Health systems resilience during COVID-19

Lessons for building back better

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World Health Organization
REGIONAL OFFICE FOR **Europe**

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Foreword from the WHO Regional Director for Europe

In March 2020, very early on in the COVID-19 pandemic, I realized that health authorities were taking unprecedented transformative actions within health systems in Europe as they sought to respond to a raging and devastating epidemiological, economic and social phenomenon.

I approached our colleagues at the European Observatory on Health Systems and Policies to establish a system to document the health system responses live as they were unfolding. Within days the Health System Response Monitor (HSRM) was launched. I am truly grateful to all those who took the time to document and collate this rich practice. As a result of these efforts, we are now equipped with crucial information that helps us to take stock of the policies implemented and examine how these have facilitated and supported resilient responses across the Region.

This volume brings together a solid review of the evidence analyzed through the lens of the health system functions and examines how actions have contributed to strengthening health system responses.

It is now time to harness the evidence from these lessons and look forward. In this regard, this work complements the findings of the Pan-European Commission on Health and Sustainable Development which has issued its report 'Drawing Light from the Pandemic' with an accompanying robust evidence review. The Commission, ably chaired by Professor Mario Monti, made a strong recommendation for investment in strong, resilient and inclusive health systems as one of the key objectives to protect us from future health threats and to make progress in health and sustainable development across the pan-European region.

In reading through this comprehensive volume, one is struck by three key observations. Firstly, the importance of strong political and public health leadership working in a synchronized fashion that ensures that all actions taken across health system pillars are based on science. Secondly, the fact that we need to go beyond our comfort zone, break down silos and work across sectors. Thirdly, that we cannot talk of building resilience unless we pay attention to equity; to leave no one behind.

These important observations echo the overarching objectives that I set out in the European Programme of Work – 'United Action for Better Health'. This document is our roadmap for the coming years as we seek to support Member States across the European Region, not only to bounce back and recover but to anticipate future threats and transform their health systems. Strengthening resilience is a pre-requisite for improving health security which requires us to take a wider view and focus on improving universal health coverage and enhancing the health and well-being of our populations.

I am delighted with the outcome of this work, and confident that it will be a foundation for our work at the WHO Regional Office for Europe as we turn our focus now to supporting countries in getting back on track to achieve health-related Sustainable Development Goals through the European Programme of Work, 2021–2025.

Dr Hans Henri P. Kluge

Regional Director
WHO Regional Office for Europe

Foreword from the European Commission

In October 2019, a few months before the emergence of SARS-CoV-2, the Council of the European Union formally acknowledged that wellbeing and economic policies are not exclusive but rather interlinked. The wellbeing of citizens is a prerequisite for economic growth and for social and economic stability, whilst economic stability and growth in turn set the stage to improve population wellbeing. The Council Conclusions thus called on Member States and the Commission to include a cross-sectoral Economy of Wellbeing perspective in national and EU-level policies, placing people and their wellbeing at the centre of policy design. Crucially, the document underlined in this context the importance of access for all to health services, including mental health, long-term care, health promotion and disease prevention, and the need to address health inequalities and to invest in health security to ensure effective and timely prevention, detection and response to health threats.

Economic growth is not an end in itself, as the Commission's Annual Sustainable Growth Strategy 2020 emphasises. Economies must work for the people and the planet in order to ensure lasting prosperity for the future.

The pandemic has put this train of thought to the test. Although initially many COVID-19 response plans were framed in terms of a choice between saving lives and saving livelihoods, the error of this thinking was soon empirically proved and widely accepted. Any attempts to prioritize the economy without getting the virus under control proved to be a futile undertaking. The pandemic has reignited the debate as to what kind of economic growth we want and what matters for our wellbeing, including how to conceptualise and measure it beyond the narrow metric of per capita GDP.

While EU citizens are, on the whole, more educated, wealthier, and healthier than before, the COVID-19 crisis has exposed many structural weaknesses and vulnerabilities of national health care systems. It also pinpointed many capacities and innovative solutions, such as a fast-track introduction of digital and tele-medicine tools and transformations of health care delivery pathways.

Tools such as the COVID-19 Health System Response Monitor (HSRM) platform, a major initiative led by the European Observatory on Health Systems and Policies, the WHO Regional Office for Europe and the European Commission, have been particularly helpful in collecting evidence for cross-country learning during this pandemic.

This book builds on the HSRM and reviews national health system responses to COVID-19 across the EU and beyond. It focuses on their resourcefulness and ability to absorb, adapt and transform themselves in the face of shock so that health services can continue to function as expected, ensuring financing, resource generation and service delivery to meet new, as well as existing, needs. This has been unevenly achieved across countries, reflecting the shortcomings of health system governance and national capacities and contexts.

EU initiatives to support Member States during the pandemic make up an important place in this book. The Early Warning and Response System, the Health Security Committee and the Integrated Political Crisis Response System were activated from the outset of the pandemic, with others, such as the Emergency Support Instrument, triggered in subsequent months. New initiatives with a longer term perspective were proposed under the European Health Union and with the creation of the Health Emergency Preparedness and Response Authority (HERA). The Recovery and Resilience Facility offers large-scale financial support to Member States for investment and reforms aimed at mitigating the economic and social impact of

the coronavirus pandemic and making European economies and societies more sustainable, resilient and better prepared for future challenges and opportunities. Finally, EU-level action reminded us all of the power of solidarity in the face of crises. The EU Vaccine Strategy enabled all EU countries to get timely access to the same vaccines under the same conditions and at the same time, from Uppsala to Limassol.

Since 2020, a sustainable post-pandemic recovery has been at the core of subsequent EU Presidencies. Their subsequent mottos – *A strong Europe in a world of challenges* (Croatian Presidency), *Together for Europe's recovery* (German), *Time to deliver: a fair, green and digital recovery* (Portuguese), *Together. Resilient. Europe* (Slovene) – and the key words ("recovery, power, belonging") on which France will found theirs, show that Member States are determined to rebuild a more equitable, sustainable and stronger Europe, one that can address future adversities and ensure that its citizens, united in their diversity and adversity, can also be united in prosperity and wellbeing.

Sandra Gallina,
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Foreword from the editors

This volume recounts the numerous measures that our health systems have employed over the past almost two years to respond resiliently to the COVID-19 pandemic. This is a tale of hope, showing the resourcefulness and ingenuity of our health systems, which have marshalled the necessary financial, physical and human resources to enable dual delivery of COVID and non-COVID services. It highlights the immense dedication of our health and care workers and the strength of our communities. It is also a tale of despair, laying bare the chronic underinvestment in health systems, manifested in health coverage gaps, workforce shortages, flawed health information systems, and many other weaknesses. This volume also attests to the deficiencies in health governance at the national and international levels. These deficiencies, individually and collectively, have undermined the resilience of health systems, preventing the often limited existing capacity to be mobilized to develop an effective response.

Above all, the COVID-19 pandemic has highlighted the critical role of governance, not only for ensuring that financing, resource generation and service delivery operate as intended but also in harmony with each other – as a system. More broadly, governance offers an effective basis for optimal decisions – this also applies to working across health and other sectors and across national borders, within the EU or as part of the global response led by the WHO.

The concluding lessons of this volume draw on evidence from the experiences of national responses to the pandemic to understand what is needed to strengthen resilience to future shocks in the spirit of building back better. They call for political will to prioritize health and invest in strong and well-governed health systems, including high quality, internationally connected surveillance and monitoring, strong public health and primary health care, well-supported workforces, and appropriate use of innovative solutions such as digital health. They also recognize the necessity of having strong social safety nets and policies that leave no one behind – these things must not be neglected in post-pandemic recovery plans. These lessons are not new but for too long have not been acted upon. This book calls on decision makers to learn from them and take action so that they never again fail to protect our health on the scale that occurred during this pandemic.

The Editors

Acknowledgements

Figures, tables, and boxes

Boxes

List of abbreviations

ASEAN Association of Southeast Asian Nations

CDC Centers for Disease Control

CECC Central Epidemic Command Centre

CEPI Coalition for Epidemic Preparedness Innovations

COVAX COVID-19 Vaccines Global Access

CRII Coronavirus Response Investment Initiatives

ECDC European Centre for Disease Prevention and Control

EMA European Medicines Agency

EMRN EU Medicines Regulatory Network

EU European Union

EUDCC EU's Digital COVID Certificate

EWRS Early Warning and Response System

FAO Food and Agriculture Organization

FFS Fee-for-service

FTTIS Find, Test, Trace, Isolate and Support

GAVI Gavi, the Vaccine Alliance

GDP Gross domestic product

GHSI Global Health Security Index

HERA Health Emergency Preparedness and Response Agency

HSPA Health system performance assessment

HSRM Health System Response Monitor

HTA Health technology assessment

HTR Hard-to-reach

ICU Intensive care unit

IHR International Health Regulations

ILO International Labour Organization

IMF International Monetary Fund

IPPPR Independent Panel for Pandemic Preparedness and Response

IT Information technology

JPA Joint Procurement Agreement

KCDC Korean Centers for Disease Control

KDCA Korean Disease Control and Prevention Agency

MCAG Medicines Criticality Assessment Group

MERS Middle East respiratory syndrome

MHRA Medicines and Healthcare Products Regulatory Agency

OECD Organisation for Economic Co-operation and Development

OHEJP One Health European Joint Programme

OIE World Organisation for Animal Health

PHC Primary health care

PHEIC Public Health Emergency of International Concern

PPE Personal protective equipment

PRR Populist radical right

RCCE Risk Communication and Community Engagement

SARS Severe acute respiratory syndrome

TAG Technical Advisory Group

UCPM European Union Civil Protection Mechanism

UN United Nations

UNEP United Nations Environment Programme

WEF World Economic Forum

WHO World Health Organization

Executive summary

COVID-19 has created huge challenges. The lessons it has generated on preparing for future pandemics are clear but they are by no means the only learning. All health systems are vulnerable and there are practical steps that all countries can take, not simply to increase the resources available, but to ensure the capacity to mobilize, adapt and use those resources in different shock scenarios. The *Health systems resilience during COVID-19: Lessons for building back better* study gathers the evidence of how countries have managed (or not managed) to re-engineer what they do, who does what and how, and draws out the implications for future resilience.

