Ministerio de Sanidad, 2021). Available documents typically have a heavy focus on technical/logistical aspects of testing and tracing, rather than a focus on broader lessons learned and societal considerations. Nonetheless, this chapter aims to provide an overview of a broad array of themes emerging from available evaluations of COVID-19 testing and tracing efforts. The chapter first tackles a number of commonly identified challenges and weaknesses, organized into the subthemes of capacity; compliance; contact tracing apps; (de)centralisation and local expertise; improvisation and agility. The last part of the chapter considers the limited attention to diversification and specific actions for vulnerable across available evaluations of testing and tracing strategies.

#### Capacity

Capacity constraints were a commonly identified challenge in maintaining effective COVID-19 testing and contact tracing. In the face of rapidly increasing case numbers in the various pandemic waves, tracing and testing capacity frequently became overloaded. As a result, considerable delays in confirming infections and tracing contacts were commonplace, increasing transmission of the virus. In Austria, for instance, the exponential increase in the infection rate with the Omicron variant in early 2022 caused the contact tracing infrastructure to collapse. Several of Austria's federal states announced that they did not have sufficient capacity to trace every contact, and their services were only partially functional. Thus, they started prioritizing the contact tracing resources for certain groups such as people working in the critical infrastructure (Der Standard, 2022). Similarly, an audit by Israel's State Comptroller Office entitled Epidemiological investigations for cutting the chains of infection in COVID-19 published in August 2021 concluded that although monthly numbers of tests had increased and the contact tracing capacity had grown substantially since early 2020, waiting times and delays remained commonplace. The German evaluation published in June 2022 noted that as warning of close contacts of infected individuals took an average of 4.2 days, most people were contacted only after they had already been infectious, seriously impacting the effectiveness of contact tracing (BMG, 2022, p. 79). In Spain, testing & tracing efforts were guided by the government document Strategy for the early detection, surveillance and control of COVID-19. Although this document clearly identifies objectives and strategic measures, it did not give indications to the Spanish autonomous regions as to the optimum number of tracers or the number of tests to be carried out. This ambiguity in how to achieve the stated objectives has led to different interpretations in different regions, and contributed to considerable differences in regions' testing agility, with some regions having considerably more resources, infrastructure and capacity for testing and tracing than others (Henríquez et al., 2020).

Despite challenges, it is important to note that capacity for testing and tracing has increased significantly from the beginning of the COVID-19 pandemic. As illustrated in Figure 1, most COVINFORM countries have witnessed a remarkable increase in the number COVID-19 tests in the past two and a half years.

#### Figure 1: Total number COVID-19 tests per 1,000 people in COVINFORM countries (cumulative)



Source: Official sources collated by Our World in Data

OurWorldInData.org/coronavirus · CC BY

#### Compliance

Promoting and ensuring compliance with testing and isolation requirements is another issue that has been identified as a key challenge. A commentary published in The Lancet Europe noted that even when public willingness to comply with health protective behaviours like self-isolation is high, practical feasibility often prevents full adherence. The authors conclude that without sufficient support, self-isolation is not practically and economically feasible for many people (Patel et al., 2021). In the UK, a study investigating adherence to self-isolation and quarantine in North London uncovered a lack of perceived benefit and lack of access to community support as common reasons for non-compliance (Eraso & Hills, 2021). With regards to the latter barrier, the authors recommend the government should focus on locally organised assistance at different levels, including practical and financial needs.

Similar barriers were also highlighted in the *Test, Trace, Protect in Wales: An Overview of Progress to Date* report by Audit Wales. It was noted that in the autumn of 2020, "there was considerable confusion about self-isolation and what support was available, leading to non-compliance with measures to control the spread of COVID-19" (Audit Wales, 2021a, p. 28). In response, a self-isolation helpline was launched in the Cwm Taf Morgannwg region in late 2020. For people on low incomes, the Welsh government made available a £500 payment if they have tested positive for COVID-19 or had been told to self-isolate. Unfortunately, the effects of these responses have not been evaluated. In addition, in Belgium, the Belgian Special Committee evaluation concluded that "the monitoring of compliance with quarantine by travellers, etc. was anything but flawless" (De Kamer, 2021, p. 91). It recommends "taking the necessary measures to monitor compliance with quarantine" as a priority for the future, yet does not elaborate what this should look like in practice, nor how barriers to compliance should be addressed.