The study understands resilience as the ability of the health system to prepare for, manage and learn from a sudden and extreme disturbance. It is about maintaining the performance of core heath system functions. While the focus here is on responding to shock, it is increasingly evident that the ability to transform and evolve will also be critical in meeting long-term structural challenges to health systems.

The evidence the study assembles is rooted in what has happened and what policy makers need to know for the future. It builds on the core health system functions of governance, financing, resource generation and service delivery and organizes its findings around a set of strategies that policy makers can use to strengthen the resilience of their health systems. These strategies and corresponding examples largely draw on the Health System Response Monitor (HSRM), a joint initiative of the European Observatory on Health Systems and Policies, the WHO Regional Office for Europe, and the European Commission, and benefit from the timeliness and accuracy of the content it collected. The examples used to illustrate each strategy offer ways to achieve the strategic objective but are by no means exhaustive.

The different strategies described in this volume do not sit and should not be viewed in isolation from each other – they are complementary and linked, highlighting the interdependency of the health system functions. Each strategy works best when developed in light of the interactions with other health system elements and of national context. It is essential that these interactions are effective if health system functions are to operate in harmony with each other, as a system.

What have we learned from the COVID-19 responses?

Leading and governing the COVID-19 response

Leading and governing the COVID-19 response is central to aligning these elements. It is perhaps the most complex area to unpack, not least because there is no universally agreed concept of health system governance, but also because of its enabling role for all the other health system functions and the various linkages and feedback loops this creates. Further, much of how a pandemic is managed falls outside the control of the health system itself and yet the health system and public health leadership(s) have to find ways to interface with other systems and the wider political context. At the same time, governance supports political leadership to enable the effective mobilization of resources both within and beyond the health system to facilitate an effective national and international response.

Strategy 1

Steering the response through effective political leadership is dependent (amongst other things) on the governance setup and the wider political context and leadership styles. The leaders of health systems have to build a relationship with their non-health counterparts that are context appropriate and utilize the tools they have to influence policy. They also have to take responsibility for steering how health systems are governed. Steps to support effective leadership include:

- Promoting responsiveness, resourcefulness and the capacity to learn in leaders and organizations, including by intelligent use of health data [Strategy 3].

- Assessing the strengths and vulnerabilities of the wider political system and, specifically, mapping the way it uses incentives, allocates resources, distributes powers and regulates their use.

- Framing communication with and across government in light of how the system works [Strategy 7].

- Encouraging consensus-building efforts like cross-parliamentary committees.

- Fostering good governance including transparency, accountability, participation, integrity and policy capacity.

Strategy 2

Delivering a clear and timely COVID-19 response strategy is critical. The strategy needs to be coherent, recognizing the perceived trade-offs between health and the economy and address implementation. Country experience demonstrates the value of:

- Established mechanisms to set up and update emergency response plans.

- Having the facility (at national level) to introduce emergency legislation.

- Setting time limits to emergency powers and/or systematically reviewing civil liberties challenges.

- Appropriate tools and defined pathways which consider proposed policy interventions in light of the national context, societal and stakeholder interests, and make the policy outcomes "acceptable" and implementable.

- A tradition of formal consultation with science and knowledge-brokering expertise to bridge the science policy gap [Strategy 4].

- Transparent communication particularly when explaining a change in direction [Strategy 7].

Strategy 3

Strengthening monitoring, surveillance and early warning systems clearly falls within the remit of the health system but has huge impact in the wider arena and in terms of delivering an effective response strategy [Strategy 2] and accountability [Strategy 6]. COVID-19 exposed weaknesses at the national, EU, and multilateral level that need to be tackled. Measures that will help include:

- Developing strong disease surveillance and monitoring systems.

- Monitoring provision of essential services and access and 'following' vulnerable groups (including by ethnicity and underlying conditions).

- Exploiting digital health tools and coordinating mechanisms to support surveillance and monitoring.

- Boosting the 'one health' approach and sharing data and expertise across sectors and nationally, regionally and globally.

- Expanding the EU's capacity to respond to future cross-border threats and WHO's health systems surveillance powers and response capacity.

Strategy 4

Transferring the best available evidence from research to policy means making sure the science generated by academia can be used by decision makers working under pressure. Some countries had formal mechanisms to broker knowledge, others did not. There is a demonstrable advantage in:

- Facilitating open access to research.

- Signalling the limits of confidence in new research and acknowledging where it proves to be inaccurate.

- Establishing formal (consultation, expert panel, advisory) mechanisms to enable experts to feed into policy.

- Multidisciplinary working with key disciplines (epidemiology, clinical, social care) and population groups (women, minority ethnic groups).

- Making national public health agencies (and their population health perspective) central in assessing the situation and in advising on which strategies to implement.

- Paying careful attention to the transparency, objectivity and independence of expert advice.

- Using intermediaries to help connect research and policy whether:

  ○ independent knowledge-brokers like the European Observatory on Health Systems and Policies;

  ○ international bodies like WHO and the EU; or from

  ○ civil society.

Strategy 5

Coordinating effectively within (horizontally) and across (vertically) levels of government is important whether government is centralized or decentralized. The pandemic showed clearly that both models have merits at particular points in a crisis. In practice:

- Centralization of power can enhance efficiency in a crisis, but more decentralized approaches have the advantage of being territorially sensitive.

- Coordination is key in ensuring equity and policy coherence.

- Horizontal coordination is supported by mechanisms from emergency committees to inter-agency groups and may be easier to achieve where there are established traditions of liaison.

- Vertical coordination can be undermined by competition over power and the regional and local governments' distinct agendas; it can be facilitated by established formal and

informal ways to manage these competing perspectives.

- Clarity on roles and allowing that these roles can change over time support both horizontal and vertical coordination.

- Aligning decision making authority with implementation responsibilities is also key.

Strategy 6

Ensuring transparency, legitimacy and accountability is essential to protecting systems from abuse and in signaling that the system can be trusted. There is, however, a tension between acting fast in response to an emergency and observing normal due processes, which may promote transparency and minimize the risk of abuse. The experience of the pandemic suggests that:

- Relaxing procurement procedures to allow urgent action opens a system to corruption. However, risks can be mitigated by ensuring procurement changes are transparent and by reviewing practice.

- External oversight is important particularly where emergency legislation restrict civil liberties, and can be achieved in a number of ways including by:

  ○ publishing details of response measures and performance indicators;

  ○ sustaining or setting up parliamentary scrutiny;

  ○ establishing dedicated committees or using (innovative) online tools to monitor responses;

  ○ having judicial and civil society initiatives act as scrutineers; and

  ○ encouraging transparency and anti-corruption organizations and protecting 'whistle-blowers'.

Strategy 7

Communicating clearly and transparently with the population and stakeholders is essential in sharing public health messages and explaining requirements. It also creates trust which in turn promotes compliance. Countries have found that:

- Well-presented data and participatory approaches to data sharing can have a high impact but often are not prioritized.

- Using a variety of channels (broadcast, print press) increases the reach of public health messages, while social media accesses harder-to-reach audiences.

- Targeting specific population groups (the young, the vulnerable, those who don't speak the country's official language) with tailored campaigns is effective in a way that one-size-fits-all messages are not.

- Multiple channels and messages can create inconsistency and confusion; coordinating communication across channels and actors through a national communication strategy ensures consistency but is not easy to achieve.

- There is a huge challenge from (an "infodemic" of) misinformation particularly on social media and a corresponding need to fact check and moderate.

Strategy 8

Involving non-governmental stakeholders including the health workforce, civil society and communities strengthens emergency responses. Countries have increased roles for a mix of 'non-state actors' over the course of the pandemic and used them in different settings. Their experience suggests that:

- Professional bodies and medical associations support mobilization of resources and transmission of key information such as clinical evidence.

- Engaging with non-state actors helps policy makers to formulate appropriate and acceptable responses.

- Involving civil society in information sharing and in providing services like testing, taps into the trust they have established and boosts capacity.

- Participation also develops trust, helps reach marginalized populations and increases uptake of public health measures.

- The private sector can usefully contribute to multi-stakeholder approaches to resource mobilization.

- Consulting unions and employers helps improve the design of government support packages.

- Pre-existing structures and tools and new coordinating structures support the alignment of non-state actor efforts.

Strategy 9

Coordinating the COVID-19 response beyond national borders is critical to long-term success against the pandemic. At the outset there were tensions between the international perspective and a 'home nation first' position, some of which persist, but solidarity has strengthened with time. It is observable that:

- Countries who had prior, direct experience of similar pandemics responded more effectively and have lessons to share.

- The pooling of scientific expertise and knowledge sharing confers real advantage.

- Commitments to international cooperation do not automatically translate into willingness to coordinate health emergency responses although over time there was more support for cross-country initiatives.

- Cross country collaboration is nonetheless worthwhile both in terms of preparedness and response (capacity sharing, joint procurement).

- There is scope to strengthen international preparedness for future threats whether through EU level action or by enhancing the role of WHO in global health governance.

- The European Commission has already made a series of proposals to strengthen the EU's capacity to respond under the general framework of the European Health Union, while the Pan-European Commission on Health and Sustainable Development made a series of recommendations targeted at the pan-European and global levels.

The strategies which fall into the governance domain overlap and interact with each other. Monitoring and translating evidence into policy [Strategies 3 and 4] for example, help political leaders to steer responses better and with planning a coherent response [Strategies 1 and 2] but they also enable transparency and accountability [Strategy 6]. By the same token, good communication

[Strategy 7] is fundamental to accountability but also to cross governmental coordination and to engagement with non-governmental stakeholders [Strategies 5 and 8]. Policy makers can achieve most where they consider the links between strategies and combine different approaches to fit the national context.