#### **Contact tracing apps**

In many countries across the world, governments set their hopes on digital contact tracing (DCT) systems as a helpful tool to expand their contact tracing capability and contain the spread of the virus. Although such DCT systems did not frequently come up in formal evaluations, it has been a topic of heated debate. DCT systems used in COVINFORM countries typically relied on smartphone apps which can keep track of the distance between mobile devices that have that app installed. Using this proximity data, the apps can then infer the risk that COVID-19 is transmitted between two individuals, and alert users to test and isolate (Blasimme et al., 2021). It is difficult to assess how useful contact tracing have been in tackling the pandemic, as there is a lack of scientific analysis and audit of their functioning. However, a recent analysis of EU contact tracing apps by the European Data Journalism Network estimated that on average, the apps only tracked 5% of confirmed COVID-19 cases during

their active period (Merino, 2022). In line with this, the success of COVID-19 apps is viewed rather critically across COVINFORM countries. For example, in September 2021 the Spanish Secretary of State for Digitization had to appear in the Senate to talk about the *COVID Radar* app in response to a parliamentary request to explain "the reasons why it is not obtaining the expected results". Although in her response, the Secretary of State for Digitization describes the app as "a



Figure 2: Radar COVID app (Spain)

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useful tool", she considers a key problem to be that only half of Spain's autonomous regions have decided to use the application (Senado de España, 2021, p. 5). Disappointing number of downloads have been identified as a problem in other countries, too. In Portugal, this has been linked to the government's controversial intention of making the app mandatory, as well as concerns regarding user privacy and data security (Pinto et al., 2021). Although in most countries COVID-19 contact tracing apps have not been subjected to official evaluations, some government-affiliated committees and task forces have offered critique. For example, a report by the bioethics task force of Italian National Institute of Health underlined that in order to ensure social acceptability of contact tracing apps, issues that need to be addressed include proportionality of the information collected, voluntariness of use, anonymity, transparency about impact, data deletion criteria, and free availability of technical and health care assistance (ISS Bioethics COVID-19 Working Group, 2020).

#### (De)centralisation and local expertise

As previously noted, particularly in countries with decentralised health systems where regions or federated entities have substantial autonomy, there were often significant differences in the available capacity and resources for testing and contact tracing. Decentralised approaches were also associated with other challenges, such as inconsistencies in contact tracing data. A 2022 ECDC analysis of COVID-19 contact tracing data highlighted that in Italy and Spain, for example, contact tracing data are collected at regional and local levels and the type of data collection systems varies considerably. In Italy, local healthcare units have far-reaching autonomy in deciding how to manage contact tracing within the requirements set by the regional governments. Although the Italian National Institute of Health offered the regions to use the outbreak investigation tool *Go.Data* to manage contact tracing, use of the tool across local health units has been inconsistent. Similarly, some Spanish regions have adopted *Go.Data*, while others opted to develop their own digital platforms. As a result, in these countries it has been more difficult to use contact tracing data to follow the transmission dynamics of the pandemic and to better understand locations or settings of high transmission. Fragmented data also makes it harder to measure the impact of measures and hereby use data shape decision- and policymaking (Glenngård, 2020).

Another country where a decentralisation approach has led to challenges is Sweden. Responsibility for healthcare services in Sweden lies with the 21 regional councils (Glenngård, 2020), and this resulted in significant regional differences in testing and tracing priorities and strategies. However, regional health directors and infection control physicians indicated that these differences were at least partly the result of unclear and delayed publication of guidelines and manuals by the Swedish Public Health Authority (PHA). A lack of clarity about priorities in the national guidelines led regions to make their own assessments, and the absence of a transparent, long-term strategy for testing and tracing made it difficult for regions to plan for staffing and resource requirements (Coronakommissionen, 2022). Similar issues were identified in the evaluation of the Swiss testing and tracing strategies. Significant differences in testing and tracing activities were observable between cantons, leading to confusing among the population. When new strategies were announced, there was often not sufficient time to prepare personnel and material capacities for the changes at the canton level (Balthasar et al., 2022).