Financing COVID-19 services

Financing services for COVID-19 is the second functional area that the study explores. The pandemic disrupted all of financing, from the availability of sufficient and predictable levels of funding, to the demands made on funds (which had to cover intensive care, new materials and equipment), to the flow of funds through the system (where health service providers were affected by dramatic changes in the services needed). It is essential that health systems can allocate resources so they are available in the right places and in good time to deliver quality health services to the whole population including those who cannot afford to pay, without people experiencing financial hardship.

Strategy 10

Ensuring sufficient and stable funds to meet needs is easier for countries with well-funded health systems which can absorb unexpected costs but all countries have managed to mobilize additional monies in the crisis. It has become evident that:

- Mechanisms to draw down financial reserves and/or to undertake public borrowing allow countries to meet unpredictable needs.

- Having an earmarked reserve of funding for health makes it easier to quickly cover financing gaps.

- Public financial management rules can create blocks to flexibility, with line budgeting making it particularly difficult to reallocate public funds to the health system.

- Countercyclical health financing mechanisms are an important tool that shield health systems from the effects of a sudden rise in unemployment (caused by the pandemic).

- Borrowing and mechanisms such as bonds and debt service relief can help bring in funds.

- International initiatives can also prove useful as with the dedicated recovery fund for EU Member States or the support provided by

the European Commission, the UN, and the World Bank.

Strategy 11

Adapting purchasing, procurement and payment systems to meet changing needs and balance economic incentives is critical in flowing funds through the health system appropriately. Countries have had to reengineer financing to: deliver additional services; to protect core providers from the financial disruption; and to make procurement as efficient as possible. Countries have found that:

- The ability to change or restructure payment systems and channels is crucial in:

  ○ getting funds to providers (institutions and professionals) to offset income losses; and

  ○ incentivizing the provision of new services.

- Flexibility in changing payment systems to provide the ability to replace activity-based payments with budgets or flat-rate compensation; introducing new fee-for-service payments; and reimbursing extra capital spending can all prove effective in meeting COVID-19 financing needs, including compensating providers for income loss.

- Changes in payment systems can ensure services to vulnerable populations and/or support innovative models of care.

- Incentives for extra services need to be revaluated to 'remove' those which prove ineffective.

- Centralizing procurement (including at EU level) can help meet urgent needs more efficiently.

- More flexible approaches to procurement, while often essential, need to be monitored for potential abuses that need to be addressed [Strategy 6].

Strategy 12

Supporting universal health coverage and reducing barriers to services are all about access and, in the case of COVID, about how to meet new health needs

while sustaining essential services. Countries have had to expand or adjust the range of services, the share of costs and the population groups covered to protect people and particularly the vulnerable and to ensure access. Their experiences show that:

- Offering COVID-19-related services to everybody and at no cost facilitates uptake (although populations who are normally excluded can still be hard to reach).

- Taking active steps to reach people who are not otherwise eligible for health coverage (undocumented migrants, the unemployed) is critical because of the high risk of infection these groups face and because of the risk that poses to wider public health.

- Removing user charges can be key not just for COVID-19 services but in maintaining access to routine services during economic shocks.

- Fast-track health technology assessment (HTA) helped address COVID-19 but decisions need to be reviewed to ensure effectiveness.

Mobilizing and supporting the health workforce

Mobilizing and supporting the health workforce is the third functional area that the study focuses on. All countries, whatever their starting point in terms of staffing/shortages, geographical inequities and skill mix, have had to respond to surges in demand and extreme pressures on workers. Pre-existing staff shortages and unevenness in staff distribution make it more difficult to scale up. They have had to adapt at extraordinary speed to deliver acute care and to cover vaccination programmes while at the same time trying to ensure that other essential and non-essential services continue. Again, this has meant systems changing and adapting.

Strategy 13

Ensuring an adequate health workforce by scaling-up existing capacity and recruiting additional health workers is one response or rather one set of responses to the burdens of the pandemic. Countries have sought to increase the capacity of the existing workers and to bring in additional health workers. There has been important learning, including that:

- Data on health workforce availability and skill profiles is needed to inform actions to surge capacity.

- Increasing the workload of existing staff by extending hours, cancelling leave, and suspending employment limitations increases capacity but has risks, including burn out [Strategy 15].

- Adapting staff roles, shifting tasks within teams and redeployment helps but requires training and support [Strategy 14].

- Mobilising medical and nursing students, inactive or retired health personnel, private sector workers, and volunteers can increase capacity but requires system change.

- Legislation and regulation need to be adapted to accommodate new recruitment and to make legal provision for insurance, pensions and so on.

- Coordinating national policies and local responses from employers and managers is needed for implementation.

Strategy 14

Implementing flexible and effective approaches to using the workforce means changing what individual staff do and the way tasks and roles are combined so that new demands can be met. The efforts in countries indicate that:

- Modifying work practices, adjusting skill-mix, and redeploying people support the optimal use of staff in hospital and outpatient settings.

- Having well-developed task shifting arrangements in place makes change easier.

- Involving professional associations supports new working practices.

- Providing adequate (re)training is important and should reflect the health worker needs.

- Changing what staff do also requires that suitable medical indemnity is put in place.

- Delegating tasks (such as tracing, testing or vaccination) to non-medical personnel or volunteers allows health workers to concentrate on more specialist services.

- Changes need to be reviewed but have demonstrated the scope for updating established practices and innovation long term.

Strategy 15

Ensuring physical, mental health and financial support for health workers is important in sustaining commitment and in helping to minimize absenteeism and burn out. Countries struggled to provide personal protective equipment (PPE) and train staff, particularly at the outset, and the financial costs of providing support continues to be a challenge [Strategies 10 and 11]. Nonetheless, there is good evidence that:

- Providing PPE, regular testing, and training do protect physical health and also signal that workforce wellbeing is a priority

- Offering remote counselling and other online support also supports staff mental health, helps people function under pressure, and indicates commitment to them.

- Addressing practical needs is also essential for staff to be able to continue to work. Making childcare available when schools closed and helping with accommodation and transport enables workers to continue to do their jobs.

- Financial support also has a role in rewarding additional work and in recognizing health workers.

- Failing to tackle physical, mental health and financial stresses has negative impacts on motivation and on staff retention.

Strengthening public health interventions

Public health is the discipline that is best equipped to deal with pandemics, with its roots in the management of infectious diseases. Its main task is to protect population health as a whole and this requires making strategic choices about which services, populations, and vulnerabilities to prioritize as well as strong communication and outreach mechanisms. It is thus ideally placed (in theory) to shape responses to health emergencies – with one foot in science and one in politics. Public health has however played very different roles in different countries with varying degrees of impact. Strengthening public health is an important way of fostering resilience to future pandemics.

Strategy 16

Implementing appropriate non-pharmaceutical interventions and Find, Test, Trace, Isolate and Support (FTTIS) services to control or mitigate transmission relates very specifically to infectious disease outbreaks but touches too on fundamental public health skills. It is evident that:

- Implementation of (non-pharmaceutical) measures (face masks, physical distancing, vaccine 'passports') varied over time in response to emerging evidence, which required updateable structures and processes as well as effective communication.

- Having strong (pre-existing) public health and primary care systems conferred an advantage particularly where there was a tradition of public health–primary care–community linkages.

- Innovative digital technologies including contact and symptom tracking apps had only mixed value and also faced challenges around acceptability [Strategy 6].

- Public health needs to secure public acceptance of interventions, including by:
  - considering their unintended impacts and civil liberties connotations;
  - communicating clearly and with an understanding of public perceptions; and
  - taking particular care in explaining policy changes.

- Consulting non-government stakeholders in civil society and communities has value [Strategy 8] with public health – a logical entry point for engagement.

- Income and social support (adequate sick pay, benefits) are critical if isolation policies are to be workable and in protecting people who lose their jobs or who live precariously.

Strategy 17

Implementing effective COVID-19 vaccination programmes is the route out of the pandemic and another traditional area of public health expertise. In this instance, countries have had to contend with international, national, and local dimensions. They have found that:

- Mechanisms to coordinate efforts across countries, including COVAX led by the WHO and the EU's Vaccine Strategy, are a huge asset in vaccine development.

- Multilateral action on procurement and distribution is also an advantage, particularly for smaller countries, although putting models in place from scratch is complex [Strategy 9].

- Investment from public sources played a major role in vaccine development but there needs to be some reappraisal to better balance the benefits accruing to the public and private sectors.

- Careful planning and monitoring are essential to provide adequate supplies, venues and workforce for effective purchasing, distribution and dispensing of vaccines.

- Established mechanisms for creating plans at the national level allowed countries to deliver under pressure and to maintain equity across regions.

- The legislative and regulatory flexibility to adapt the use of health workers and infrastructure facilitated the rapid roll out of vaccination programmes.

- National monitoring systems and real-time data is necessary to manage well [Strategy 3].

- Communication campaigns are also a crucial part of tackling misinformation and vaccine hesitancy [Strategy 7]. A focus on community engagement helped vaccine uptake [Strategy 8].

Strategy 18

Maintaining routine public health services including screening and vaccination proved difficult as resources were diverted to tackle COVID and facilities closed. Routine services were also hampered by public reluctance to seek care both out of fear of infection and a reluctance to 'trouble the health system' at a time of crisis. The experience in countries suggests that:

- There has been a pattern of chronic under investment in public health across Europe.

- Routine services are more difficult to sustain during a crisis if the system is already under resourced.

- Taking a strategic approach to priority setting for 'non-emergency' public health services can ensure the best use of the remaining health system capacity and protect access but requires adequate information and decision-making capacity.

- Systems where public health and primary health care were closely linked were better able to reassign roles and maintain services [Strategy 20].

- Established multidisciplinary approaches to public health and existing links to mental health and social care services also facilitated comprehensive responses.