Although evaluations identified decentralisation as being associated with key challenges, it was also sometimes described as having unique strengths. In the case of Wales' *Test, Trace, Protect* (TTP) strategy, for example, the combination of local expertise and national oversight was seen as particularly valuable. Audit Wales concludes:

"The configuration of the TTP system in Wales has a number of strengths, blending national oversight and technical expertise with local and regional ownership of the programme, and the ability to use local intelligence and knowledge to shape responses." (Audit Wales, 2021a, p. 6)

Shared ownership by Public Health Wales (PHW), health boards and local authorities of the TTP process were considered key in ascertaining that local expertise was not lost.

#### **Improvisation & agility**

Despite key difficulties and imperfections, countries typically look back with pride on the speed with which complex testing and tracing systems were set up. In the early stages of the pandemic, rolling out COVID-19 testing and tracing systems resembled "building a plane while flying it", as described in Ireland's Health Service Executive's COVID-19 Testing and Tracing strategy document (HSE, 2020, p. 2). Countries had to simultaneously design, build, and operationalise testing and tracing infrastructures. In the face of constantly changing scientific insights and the emergence of new variants, the rapid scale-up of these systems' activities and exponential increases in capacity is remarkable. Audit Wales points out that "processes have been put in place in a matter of days, which in normal times, would have taken months or years" (Audit Wales, 2021a, p. 33). Indeed, across COVINFORM countries, testing & tracing systems have shown a high capacity for continuous adaptation and evolution. This included recruiting large numbers of staff, repurposing laboratories, setting up IT systems, and expanding the use of antigen tests in addition to RT-PCR testing (Rajan et al., 2022). As the pandemic evolved, priorities in testing & tracing programmes shifted considerably. This was particularly the case in countries where testing became mandatory for some groups of unvaccinated citizens, such as Greece. COVID-19 testing in Greece became gradually mandatory to various professionals and general population groups, such as private and public sector employees, employed to tourism industry or food services, students and teachers (Hellenic Government, 2022).

By summer 2022, the WHO regional office for Europe noted that the main objective of testing and tracing is no longer to attempt to interrupt transmission, but rather to "control impact and mitigate disruption" (WHO, 2022, p. 28). Many COVINFORM countries have revised their testing strategies in the first half of 2022, typically narrowing down indications for testing and focusing on targeted/sustained testing among specific groups such as healthcare workers and clinically vulnerable individuals. In its outlook on "transitioning beyond the acute phase of the COVID-19 pandemic" the ECDC remarked that many countries currently have "lower overall testing volumes", as well as "high numbers of self-test and rapid antigen detection tests" (ECDC, 2022b, p. 4). Nonetheless, maintaining agile testing and tracing systems remains important. Audit Wales notes in its evaluation that "new variants of the virus also present a significant challenge and are increasing the pressure on the TTP programme to remain agile" (Audit Wales, 2021a, p. 11). Similarly, the WHO regional office for Europe encourages Member States "to maintain resources, processes and systems established for COVID-19 contact tracing so that these can be rapidly reactivated when required" (WHO, 2022, p. 29).

#### **Diversification of strategies**

Diversification and specific actions for vulnerable groups is a thematic area that receives relatively limited attention across available evaluations of testing and tracing strategies. For example, in Belgium, the recommendations in the evaluation by the Special Committee focus mostly on the technical and operational aspects of testing and tracing strategies. There is little to no attention to how testing and

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strategies have been perceived and experienced by the public, nor to how strategies can be tailored or diversified for different groups in society. The German "Evaluation of the Legal Foundation and Measures of Pandemic Policies", however, does note that there were fewer tests administered among vulnerable groups such as people living under the poverty line, refugees and other migrants, and homeless/houseless people (BMG, 2022, pp. 96–97). Accordingly, the BMG identified "target-group oriented actions", including easy and affordable testing, as an important learning for the future (BMG, 2022, pp. 98–99), although it does not provide reflections on what such actions should constitute in practice.

In many COVINFORM countries, efforts to adapt or target testing and tracing strategies, as well as efforts to support people in self-isolation, were predominantly led by local-level governments and organisations. This might offer some explanation as to why this topic is not extensively considered in national-level evaluations. Indeed, the Audit Wales evaluation of the TTP strategy notes that "there has been less national oversight of what is needed by way of support for people to self-isolate and an absence of information to know whether those services are effectively influencing public behaviour" (Audit Wales, 2021a, p. 27). The House of Commons, in its 2021 evaluation of the national programme for testing and tracing in England, in fact recommended that there should be more exchange of expertise and lessons learned among stakeholders across different geographical levels and across sectors. Going forward, they encourage the NHS Test and Trace Service (NHST&T) to "review how it engages with and draws expertise from the wider public health establishment and other sectors", including "local government, the schools sector and the hospitality industry" (House of Commons, 2021, p. 7).