Transforming delivery of health services to address COVID-19 and other needs

Transforming delivery of health services was essential in providing care for patients with COVID-19. The study looks at how systems coped and at the wider lessons for resilience, particularly in terms of surges in demand for intensive care beds and in maintaining essential (and non-essential) services. Countries have focused on these two dimensions but have also had to consider financing, purchasing and payment mechanisms and the workforce implications.

Strategy 19

Scaling-up, repurposing and (re)distributing existing capacity to cope with sudden surges in COVID-19 demand means making capacities available at the right points in time and in the right places. It is crucial and depends on the ability to coordinate all relevant elements. Countries have found that:

- Systems with routinely high bed occupancy rates had little spare capacity and faced additional pressures in scaling up.

- Hospital capacity can be increased fairly rapidly by repurposing existing beds, using beds in the private sector or military settings, or transferring patients between facilities, regions, and countries.

- Increasing infrastructure must happen in tandem with increased workforce capacity.

New and temporary facilities were hampered by a lack of skilled staff.

- Beds can only be fully operational if material capacity is sustained which means clear coordination and well-defined responsibility for the supply chain.

- The ability to manage resources effectively was dependent on the availability of real-time data. This was easier where there were already information systems in place.

- The access to appropriate financing and procurement mechanisms also helped sourcing materials.

- Inefficiencies can arise when the focus on hospital beds diverts attention from primary care and skews treatment modalities so that patients who could have been treated in ambulatory care are admitted.

Strategy 20

Adapting or transforming service delivery by implementing alternative and flexible patient care pathways and interventions and recognizing the key role of primary health care was a way of dealing with the treatment of COVID patients and maintaining essential non-COVID care. Countries' experiences show that:

- Creating dual delivery care pathways to separate COVID and non-COVID patients protects patients and staff.

- An existing ability to coordinate across levels of care and care settings helps in adapting care pathways.

- Having mechanisms in place to determine and update guidelines and to communicate the information to clinicians was critical in ensuring best management of COVID-19 cases. The use of professional bodies, online training, feedback, and compliance systems all supported this.

- The ability to adjust and update decisions on provision of essential services in light of the epidemiological situation was also crucial in revising policy on non-urgent care as disease severity fluctuated.

- Primary health care (PHC) has a set of key roles to play in managing COVID-19 outside hospitals, providing essential care, and sustaining public health services [Strategy 18].

- Using digital health tools (remote consultations, remote monitoring) increases PHC capacity but may well require adjustments in legal and financial frameworks.

- Inadequate support for vulnerable groups was widespread and was a failing in its own right and a threat to the effectiveness of the overall response.

- Mental health care needs require careful monitoring due to the increased burden across the population.

How can COVID-19 inform health systems 'building back better'?

COVID-19 has thrown up extraordinary examples of resilience: the health workforce has absorbed phenomenal pressures and continued to function; new ways of working have been introduced, new facilities opened, new types of services delivered; several COVID-19 vaccines were developed and approved; and governments have found the money for health care and to protect their populations from the worst of the pandemic's economic effects. Nevertheless, all governments and all countries are aware of the very real failures: to sustain essential services; to protect health care workers; and to safeguard public health and, foremost, save lives. Health systems, however well they managed during the crisis, were woefully underprepared and this points to, perhaps the most frustrating of all failings, the failure to learn from past crises. It was made abundantly clear during the financial crisis of 2008 that health systems, health, and wealth are inextricably linked to each other and that underinvesting in health systems has significant consequences not just for health but also for the economy itself and, ultimately, for our wellbeing. The COVID-19 pandemic offers lessons for how – this time – countries might build back better.

There is a need to invest more in health systems and moreover for that investment to be appropriate. This implies putting funding into neglected areas and managing that funding efficiently. Areas that are critical to building back better and which require well managed investment include:

- Surveillance and monitoring systems that will allow health systems to respond and be better managed.

- Primary health care which is often the most appropriate and cost-effective setting for care.

- Public health which is best placed to handling threats of infectious and chronic diseases, including by influencing socioeconomic determinants of health and providing outreach to excluded communities.

- Skills and initiatives to promote better ways of working for individuals and teams, as well as across levels of health and social care.

- Remote health tools that complement more conventional patient clinician contact.

- New care pathways that draw on the investments in primary care, skills, and digital tools, and can be flexibly adapted in an emergency.

There is also a pressing need to invest in governance and the complex mix of capacities required to make health systems resilient in crisis and in normal times. Again, investments need to be appropriate and to work across three levels of governance: within health systems; with society more widely; and lastly, in terms of the international community. There is an opportunity now to:

- Reimagine health systems governance, accounting for various contexts and the new multi-level and multi-stakeholder approaches that have surfaced during this pandemic.

- Ensure governance systems are more flexible, which allows changes and encourages innovation in an emergency, but which also insists on following the due process to protect health systems from abuse and a post hoc review.

- Develop stronger links beyond health systems, making health part of the wider discussion and planning of the economy and of social security.

- Improve two-way communications to build trust including through closer health system engagement with social networks and communities, with civil society, and with other stakeholders.

- Incorporate a clear international perspective that links governments with each other and with international bodies and which considers how to develop and distribute resources equitably.

- Strengthen European and global health governance, with adequate financing and enforcement mechanisms, to guard against repeating the mistakes of this crisis.

None of these investments will be possible without the political will to prioritize health. People are acutely aware of the role of health systems in the pandemic. Political leaders now need to make resilient health systems central to their thinking about the future. They need to commit to health system investment and innovation, not just to protect against future health threats or even as a way of dealing with long-term structural challenges, but as a pillar of social solidarity and economic prosperity and as a key route to societal wellbeing.

In December 2019, a novel coronavirus (SARS-CoV-2) appeared in the city of Wuhan, in the People's Republic of China. Soon it would cause the most severe pandemic since influenza swept the world a century earlier. Since little was known about the new virus at the time, many, but not all, countries initially followed their existing pandemic influenza response plans (if they had any), assuming that widespread community transmission would be inevitable and seeking to flatten the infection curve so as to avoid overwhelming health services. This approach dominated in Europe.

Yet it should have been apparent that COVID-19 was not like pandemic influenza, not least because it was caused by a coronavirus similar to the virus that caused severe acute respiratory syndrome (SARS) that had emerged in 2003. SARS had been managed successfully by a strategy of maximum suppression leading to elimination, very different to the strategy normally adopted with influenza. The need for such an approach was soon confirmed by knowledge of SARS-CoV-2's transmission dynamics and epidemiology. A report by the World Health Organization (WHO) joint mission to the People's Republic of China published at the end of February 2020 confirmed that the virus could have been eliminated even after widespread community transmission had commenced WHO (2020d). There was also strong evidence to support the elimination approach from the early success of several other countries, although it was not always easy to maintain this approach over time. The economic impact has also been smaller in the few countries that pursued elimination early on (Kochanczyk & Lipniacki, 2021).

As the pandemic continues, national policies during the first 18 months since the new virus emerged offer useful learning for the months ahead, shedding light on the characteristics of responses that can enhance health systems resilience in the face of COVID-19. Countries that have been the most effective in containing the virus

and controlling its resurgence offer valuable lessons for future learning. Identifying mistakes or missteps is also important. At the time of writing (October 2021), the pandemic is far from over (WHO, 2021f).

The analysis of national and international responses in this volume has two aims. First, it can support national policy-makers with evidence on what worked best – in different contexts – in responding to COVID-19, allowing them to assess their responses so far and make adjustments, as needed, for the months to come and for updating preparedness and response plans to develop resilience in the face of future health threats. Second, it offers broader lessons for health system strengthening for the post-pandemic recovery thus enabling the commitment to "build back better" and to ensure health systems are better prepared for any future threats.

1.1 What is health systems resilience?

A working definition

Resilience is commonly understood to be the capacity to recover (or bounce back) quickly from a shock. Application of the concept of resilience to studying health systems is relatively new and there is no uniformly accepted definition. Most definitions of health systems resilience have typically focused on understanding health system preparedness and the ability to absorb, adapt, and transform to cope with acute shocks to health and the economy (Castleden et al., 2011).

In this study we adopt the definition of health systems resilience introduced in the European Observatory on Health Systems and Policies' Policy Brief *Strengthening health systems resilience. Key concepts and strategies* where it is defined as the "health system's ability to prepare for, manage (absorb, adapt, and transform)

and learn from a sudden and extreme disturbance", such as the COVID-19 pandemic (Thomas et al., 2020). The words "prepare for" are important as they recognize that resilience has a forward-looking element that seeks to reduce the risks from the impact of future shocks (Box 1.1). From the perspective of those interested in health system performance, this means not only maintaining performance of core health system functions, i.e. governance, financing, resource generation and service delivery, but goes beyond that to include a health system's ability to transform and evolve,

ideally improving its performance. Resilience can thus be seen as the *ability* of the health system to maintain or improve its performance in the face of a shock, rather than being an objective on its own. The ultimate aim is to ensure that a health system's goals, especially that of improving the health of the population, can be maintained following a shock.

All health systems around the world had their resilience tested during the COVID-19 pandemic; it is important to understand how to prepare them better for any future shocks. However, the experience of a shock is not a necessary precondition for a health system to be judged as resilient: a resilient health system is *prepared* for the occurrence of a shock, but this shock may not necessarily happen. However, creating resilience depends on having an understanding of the range of shocks that may occur in any future scenario (Pan European Commission on Health and Sustainable Development, 2021).

The literature

As the literature on health systems resilience has evolved, definitions have expanded to consider how to minimize exposure to and preparedness for shocks (i.e. managing risks or vulnerability) and to identify measures that address potential system strains or stresses, such as population ageing. The European Commission, with the European Observatory on Health Systems and Policies and the Organisation for Economic Co-operation and Development (OECD), adopt just such a broader approach to resilience in the biennial State of Health in the EU country profiles (European Commission, 2021s). This approach was also followed by the European Commission's Expert Group on Health Systems Performance Assessment in its 2020 report (EU Expert Group on Health Systems Performance Assessment, 2020), and later in a report by the Expert Panel on Effective Ways of Investing in Health (EXPH). The latter defines resilience as:

> the capacity of a health system to (a) proactively foresee, (b) absorb, and (c) adapt to shocks and structural changes in a way that allows it to (i) sustain required operations, (ii) resume optimal performance as quickly as possible, (iii) transform its structure and functions to strengthen the system, and (possibly) (iv) reduce its vulnerability to similar shocks and structural changes in the future (European Union, 2020).

The OECD has recently used a very similar definition in their Health at a Glance 2020 report (OECD, 2020c).

Box 1.1 *How do health systems respond to a shock?*

A health system shock can be understood as **a sudden and extreme (severe) change which will impact on a health system** (Thomas et al., 2020). Health system response to a shock can be seen as a cycle consisting of the following four stages (Fig. 1.1):

Stage 1: Preparedness is related to how vulnerable a system is to various disturbances (limiting exposure) and how ready it is for when a shock hits (e.g. by having practiced and resourced systems of response).

Stage 2: Shock onset and alert At this stage, the focus is on timely identification of the onset and nature of the shock.

Stage 3: Shock impact and management The system absorbs the shock and, where necessary, adapts and transforms to ensure that health system goals are still achieved.

Stage 4: Recovery and learning Finally, there is a return to a new kind of normality but there may still be changes as a legacy of the shock. In this stage, it is important to recognize what these legacy components are and how they will continue to impact on the system and its performance.

Fig. 1.1 *The four stages of a shock cycle*

Stage 1 Preparedness of health systems to shocks

Stage 2 Shock onset and alert

Stage 3 Shock impact and management

Stage 4 Recovery and learning

Source: Thomas et al. (2020).

A similar conceptualization of resilience has been used in the work on health systems strengthening. For example, Kutzin and Sparkes (2016) defined health systems resilience as: "health systems' capacity to absorb disturbance created by changing environments, sudden shocks or crises, and to adapt and respond effectively with the provision of needed services". This strand of work sees resilience as a dynamic *objective* of investments and reforms, seeking to achieve and maintain the goals of universal health coverage and health security (protection against risk), with health system strengthening as the means (policy instruments) to achieving these goals.

Papanicolas and colleagues (2021), in their work on health system performance assessment (HSPA), link health systems resilience with how well the key health system functions (i.e. governance, financing, resources, service delivery) perform in the face of a shock, i.e. if they can continue to meet their objectives. They thus see resilience – in line with the approach adopted in this study – as a characteristic of a health system rather than its objective.

This understanding of resilience as an ability rather than an outcome is also echoed in the approach recently proposed by Topp (2020) who argues that health systems resilience should not be seen as an apolitical outcome, synonymous with strong health systems and measurable results. She contends that resilience is not a monolithic "good" that can be easily measured and compared across countries and proposes that it should rather be assessed in the context of national politics, interests and intentions of health system actors and the ways in which they mobilize and channel their power.

The concept of resilience is also featured in the Health 2020 document of the WHO Regional Office for Europe which distinguishes between resilience at the individual, community and system levels. It states that "building resilience is a key factor in protecting and promoting health and well-being at both the individual and community levels" (WHO, 2020b), with the development of supportive environments, including health services and public health programmes, being seen as instrumental to building resilience. Health 2020 sees collaboration among different sectors within government, as well as full engagement by civil society (an approach set out in whole-of-government and whole-of-society approaches), as crucial for the development of environments that support strengthening of resilience. Resilience at the systems level is also seen as crucial to making progress towards the implementation of the Sustainable Development Goals (SDGs), to which the world's governments have committed, where it is seen not only as a reactive capacity focused on absorbing and adapting to shocks but also as a proactive capacity to strengthen health systems, with an emphasis on inclusion (Rajan et al., 2020b).

The COVID-19 pandemic has moved health systems resilience higher on the policy agenda. Thus, the European Commission has applied its resilience framework to studying health systems' responses to COVID-19 in the 2021 (forthcoming) edition of the State of Health in the EU country profiles (see Chapter 7). This builds on a report on resilience of health systems written by the Commission's Expert Panel on Effective Ways of Investing in Health (2020). The Partnership for Health System Sustainability and Resilience (PHSSR) – initiated by the London School of Economics (LSE), the World Economic Forum (WEF) and AstraZeneca – applied a similar approach to assess general health systems resilience but incorporating COVID-19 as a critical case study (Wharton et al., 2021).

A new health systems resilience framework developed by Haldane and co-authors sought to identify salient elements that underlie highly effective national responses to the pandemic by analysing the experiences of 28 countries. It placed community engagement at the centre, surrounded by the building blocks of governance and financing, health workforce, medical products and technologies, public health functions and health service delivery (Haldane et al., 2021). Collaboration across sectors and health equity and outcomes surround these functions.

Others, such as the Independent Panel for Pandemic Preparedness and Response (2021), have drawn on the COVID-19 experience so far to offer recommendations to "Make it the Last Pandemic". A report by the Global Facility for Disaster Reduction and Recovery (GFDRR) and the World Bank identified five principles for building resilience of health systems to better prepare them to respond a wide range of shocks: 1) a foundation of health care systems' capacities to effectively manage routine demand; 2) managing demand, capacity, and readiness for shocks at individual health care facilities; 3) health care systems' strategies to increase surge capacity and system-level coordination; 4) coordination with disaster response and civil protection agencies; and 5) ensuring critical infrastructure for health facilities (Rentschler et al., 2021). The evidence review prepared by the European Observatory on Health Systems and Policies to inform the work of the Pan-European Commission on Health and Sustainable Development (2021) – an independent Commission convened by the WHO Regional Director for Europe and chaired by Mario Monti – dedicates a chapter to making a case

for more investment in strong, resilient and inclusive health systems, focusing on striving for the achievement of universal health coverage, stepping up investments in public health interventions and interventions beyond the health system to address social and economic determinants of health, supporting and protecting the health workforce, while committing to a policy of self-sufficiency, and prioritizing the integration of health and social care services (McKee, 2021).

1.2   What does this study aim to achieve?

The aim of this study is to capture the key strategies for a resilient health system response to the COVID-19 pandemic to draw lessons for the post-pandemic recovery and for improving health systems preparedness to respond to future threats. Guided by the definition of resilience stated above (Section 1.1), we have examined national responses to COVID-19, distilling the characteristics of these responses that were critical to maintaining performance of the core health system functions. The initial work had been guided by the original list of resilience strengthening strategies derived

by Thomas et al. (2020) that was based on experiences of past shocks, such as the financial crisis, Ebola virus and other outbreaks and crises. Since then we have refined this original, generic list to 20 strategies that contributed to a resilient health system response during the COVID-19 pandemic. We group them into categories that broadly correspond to core health system functions: leading and governing the COVID-19 response, financing health and other services, mobilizing and supporting the health workforce, strengthening public health interventions, and transforming the delivery of health services to address COVID-19 and other needs (Table 1.1).

Limitations

This book is written for health policy-makers and analysts who must deal with the often messy reality in the political landscape in which many different factors play a role in decisions. This is apparent in the experiences of many countries in Europe and beyond. Also, what needs to be done will depend on the characteristics of the country concerned. A country with a well-resourced health system may well have

Table 1.1   *Responding to COVID-19: 20 key strategies to enhance resilience*

LEADING AND GOVERNING THE COVID-19 RESPONSE	
Strategy 1	Steering the response through effective political leadership
Strategy 2	Delivering a clear and timely COVID-19 response strategy
Strategy 3	Strengthening monitoring, surveillance and early warning systems
Strategy 4	Transferring the best available evidence from research to policy
Strategy 5	Coordinating effectively within (horizontally) and across (vertically) levels of government
Strategy 6	Ensuring transparency, legitimacy and accountability
Strategy 7	Communicating clearly and transparently with the population and stakeholders
Strategy 8	Involving nongovernmental stakeholders including the health workforce, civil society and communities
Strategy 9	Coordinating the COVID-19 response beyond national borders
FINANCING COVID-19 SERVICES	
Strategy 10	Ensuring sufficient and stable funds to meet needs
Strategy 11	Adapting purchasing, procurement and payment systems to meet changing needs and balance economic incentives
Strategy 12	Supporting universal health coverage and reducing barriers to services
MOBILIZING AND SUPPORTING THE HEALTH WORKFORCE	
Strategy 13	Ensuring an adequate health workforce by scaling-up existing capacity and recruiting additional health workers
Strategy 14	Implementing flexible and effective approaches to using the workforce
Strategy 15	Ensuring physical, mental health and financial support for health workers
STRENGTHENING PUBLIC HEALTH INTERVENTIONS	
Strategy 16	Implementing appropriate nonpharmaceutical interventions and Find, Test, Trace, Isolate and Support (FTTIS) services to control or mitigate transmission
Strategy 17	Implementing effective COVID-19 vaccination programmes
Strategy 18	Maintaining routine public health services
TRANSFORMING DELIVERY OF HEALTH SERVICES TO ADDRESS COVID-19 AND OTHER NEEDS	
Strategy 19	Scaling-up, repurposing and (re)distributing existing capacity to cope with sudden surges in COVID-19 demand
Strategy 20	Adapting or transforming service delivery by implementing alternative and flexible patient care pathways and interventions and recognizing the key role of primary health care

different priorities from one that has underinvested in its health system over many years. The scale of this problem is apparent from the large variation in inputs such as intensive care beds in Europe at the start of the pandemic. There will also be differences in what is possible and, especially in federal countries, policy-makers at one level may be constrained by decisions taken at another. Countries also vary in their capacities to respond. For instance, there are enormous differences in the ability of different countries to test and trace and in their laboratory capacities, key elements in pandemic response.

The categorization of the strategies that we use is inevitably artificial and, in practice, many elements are interconnected or overlap. Hence, we have taken a pragmatic approach and the divisions should not be seen as relating to actual or desirable organizational structures.