# 6. Evaluations of COVID-19 vaccination

Following a lightning-fast quest for COVID-19 vaccines, vaccination campaigns were rolled out from December 2020 onwards. Among COVINFORM partner countries, Israel and the UK were remarkable front runners (see Figure 1) and had a comparatively rapid initial vaccination phase. Countries that took part in the European Commission's strategy of joint vaccine procurement were slower to get started with large-scale vaccination, but largely caught up in terms of vaccination coverage by the end of summer 2021. It is noteworthy that whereas other COVID-19 responses like testing & tracing had to be implemented without much time for planning or deliberation, countries had had some time to prepare for the roll-out of their vaccination campaigns by the time vaccines became widely available. As such, countries arguably had the opportunity to set key targets and agree on clearly delineated responsibilities.



#### Figure 3: Share of people who received at least one dose of COVID-19 vaccine in COVINFORM countries

Since vaccination efforts commenced only later in the pandemic, there has been less time to produce in-depth evaluations of vaccination campaigns. Indeed, some of the evaluations published up until June 2021 cover only the initial phases of the vaccination campaign. And although most countries have (technical) reports available documenting vaccination progress, only a few countries have published evaluations that go beyond reporting quantitative coverage outcomes and evaluate vaccination strategies and processes qualitatively. This chapter tackles several key themes emerging from available evaluations of COVID-19 vaccination campaigns. It considers the success of vaccination campaigns in relation to vaccination coverage targets, and offers comparative reflections on mandatory COVID-19 certification and the key challenge of vaccination hesitancy. Subsequently, it goes into organisational aspects of COVID-19 vaccination campaigns, and the challenges associated with the coordination between stakeholders at different geographical levels. Finally, the chapter compares insights from available evaluations as to how vaccination campaigns were structured and diversified to reach different population groups at different time points and in various ways.

#### **Overall success & coverage targets**

Most available evaluations and technical reports looking back on the COVID-19 vaccination focus heavily on coverage rates as a key measure of success. When looking at coverage alone, it is fair to say that COVID-19 vaccination has been rather successful. By summer 2021, the European Commission announced that its goal of vaccinating 70% of the EU's adult population had been met (EC, 2021). This was considered a significant milestone, which was achieved ahead of the target deadline the EC had set. As illustrated in Figure 2, the share of people vaccinated against COVID-19 by the end of August 2022 differs significantly between COVINFORM countries.





Note: Romania could not be included in this graph due to unavailability of data in the Our World in Data database.

In countries where evaluation documents or other reports explicitly reflect on whether coverage targets for vaccination were met, conclusions were typically positive in this regard. For example, the Belgian public health institute Sciensano concluded in late 2021:

"As of 31 October 2021, Belgium has achieved a full vaccination coverage rate of 86.4% in the population over 18 years of age, making Belgium the 7th EU/EEA country with the highest full vaccination coverage rate in the population over 18 years of age." (Sciensano, 2021, p. 3)

A report by the Auditor General for Wales on the roll-out of the COVID-19 vaccination in Wales published in June 2021 concluded:

"The milestones in the Welsh Government's vaccination strategy have provided a strong impetus to drive the programme. To date, the Welsh Government's milestones have been met." (Audit Wales, 2021b, p. 4)

Similarly, England's National Audit Office (NAO) remarked that COVID-19 vaccination uptake had exceeded expectations, and "has been higher than for previous flu vaccination programmes" (NAO, 2022, p. 6).