Further, for each strategy we offer examples of ways to achieve them but these are by no means exhaustive. Given the complexities of tracking health system responses to the ongoing, severe and multifaceted health system shock, we do not aim to assess health systems resilience per se, but rather we focus on identifying strategies that have been shown to be conducive to a resilient response in the face of the pandemic. In other words, we include responses that have enabled the maintenance (and in some cases improvement) of performance for health system functions. While the focus is on countries in the European Union (EU) and the broader WHO European Region, we also include particularly relevant examples from other countries. The choice of country examples reflects – to some extent – the availability of information published in English and some countries may thus be underrepresented in this study.

Finally, the information on which this volume is based comes, to a large extent, from the COVID-19 Health System Response Monitor (HSRM) and is dependent on the timeliness and accuracy of reports supplied to it. The COVID-19 HSRM was created in March 2020 in response to the COVID-19 outbreak to collect and disseminate up-to-date information on how health systems in countries of the WHO European Region respond to the crisis (see www.covid19healthsystem. org). The HSRM is a joint initiative by the European Observatory on Health Systems and Policies, the WHO Regional Office for Europe, and the European Commission. The HSRM content is structured broadly around the standard health system functions, capturing information on policy responses related to governance, financing, resource generation and service delivery in country-specific webpages and cross-country analysis

posts. Other material, in particular the special issues of *Eurohealth* (2020) and *Health Policy* (forthcoming), the Observatory's COVID-19 Response Webinar Series (https://eurohealthobservatory.who.int/monitors/hsrm/covid-19-webinars), and other key documents and peer-reviewed literature have been used to inform this analysis.

1.3 Outline

This volume contains eight chapters, with the next five chapters (Chapters 2–6) describing the 20 strategies for resilient health system response to COVID-19 summarized in Table 1.1. Box 1.2 explains how these chapters are organized and how to read them. These chapters are followed by a chapter on measuring health systems resilience (Chapter 7) and a concluding chapter with key lessons to build back better (Chapter 8). The chapters are structured as described below.

Chapter 2 Leading and governing the COVID-19 response relates to strategies to achieve effective leadership and strengthen governance of the health system response to COVID-19. Since the scale of the shock necessitated a comprehensive, whole-of-government and whole-of-society response, these strategies inevitably go beyond the narrow boundaries of the health system.

Chapter 3 Financing COVID-19 services covers strategies to ensure sufficient funds for the health system, adjusting payment and purchasing systems to meet changing needs, and ensuring health coverage.

Chapter 4 Mobilizing and supporting the health workforce considers strategies to increase capacity to cope with increased demands for and on health workers who will face markedly increased pressures.

Chapter 5 Strengthening public health interventions describes strategies to implement public health measures, including Find, Test, Trace, Isolate and Support (FTTIS) systems, income support, and other social support measures, and COVID-19 vaccinations. It also covers strategies on maintaining regular public health services, such as childhood vaccination programmes and screening services.

Chapter 6 Transforming delivery of health services to address COVID-19 and other needs describes strategies on ensuring the ability to cope with the surge in demand for and managing provision of services for COVID-19 and non-COVID-19 patients.

Chapter 7 Issues around measuring health systems resilience during COVID-19 discusses difficulties

around measuring resilience and how countries can usefully approach assessing how resilient they were during the COVID-19 pandemic.

Chapter 8 Lessons for building back better draws lessons for strengthening health systems to ensure they are better prepared for future shocks, consistent with the imperative to "build back better".

Box 1.2   *How to read this book?*

Chapters 2–6 contain information about how countries responded to COVID-19 and organizes this information into 20 strategies. Chapter 2 describes nine strategies on leading and governing the health systems response to COVID-19. Chapters 3 and 4 identify three strategies each for financing and health workforce. The study separates the delivery of public health services in Chapter 5, with three strategies, and delivery of health care services in Chapter 6, with two strategies.

Key elements of these chapters are summarized in Fig. 1.2. Each chapter begins with an introduction that explains some context about the health system function, followed by a table listing the strategies identified within each chapter. Each strategy includes a blue box with "Key observations" that highlights the main themes and learning from within each strategy at a high level. Headings within the sections guide the reader through the key elements of each strategy.

Fig. 1.2   *How are the main chapters in this volume organized?*

chapter number

Chapter title – focuses on a specific health system function

Introduction – Highlights the main themes and learning from each strategy at a high level.

Section	Lists strategies identified in the chapter
1	Strategy 1
2	Strategy 2
3	Strategy 3

Section 1   **Strategy 1**

Key observations

Highlights the main themes and learning from each strategy at a high level.

- Observation 1
- Observation 2
- Observation 3

Heading - guides readers through the content, highlighting key elements of each strategy

Text – describes each element in more detail, focusing on practical examples.

Box   *title*

Provides more information on an aspect of the response that is particularly interesting but not essential to the storyline.

Subheading

Text provides further breakdown if relevant.

Leading and governing the COVID-19 response

The quality of governance – how decisions are made and implemented – is a major determinant of whether health systems are resilient in the face of a shock. For example, governance of financial resources determines how nimbly and transparently monies can be made available for emergency responses. Effective governance of the health workforce and of procurement systems, where it has worked, has been crucial in making arrangements for redeploying staff and ensuring that they have what they need to function. Governance of service delivery influences whether the services that are delivered match the need that has arisen.

At the macro-level, which is what this chapter focuses on, good governance is essential to create a clearly articulated strategic vision for the health system and other sectors contributing to health, as well as creating the structures through which governments can be held accountable, supporting use of evidence to inform decision- and policy-making.

A country's initial governance capacity, at the onset of the pandemic, shaped both its ability to respond and the ways in which it chose to respond. For example, countries with well-functioning institutions and high levels of societal trust, so that citizens were more likely to adhere to measures designed to deal with the pandemic, were often better positioned to respond adequately.

In most countries, governance involves a range of actors at the level of the state, society and in the international arena (Kickbusch & Gleicher, 2012). During the pandemic, new structures, many involving actors with little or no previous links to the health sector, have emerged, requiring new ways of working, a process complicated by the shift to online meetings that may allow little opportunity for building trusted relationships and sharing tacit knowledge. New adaptive approaches to governance have surfaced, with private companies, nongovernmental organizations, civil society groups, religious organizations, and others providing support to governments (McKee, 2021). This is not new. For example, some countries have long delegated key functions, such as education and some aspects of health, to religious institutions. However the nature of these relationships has changed over time.

The literature contains many governance frameworks that have been applied to health systems. These have differing perspectives (e.g. policymaker or donor), foci (e.g. health sector or broader) and components (Papanicolas et al., 2021). Despite attempts to combine these diverse perspectives, there is no universally agreed concept of health system governance. Thus, evaluating governance, even in normal times, remains challenging and more so in times of crisis. However, analysing national responses during the first 18 months of the pandemic shows the broad range of governance mechanisms that supported (or undermined) the health system response. Frameworks, such as that proposed by Greer and colleagues (2016) that group governance concepts and ideas found in the literature into five key domains (Box 2.1), are a helpful starting point for such analysis.

Political leadership is critical in a crisis. In turn, strong governance systems will support effective political leadership both in and out of the crisis. Political leadership is thus necessary to develop a response strategy (Section 2.2), and ensure that it is effectively implemented, while continually monitoring the situation and making changes where necessary. The enactment in advance of a crisis of legislative measures setting out emergency powers that can be adopted rapidly when needed is desirable, not least because such measures will often constrain basic liberties and it is better that they are debated when there is no pressure of time, thereby increasing the scope for effective legislative scrutiny and likelihood of political consensus.

Box 2.1 *What are the key dimensions of governance, and where are they discussed in this chapter?*

Existing governance literature and frameworks identify numerous dimensions of governance (Barbazza & Tello, 2014). The TAPIC framework clusters these various concepts into five common domains – Transparency, Accountability, Participation, Integrity and Capacity – in an attempt to move towards a more practical way of assessing governance (Greer et al., 2016).

- **Transparency** is about making clear decisions, the rationale and the decision-makers behind them (see Section 2.2 on setting a response strategy, Section 2.6 discussing transparency, legitimacy and accountability both in decision-making and policy implementation, and Section 2.7 on effective messaging and communication).

- **Accountability** implies ensuring that anybody who acts must account for their actions to appropriate other actors who can reward or punish them (see Section 2.6).

- **Participation** is about ensuring that people who are affected by a decision can express their views about it in a way that ensures they are at least heard (see Section 2.8 on stakeholder participation).

- **Integrity** means a system in which organizations and jobs have clear definitions and procedures are consistent and clear (see Section 2.5 discussing horizontal and vertical coordination within and across governments, and Section 2.9 on coordinating national responses with other countries and supranational bodies).

- **Capacity** involves employing the necessary expertise to assist policy-makers in avoiding, diagnosing and remedying policy failures and unintended consequences (see Section 2.3 discussing monitoring, surveillance and early warning systems, and Section 2.4 on transferring scientific and other expertise to informing policy decisions).

Political leadership is also influenced by the personal characteristics and leadership styles of the leaders. While this is not something that the health system can do anything to influence, those within it must understand the political leaders they must deal with.

The first strategy in this volume (Section 2.1) thus starts by highlighting characteristics of good leadership in a crisis. It then discusses the critical role of the wider political context and governance arrangements in which political leaders operate. Again, this is not something that the health system can necessarily influence, except to the extent that those who work in and depend on health services make their views felt at the ballot box, but those who must advise elected leaders and implement their decisions must understand them and adapt as appropriate. Given these many considerations, it is naïve in the extreme to believe that science and policy can ever be separate.

Section	Strategy
2.1	Steering the response through effective political leadership (Strategy 1)
2.2	Delivering a clear and timely COVID-19 response strategy (Strategy 2)
2.3	Strengthening monitoring, surveillance and early warning systems (Strategy 3)
2.4	Transferring the best available evidence from research to policy (Strategy 4)
2.5	Coordinating effectively within (horizontally) and across (vertically) levels of government (Strategy 5)
2.6	Ensuring transparency, legitimacy and accountability (Strategy 6)
2.7	Communicating clearly and transparently with the population and stakeholders (Strategy 7)
2.8	Involving nongovernmental stakeholders including the health workforce, civil society and communities (Strategy 8)
2.9	Coordinating the COVID-19 response beyond national borders (Strategy 9)

2.1 Steering the response through effective political leadership (Strategy 1)

Key observations

Effective political leadership is influenced by the governance set-up and the wider political context, which structure the ability of political leaders to act and their accountability. The personal qualities of individual leaders and leadership styles also play a major role.

- Responsiveness, resourcefulness and capacity to learn are among the characteristics of both organizations and leaders that promote resilience in crises, including COVID-19. Intelligent use of health data can motivate political leaders to "lead better" but this has not always worked.
- Parliamentary, presidential and federalist systems all have strengths and vulnerabilities. How well they respond when confronted with a crisis is determined by the way they use incentives, allocate resources, distribute powers and regulate their use, rather than by the overall "system type".
- Cross-party consensus and efforts to expand political support is likely to increase popular trust of broad strategy and specific measures and so facilitate broad population support. Achieving consensus in the pandemic was supported by judicious use of structures, such as cross-parliamentary committees. Many countries, however, found it difficult to maintain consensus over a long period of time.
- Holding political leaders to account for their actions (or inactions) conveys credibility and helps secure the support of the population. It is also important in prompting changes of policy when necessary. This could be facilitated by judiciary oversight. However, accountability had to be understood in a nuanced way given that policy-makers were dealing with completely novel challenges and rapid change.
- Strong governance enables responsive, resourceful and informed policy and encourages good political leadership. This implies having mechanisms in place to support transparency, accountability, participation, integrity and policy capacity. Countries where the political context included strong systems of governance offered their politicians a supportive framework in which to operate.

Leadership that promotes responsiveness, resourcefulness and the capacity to learn

In novel large-scale crises, including COVID-19, personal qualities of leaders, such as their character and behaviour, are of great importance (D'Auria & De Smet, 2020). Characteristics of politicians influence the degree of trust among the population that their leaders are acting in their best interests and thus that their advice should be adhered to. For example, some leaders who denied basic scientific principles (see Box 2.2) or

Box 2.2 *How have leaders pursuing populist policies handled the pandemic response?*

Is there a particularly populist approach to pandemic response and is it worse than other approaches? This issue has been widely debated but it is difficult to come to clear conclusions. Part of the problem is that the range of populist leaders is enormously wide and the borders of the category are unclear; also, over time, any leader may say something that could be considered populist. The most powerful, concise definition of populism is by Jan-Werner Müller who identifies it as an ideology that is anti-elitist and antipluralist, i.e. opposed to both elites and to political dispute (Müller, 2016). Even so, this is a still a very thin definition, since it can and does encompass politicians from the far left to the far right, who have different incentives.

Parties of the populist radical right (PRR) are a subgroup of politicians defined not just by their populism but also their associated politics of nativism, racism and xenophobia, which have always surged during health emergencies (Dionne & Turkmen, 2020). In practice, some of the most saliently counterproductive and denialist responses have been from PRR leaders (Dionne & Turkmen, 2020; Löblová et al., 2021; Massard da Fonseca et al., 2021). In part this is because the populist left was much less likely to be in power and in part it is because, as a large-scale comparative study and systematic review found, PRR leaders are more likely than other politicians to pursue austerity in health care, use health care expenditure for clientelist purposes, and ignore science (Falkenbach & Greer, 2021).

PRR parties generally own issues to do with crime, security, migration and borders and rarely own issues associated with the welfare state or health (Kitschelt, 1996). There is some evidence that they do have distinctive and consistent effects on health and health policy (Falkenbach & Greer, 2018; 2021). Their incentive in a pandemic is to try and reframe the issue in terms of borders, racism and xenophobia – turning an issue they do not own and which does not win them votes (health) into one that does (xenophobia) (Falkenbach & Greer, 2020). They might also argue against lockdowns, reflecting the suspicion of regulation of their voting bases. In other words, the leaders of PRR parties will often have incentives to activate and intensify xenophobia and racism in order to improve their political situation, with effects that can stretch beyond polls into violence and discrimination.

displayed hubris or excessive confidence undermined the trust that is essential for an effective response (Yamey & Gonsalves, 2020). Those who possessed the ability to demonstrate empathy to the unfolding human tragedy, paying attention to the struggles faced by ordinary people and taking measures to support

them – characteristics often observed in female leaders (see Box 2.3) – also engendered trust.

Tyler and Moench (2012) draw on an extensive literature in risk analysis and disaster research to identify three key characteristics of a leadership style that promotes resilience in and out of crisis: responsiveness, resourcefulness and capacity to learn. This might seem trite, but compared with the many possible kinds of leadership actions that are not on that list, from charismatic communication to hands-on engagement, the three characteristics that they identify are the ones that are most important to the leader precisely because other people can be delegated as needed to take on more clearly defined functions; for example, to lead press conferences or direct field operations. These three characteristics are defined as follows.

- **Responsiveness:** Capacity to organize and reorganize in an opportune fashion; ability to identify problems, anticipate, plan and prepare for a disruptive event or organizational failure, and to respond quickly in its aftermath.

- **Resourcefulness:** Capacity to mobilize various assets and resources in order to take action. It also includes the ability to

access financial and other assets, including those of other agents and systems through collaboration.

- **Capacity to learn:** Ability to internalize past experiences, avoid repeated failures and innovate to improve performance; as well as to learn new skills.

Yet, the advice to "have better leaders" is no advice at all. Rather, the challenge is how those seeking to protect health can be most effective with the leadership they have. Cabinets and technical teams who are in charge in a crisis and those advising and supporting them should pay special attention to those three characteristics, taking care to encourage political leaders to be responsive to new information, thinking resourcefully and beyond party lines as appropriate (see below) as well as beyond organizational charts about how to deploy and develop capacity, and learning as quickly as possible from developments during the crisis (e.g. about which public health interventions had which effects). This may be helped by intelligent use of data. While, historically, publication of health data was often long delayed, this has changed during the pandemic. The numbers of COVID-19 cases and deaths can be tracked in almost real time, making it possible for politicians to be held to account for their (in)ability to protect the health of their populations (McKee et al., 2020). It is often possible to link policy responses, such as mask mandates and reopening decisions, to epidemiological indicators (see Section 5.1) (Oh et al., 2021). This may motivate some of them to try to "lead better", although as we have seen over the past months, it has not always been the case.

The importance of political context

Political context plays a critical role, as political institutions influence both accountability and the ability to act, rewarding some leaders for decisive actions and others for tardiness or denialism (Box 2.4). It is thus important to recognize where power lies, whether formally, in the executive or legislature or at different layers of government, or informally in less visible influences, such as political donors, special advisers or even family members of political leaders. Those seeking to protect health should ensure that they understand the ideology, idiosyncrasies and the various influences (some less visible than others) acting on the leadership, and in particular must identify those who act as gatekeepers to political leaders or who interpret the world for them. They should also have a good understanding of the role of cognitive biases in decision-making, whereby two

Box 2.4   *How did the political context contribute to the COVID-19 response?*

Political leaders operate within the political structures and context of their country, and the political system contributed to the choices that leaders could and did make during the pandemic.

Large-scale research projects in comparative political science have found that so-called centripetal parliamentary democracies that concentrate both authority and accountability in one office seem to be the most resilient kind of regime (Gerring & Thacker, 2018). The centripetal theory of governance features both centralized authority and broad inclusion. Centripetal democracies concentrate enough authority to act with enough public accountability to ensure that their governments pursue public ends, but they are far from the most common kind of regime.

Presidentialist systems, where "an executive with considerable constitutional powers – generally including full control of the composition of the cabinet and administration – is directly elected by the people for a fixed term and is independent of parliamentary votes of confidence" (Linz, 1990) centralize power in a single person with a popular mandate. This provides a threat to resilience as fixed electoral terms mean that it is difficult to remove leaders who might be unfit or unavailable in a crisis.

Parliamentary systems with particular electoral rules can also have dominant leaders, such as the first-past-the-post electoral model used in Australia, Canada, India and the United Kingdom (Jarman et al., 2020b). These systems create some of the risks associated with presidentialist systems in that they can empower a leader who makes questionable decisions, but they do allow the majority party to change the leader at any time. In this way, parliamentary systems that produce dominant leaders are able to avoid some of the vulnerabilities of presidentialist systems. However, parliamentary systems also may have shifting power dynamics within cabinets; a change of health minister, which may be for reasons entirely unconnected with the pandemic, may lead to a marked change in policy.

Federalism is another key political structure with implications for the COVID-19 response. Federal systems hold substantial constitutional authority in regional general purpose elected governments which another tier of government cannot unilaterally abolish (Greer & Elliot, 2019). By this definition, some countries which are not formally federal, such as Italy, Spain and the United Kingdom, count as federations to some degree. Many claims are made about federal systems – that they promote experimentation, diversity, competition and learning or that they promote gridlock, bloat, corruption and races to the bottom (Greer, 2017). In terms of responding resiliently to a crisis, one perspective is that federalism may get in the way, by creating coordination problems and counterproductive political incentives (see Section 2.5). This perspective can draw on the experiences of, for example, the federations which had problems with poorly coordinated lockdowns (Czypionka, 2021). An alternative perspective emphasizes the contribution of federalism to resilience, in the form of empowered state governors that could take protective action even in the absence of federal leadership, although this has not always materialized during COVID-19, due to – among others – legal restrictions, externalities between regions, fiscal and economic vulnerability and nationalized politics (Lecours et al., 2021).