#### **Mandatory COVID-19 certification**

Even though many countries were satisfied with their vaccination coverage, by winter 2021 it turned out it was not sufficient, as COVID-19 case rates increased once again. Especially since vaccination uptake was not equally spread across the population (e.g., in terms of socio-economic class, age, gender). In order to improve COVID-19 coverage rates, several COVINFORM countries have introduced mandatory COVID-19 certification, requiring an individual to either be vaccinated, show proof of a negative test (usually in the past 48 hours), or recovery certificate demonstrating recent natural infection (Mills & Rüttenauer, 2022). The exact impact of these measures is hard to assess, particularly because such regulations were implemented in combination with hygiene and social distancing rules, meaning causality cannot be directly inferred (Oliu-Barton et al., 2022). Nonetheless, some available evaluations reflect upon the effectiveness of their mandatory COVID-19 certification rules. In Germany, for example, the controversial "2G/2G+/3G" regulations were implemented, which meant that only vaccinated, recovered, and/or tested persons could get access to restaurants, events, or other services. The German "Evaluation of the Legal Foundation and Measures of Pandemic Policies" discusses how it is challenging to measure the impact of these regulations, and acknowledges the mixed evidence base on this matter. Notably, the evaluation also reflects on how "compulsory vaccination and immunity certificates can be counterproductive for psychological reasons, as this can significantly reduce motivation to get vaccinated" (BMG, 2022, p. 78). In light of this, as well as in the face of the Omikron variant which is highly contagious even among vaccinated individuals, the BMG recommends "testing regardless of vaccination status" as a priority for the future (BMG, 2022, p. 78).

Other countries, such as Austria, went beyond the German measures and implemented a general vaccine mandate. Although there is no formal evaluation available of the Austrian vaccination strategy, it is worth noting that the COVID-19 vaccine mandate caused considerable polarization in Austrian society. A cross-sectional survey with a sample of 1,543 unvaccinated Austrian residents in October 2021 explored the underlying motivations of vaccine hesitancy, and found that the vaccine mandate was not likely to motivate the remaining group of unvaccinated people to change their opinion (Stamm et al., 2022).

#### **Vaccination hesitancy**

Across available evaluations of COVID-19 vaccination campaigns, vaccination hesitancy was indeed seen as a key challenge. Accordingly, some available evaluation documents emphasised efforts to improve trust in the vaccination campaign as a key priority for the future. For example, the 2021 report of the Auditor General for Wales highlights the need for continued effort to ensure accessibility and improve confidence in the Welsh programme:

"Health boards are continually assessing and adapting vaccination models to ensure they are accessible to all and working in partnership with other agencies to understand the reasons for vaccine hesitancy and to put actions in place. This has included some positive actions being taken to engage community leaders in particular ethnic communities, and members of the travelling community. Health boards and partners need to maintain this focus to build trusted relationships and improve the confidence in the vaccine programme. (Audit Wales, 2021b, p. 22)

The report by England's National Audit Office (NAO) also addresses vaccination hesitancy in considerable detail. In their evaluation of the rollout of the COVID-19 vaccination programme in England, the NAO provides a structured overview of "available information on uptake and hesitancy" for different population groups, and discusses potential challenges these groups may face (NAO, 2022, pp. 63–64).

Although in most countries formal evaluations either have not (yet) been published or available evaluations do not consider vaccination hesitancy in similar depth, it has certainly been a relevant topic across COVINFORM countries. The prevalence of vaccine hesitancy is rather heterogeneous, yet concerns about "genetic modification" introduced by mRNA vaccines or blood clot incidents associated with the AstraZeneca vaccine played a role in all countries (Steinert et al., 2022).

#### **Organisation & coordination**

As noted in previous chapters, organisational aspects of the management of COVID-19 responses are typically a core focus of evaluations. Naturally, the roles of different governmental stakeholders in countries' COVID-19 vaccination campaigns should be seen in light of the pre-COVID organisational structure of their health system. In countries with highly decentralised health systems - e.g. Austria, Germany, Italy, Spain and Switzerland – lower levels of government typically carry most of the responsibility. However, despite health system differences, it seems COVID-19 vaccination was more of a centralised effort than testing & tracing was. For example, even in Spain and Italy, which both have highly decentralised health care systems and where testing & tracing was organised at the regional level, the vaccination program was the result of a joint effort between the central governments, the medical government agencies and the National Research Institutes (Antonini et al., 2022). Such joint efforts were seldom free of disagreements. For example, in Italy, some regional-level prioritisation decisions were not in line with the central government guidance on priority groups for vaccination. In response, the Italian Commissioner for the COVID-19 Emergency adopted an ordinance requiring all regions to adjust their regional plans to follow the national strategy (Governo, 2021). In Spain, the intergovernmental coordination between the Ministry of Health and the Autonomous Communities to manage the health crisis (including but not limited to the vaccination campaign) was carried out through the Interterritorial Council of the National Health System (CISNS). The powers of the CISNS for the health management of the pandemic were not without controversy, due to political disagreements between the national Government and some Autonomous Communities over the binding nature of the CISNS decisions and its legal capacity (De la Quadra-Salcedo Janini, 2021).

Nonetheless, it seems collaborations between different governance levels posed fewer challenges in the COVID-19 vaccination campaigns than in other COVID-19 responses. Indeed, Belgium's Task Force for vaccination concluded in March 2022:

"Despite a complex intervention with a complicated state structure, it is important that every level, regardless of who has the final say, continues to speak to each other. This went quite well in the Vaccination Strategy." (Task Force Vaccinatie, 2022, p. 65)

Similarly, England's National Audit Office (NAO) considers the "balance between central commandand-control and wider empowerment" a key strength of the COVID-19 vaccination campaign. The NAO also points out that this was facilitated by "great clarity of purpose and priorities from the start of the vaccination rollout" (NAO, 2022, p. 10). Although COVID-19 vaccination campaigns were certainly rolled out under considerable time pressure, there was more time for planning and delineation of responsibilities than was the case in earlier COVID-19 responses.

To further streamline the organisation of other potential emergency vaccination programmes in the future, some evaluations point out the need for additional planning and a clearer legislative basis. For instance, Belgium's Task Force for vaccination pointed out:

"Initially, there was no legal framework tailored to this type of vaccination campaign, so one had to fall back on existing 'non-adapted' legislation. As a result, often cumbersome procedures had to be repeated with each new step in priority vaccination. Therefore, a thorough reflection on a sustainable, GDPR-compliant integrated approach in a high-performance legal framework is a task with the highest priority." (Task Force Vaccinatie, 2022, pp. 65–66)

Similarly, in Austria, the pandemic preparedness legislation charged the health insurance institutions with the central management of the distribution of vaccinations in the case of an Influenza pandemic. After the emergence of the COVID-19 pandemic, there was no legal clarification on how to proceed in the event of a pandemic caused by a different pathogen, such as SARS-CoV-2 (Austrian Court of Auditors, 2022, p. 10).

#### **Diversification of strategies**

Across COVINFORM countries, COVID-19 vaccination campaigns were structured and diversified to reach different population groups at different time points and in various ways. Faced with limited vaccine supply in the earlier phases of countries' vaccination campaigns, the initial roll-out occurred following vaccination priority criteria. In some countries this prioritisation was mostly based on age, whereas other countries first focused their attention on groups like frontline health workers and care home residents. Although age was a common criterion to use, it was operationalised in different ways – for example, Israel used an initial cut-off point of 60 years and over, whereas many countries focused their attention first on the 'oldest old' (e.g. 80+), before moving incrementally to younger age groups (Cylus et al., 2021). In the available evaluations that consider this prioritisation process, definitions of priority groups are typically considered to have functioned as useful guidance to structure the vaccination campaign. However, identifying which people belonged to a priority group was not always straightforward. For example, the Audit Wales report describes how the lack of a centrally maintained population dataset made it challenging to identify individuals belonging to some priority groups:

"We have observed extensive national-level discussion to respond to the challenges of identifying relevant population datasets. This included identifying all those aged 16-64 years clinically at risk where definitions of clinical conditions have needed to be clarified, and information about individuals is contained on different systems. There have also been challenges identifying unpaid carers who have previously not been recorded on any system.

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This indicates some of the difficulty in using a complex vaccination prioritisation model in the environment where no single centrally maintained population dataset exists for this purpose." (Audit Wales, 2021b, p. 15)

The Swiss evaluation committee found that even for patients themselves, it was not always clear whether they belonged to a specific priority group for vaccination. Indeed, implementing the "risk-based prioritisation of the order for registration" was far from straightforward, as "the risk criteria are very detailed and for many patients very difficult to understand" (Balthasar et al., 2022, p. 45).

Evaluation and strategy documents show that there has been considerable attention to the need to adapt and diversify strategies to make vaccination accessible and acceptable for different groups in society, probably more so than in earlier COVID-19 responses. Particularly when initial scarcity concerns subsided and sufficient vaccines became available for the entire population, more resources went into targeting specific groups. For instance, in Greece, Mobile Health Units were used to lower barriers to access for like residents of nursing homes, inmates in detention centres and immigrants, refugees and asylum seekers in Reception and Identification Centers (Georgiopoulou, 2021). ). A special provision was also taken to provide uninsured residents like refugees, immigrants, homeless persons and Roma with a temporary Social Security Registration Number (AMKA) exclusively for the COVID-19 vaccination (Hellenic Government, 2021). In England, various outreach approaches like walk-in and pop-up clinics in various locations were used to target specific groups such as homeless people (NAO, 2022, p. 63). Many other countries implemented similar strategies to lower administrative and physical barriers to COVID-19 vaccination.

In its reflections on "key learning points with regards to selecting individuals for priority vaccination", the Belgian Task Force for Vaccination pointed out that although accessibility "in terms of distance, time, cost, and administrative procedures" is certainly a requirement for effective vaccination, "acceptability (perception of need and perceived risks of the disease/vaccine); and trust in the vaccine, in vaccinators and in the healthcare system" are also key (Task Force Vaccinatie, 2022, p. 69). With regards to the right geographical level to address these barriers, the Belgian Task Force concluded that the regional level "appears to form a sufficient 'critical mass' to efficiently set up large-scale campaigns, and at the same time offers sufficient connection with the local actors (health care professions, care organizations, etc.) to flexibly respond to local differences and needs". At the local level, the Task Force observed that "bottom-up and neighborhood-oriented services" were key to maximise relationships of trust, and that "it is important to encourage multidisciplinary cooperation between local GPs, nurses, GP pharmacists and other involved care providers (e.g. social workers, community health workers) for outreach to vulnerable groups" (Task Force Vaccinatie, 2022, p. 70). In Sweden, municipalities tried to promote acceptability and trust of COVID-19 vaccines among ethnic minorities through "vaccination guides", which were mainly persons that speak at least one minority language fluently and that live or in other ways are rooted in migrant neighbourhoods. These individuals disseminated multilingual information about the vaccine, and aimed to promote open dialogue with residents. These efforts have been evaluated positively, as vaccination rates increased in the targeted areas after the intervention by vaccination guides (Axelsson, 2022).

Despite efforts to adapt and target COVID-19 vaccination strategies to specific groups, vaccination uptake remains heterogeneous. Across partner countries, vaccination data are typically disaggregated by age, sex, and geographical area. For example, the Belgian public health institute Sciensano concluded in late 2021 that "there is a positive gradient in vaccination coverage as a function of age,

ranging from 71.7% in 12-17 year olds to over 90% in people aged 55 and over" (Sciensano, 2021, p. 3). With regards to regional differences in vaccination coverage in Belgium, Sciensano also notes:

"In the Flemish Region, vaccination coverage is higher for each age group than in the Brussels Region, in the Walloon Region and in the municipalities of the German-speaking Community. This trend is not a new phenomenon, nor is it specific to the COVID-19 vaccine. Cultural and socio-economic factors certainly play a role in this." (Sciensano, 2021, p. 41)

Other COVINFORM countries have reported on similar trends in age and geographical differences. However, with the notable exception of the UK, most countries' COVID-19 data is not disaggregated along ethnic or racial lines. In England, lower vaccination rates were observed among "particular ethnic minority groups, being lowest among adults of Chinese origin (48%), Black Caribbean origin (49%) and Black Other origin (49%), compared with 76% for all ethnic origins" (NAO, 2022, p. 7). As such, continuing to address persistent inequalities remains a priority.

### 7. Conclusions

In summary, this deliverable provides a cross-country synthesis of **pandemic preparedness plans** and **evaluations** of specific COVID-19 public health responses. The report analyses the extent to which lessons learned about best practices and missed opportunities have been documented in formal evaluations and other relevant documents. In line with the COVINFORM project's focus, the analysis pays particular attention to how COVID-19 responses have been adapted or diversified to meet the needs of groups in society that have been disproportionately impacted by the crisis.

#### Pandemic preparedness planning

Apart from Cyprus, all countries under study had a publicly available pandemic preparedness plan prior to the outbreak of the COVID-19 pandemic. However, there is considerable variation in the scope and approach of the plans. The majority of COVINFORM countries published one or several updates of their plans following their publication, but four countries (Austria, Belgium, Portugal, and Romania) never updated their plans.

Our comparison of countries' pandemic preparedness plans highlighted that many plans lacked specificity with regards to the need to tailor pandemic responses to different groups in society. When plans mentioned the disproportionate impact a potential pandemic would likely have on specific groups, they often focused on medical vulnerability. There was limited focus on other types of vulnerable groups, such as people of low socio-economic status, migrants, homeless people, and people living with disability. Although some plans discuss the need for communication strategies to be adapted to reach specific groups of people, target populations and specific communication action plans were typically poorly defined. Some pandemic preparedness plans included a description of how evaluations of the pandemic preparedness and management of the pandemic should be carried out. Yet in most cases, plans point out the importance of an evaluation, but do not offer a concrete methodology or plan for such evaluations.

More than two years into the COVID-19 crisis, important lessons have been learned regarding the strengths and weaknesses of pre-existing national pandemic preparedness structures. The general consensus arising from available evaluations is that pre-existing pandemic preparedness structures

were not adequate to manage the global shock posed by the COVID-19 pandemic. Responsibilities were not clearly defined, insufficient resources and other structural factors hampered implementation of the actions outlined in national plans, and the plans were not sufficiently relevant for the specific context of a pandemic coronavirus. In addition, pandemic preparedness plans were typically not designed for the broad and long-term impact posed by the pandemic.

Many countries are planning or carrying out changes to their pandemic preparedness structure based on the lessons learned during the COVID-19 pandemic. At a national level, changes to pandemic preparedness structures typically involve alteration of the division of responsibility for emergency preparedness. Other common suggestions for the future include an increased focus on capability development, simulations, and promoting institutional memory.

#### **Testing & tracing**

Our cross-country comparison of available evaluations also found that the extent to which testing & tracing efforts have been formally evaluated differs between national contexts. In countries where government-commissioned evaluations were carried out, some aspects of testing & tracing strategies were typically covered in these evaluations. Some countries have conducted and published audits or reports specific to testing and tracing strategies, while other countries have not conducted specific evaluations but may have 'living' strategy documents that have been updated over time to reflect lessons learned. Available documents typically have a heavy focus on technical/logistical aspects of testing and tracing, rather than a focus on broader lessons learned and societal considerations. Common challenges and lessons learned identified across documents related to capacity; compliance; contact tracing apps; (de)centralisation and local expertise; improvisation and agility. Despite challenges, countries typically look back with pride on the speed with which they "built a plane while flying it" – countries had to simultaneously design, build, and operationalise complex testing and tracing infrastructures, and did so at remarkable speed.

Diversification and specific actions for vulnerable groups received limited attention across available evaluations of testing and tracing strategies. However, a key lesson learned across COVINFORM countries is the importance of the combination of national oversight and local expertise. Efforts to adapt or target testing and tracing strategies, as well as efforts to support people in self-isolation, were predominantly led by local-level governments and organisations. Some evaluations recommend boosting exchange of expertise and lessons learned among stakeholders across different geographical levels and across sectors as a priority for the future.

#### Vaccination

Finally, our cross-country analysis also considered evaluations of COVID-19 vaccination campaigns. Since vaccination efforts commenced only later in the pandemic, there has been less time to produce in-depth evaluations of vaccination campaigns. Although most countries have (technical) reports available documenting vaccination progress, only a few countries have published evaluations that go beyond reporting quantitative coverage outcomes and evaluate vaccination strategies and processes qualitatively. Nonetheless, our analysis highlighted important themes in available evaluations, including mandatory COVID-19 certification; vaccination hesitancy; and coordination between stakeholders at different geographical levels. Interestingly, collaborations between different governance levels seem to have posed fewer challenges in the COVID-19 vaccination campaigns than in other COVID-19 responses, although additional planning and a clearer legislative basis are

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considered necessary to further streamline the organisation of other potential emergency vaccination programmes in the future.

Our analysis also considered how vaccination campaigns were structured and diversified to reach different population groups at different time points and in various ways. Particularly when initial scarcity concerns subsided and sufficient vaccines became available for the entire population, more resources went into targeting specific groups. Available evaluations and strategy documents highlight the need to prioritise not just **accessibility** of vaccination (in terms of distance, time, cost, and administrative barriers), but also **acceptability** (perceptions of need, relevance and risks) and **trust** in the vaccine and the wider healthcare system. Finally, our analysis showed that despite efforts to adapt and target COVID-19 vaccination strategies to specific groups, vaccination uptake remains heterogeneous. Continuous efforts to address these inequities are required.

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