Lesson-drawing in each country should focus on what lessons can be drawn about the particular incentives, allocation of resources and powers and their uses when confronted with the pandemic.

individuals may draw completely different conclusions from the same message (McKee & Stuckler, 2015). In particular, it is important not to overestimate the level of understanding among political leaders of the concepts that underpin public health. Political biographies provide a rich source of material for understanding the challenges involved.

Securing cross-party consensus

Political partisanship adversely affects health behaviours and policy preferences, thereby impacting on the success or failure of the pandemic response. Those who seek broad political support are likely to both increase popular trust and understanding of chosen measures but also facilitate broader support for them among the population.

This can be facilitated by judicious use of structures, such as cross-party committees. Thus, a quarter of parliaments in OECD countries set up special COVID-19 committees or cross-party working groups (OECD, 2020b). However, institutional fixes such as these only operate to the extent that the parties involved wish to use them, which in turn depends on their political goals as well as their institutional contexts. For example, the Netherlands has long-favoured coalitions of small political parties, which contributes to a culture of negotiation and a premium on developing policies that can gain broad cross-party support. This makes Dutch policy slower to change than the policies of the United Kingdom, whose political culture is shaped by a voting system and political settlement that enable strong executives with often large parliamentary majorities. In the Netherlands, politics rewards consensus-building; in the United Kingdom it rewards dramatic actions even if the next government (or even the same government) might reverse them (Bekker et al., 2018). However, even in the United Kingdom, parliamentary committees

can hold the executive to account and a non-statutory grouping, the All-Party Parliamentary Group on Coronavirus, has succeeded in raising some important questions in its well-attended public hearings (APPG on Coronavirus, 2021).

Securing cross-party consensus has, however, its limits in a pluralistic democracy; in particular if the consensus needs to be maintained over a long period of time. Of course, in some cases this will not be possible, especially where there are parties that seek to weaponize messaging on COVID-19 to undermine the parties in power. Messages promoting concepts of "individual freedom", even though they undermine measures to control the transmission of infection, can be very appealing and have been encouraged by those with vested interests, both commercial and political. However, it is not enough for leaders to avoid divisive messaging; they should also take a robust stance against those who do promulgate such messages, which in some cases may cross into incitement to commit crimes, as with death threats against health workers (Peat, 2021).

Holding leaders to account

A crisis often leads to concentration of power in the executive (exemplified by the term "war cabinet"), in part due to the need to act urgently and decisively, but other branches of government, including the judiciary and parliament, can also play important roles and act as constraints on the executive (see Section 2.6). The extent to which these institutions can serve this function will vary depending on the constitutional settlement. However, a general principle is that political leaders must ensure that they are acting within existing law. In many countries there are provisions to hold governments to account through judicial review or strategic litigation, with the Good Law Project (2020) in the United Kingdom providing several useful examples.

The critical role of governance

The scale of the COVID-19 pandemic and its unpredictability has placed extraordinary demands on the political leaderships, cabinets and technical teams who are in charge in a crisis and those advising and supporting them. Strong governance structures and mechanisms can enable and support good political leadership in a crisis (as well as in normal times). For example, having established governance in place that fosters stakeholder participation will help the leaders to be more responsive to the needs (see Section 2.8). Resourcefulness will be enabled and supported by seeking consensus over the response strategy across the

political parties (Section 2.2) and by effective horizontal and vertical coordination across the government (Section 2.5). Finally, capacity to learn will be enabled and supported by effective monitoring and surveillance and knowledge brokering systems (Sections 2.3 and 2.4), two-way communication and participatory approaches, among others.

Strong governance that enables good health policy will also work in the absence of especially good leadership and can provide "a defence against" especially bad leadership because it determines the extent to what is possible for those who are in charge (Greer et al., 2016). For example, parliamentary and judiciary scrutiny and oversight (see above and Section 2.6) can help ensure legitimacy of executive actions and accountability of political leaders. Governance can therefore enhance resilience against pandemics as well as political crises.

2.2   Delivering a clear and timely COVID-19 response strategy (Strategy 2)

Key observations

The ability to develop a coherent strategy quickly, to manage the perceived trade-offs between health policy and other areas (most particularly the economy), and to implement policy and adapt it when needed are central to effective responses to a crisis.

- Effective knowledge brokering between science and policy were critical in designing and revising appropriate response plans. Countries that had a tradition of formal consultation with science and relevant experts in policy formulation had an advantage.

- Tools are needed to assess appropriateness of policy interventions in specific national contexts, accounting for societal values and the (sometimes distinct) interests of political and financial elites, combined with pathways to feed the assessment into decision-making to support the formulation of policy that is "acceptable" which in turn makes compliance more likely.

- Transparent communication about the chosen response strategy was essential in the highly uncertain and complex environment, especially as strategic direction often had to change.

- The capacity to change strategic direction or adapt policy is critical in highly uncertain, complex and evolving environments. Countries with established mechanisms to update pandemic response plans found this helpful.

- Having the facility to introduce emergency legislation was a key tool that enabled rapid action – although this does raise issues about the time limits of emergency powers and poses challenges in terms of civil liberties, consent and compliance.

Setting clear strategic direction amidst uncertainty

Setting a clear strategic direction was not straightforward in the early days of the pandemic, given how little was known about the virus at the time. Countries have thus sought advice from scientific and non-scientific experts (Section 2.4), in some cases from a broad range of different backgrounds including representatives of civil society (Section 2.8). However, our knowledge of this virus and how it is transmitted has increased rapidly, although policies have not always changed so quickly. Perhaps the best known example was the failure to recognize the predominantly airborne nature of transmission (Greenhalgh et al., 2021), so that many of the initial measures were of limited effectiveness and there were very long delays in adopting measures that are important, such as mask wearing, improved ventilation and air filtration. Indeed, even now, this key characteristic of transmission of SARS-CoV-2 seems not to be well understood.

Ultimately, therefore, decisions had to be taken based on incomplete information and on an assessment of the best option for their specific national context (Box 2.5). For example, when New Zealand chose an elimination strategy the exact nature of this response and its full justification had not been articulated. However, the health impact of a poorly contained pandemic had been modelled using a range of scenarios, demonstrating clear health gains if the country could minimize cases. While the net economic consequences of an elimination strategy were impossible to estimate, pursuing such a strategy provided a medium-term path to a return to a largely pre-pandemic state.

Once a strategic direction for the pandemic response is set, plans for how to implement it and how to measure success must be devised and communicated. Translating scientific evidence into policy is never straightforward but has proven especially complicated during the COVID-19 pandemic (see Section 2.4). Uncertainty and rapidly evolving evidence created immense challenges for policy-makers in capturing and understanding information and interpreting its strength and validity (Röhrling et al., 2020; Williams et al., 2020c). Given this initially high level of uncertainty, responses did not follow pre-ordained paths. Countries often needed to make adaptations as the situation evolved and knowledge changed. These changes could involve updating or even changing strategies completely. Radical policy U-turns have been a feature of the COVID-19 pandemic in some countries (Haddon et al., 2021), often happening as a delayed response to pressures from the public, scientific

or professional communities (although such changes, especially when driven by anti-science groups and lobbyists) have not always been positive. Transparent communication throughout the response, particularly about the uncertainties underlying policy decisions, may help solicit public support for adaptations to response strategies, but this has often not been used effectively or has even been neglected (Hartwell & McKee, 2021) (Section 2.7).

Decision-making has been further complicated by the fact that policies to address COVID-19 have enormous impacts on society and the economy; public health objectives may sometimes be portrayed as running counter to other government and societal objectives, such as keeping schools or places of employment open. This apparent conflict has been one of the perceived barriers to applying an elimination approach more broadly (Box 2.5) but has since been rejected as a false dichotomy (Baker et al., 2020b). Those developing responses have also had to take into account societal values and interests of political and financial elites, which may not always be in step. At its most stark, this has been an issue of individual versus collective freedoms; for example, aversion to interventionist governments and mask wearing, or protecting society through non-discriminatory public health and social measures.

The elimination approach, drawing on the success of measles elimination in many parts of the world, has been gaining political support since late 2020, especially since new strains of the virus started emerging, potentially undermining ongoing vaccination efforts (McKee, 2020). However, only a handful of countries managed to implement this approach successfully and sustain it over time. In most countries in Europe, policy efforts are now centred around a safe and sustained socioeconomic reopening while maintaining control over (i.e. suppressing) the virus (European Commission, 2021t).

Drawing on or quickly developing response plans and emergency legislation

If the chosen strategy is to be effective, it must be operationalized quickly. Besides having early warning and other health intelligence systems in place (Section 2.3), two things helped countries act fast in the face of the pandemic: having (or quickly developing) response plans, and adopting emergency legislation to give the government special powers or release of emergency funds.

Box 2.5   *Most countries in Europe adopted a suppression strategy to manage COVID-19 in early 2020*

Baker et al. (2020) group initial responses to COVID-19 in relation to the strategic goal into five types: no strategy, mitigation strategy, suppression strategy, elimination strategy and exclusion strategy (Fig. 2.1).

Fig. 2.1   *What are the various response strategies that countries adopted at the outset of the COVID-19 pandemic?*

Pandemic strategy	Description	Examples	Exit path
Exclusion strategy	Maximum action to keep the disease outside of the country	Some Pacific Island countries and territories	Return to a carefully managed "new normal"
Elimination strategy	Maximum action to keep the disease outside of the country and eliminate community transmission	China, New Zealand	
Suppression strategy	Action taken to substantially lower case numbers and outbreaks	Most countries in Europe and North America	Prolonged control measures until sufficient vaccination rates
Mitigation strategy	Action taken to "flatten the curve" to avoid overwhelming health services and protect those at high risk	Sweden, UK (at least at certain points)	Pandemic spreads through population until "herd immunity" and/or sufficient vaccination rates
No substantive strategy	Largely uncontrolled pandemic wave	Some lower income countries	

Source: Baker et al. (2020b).

A typical approach chosen by many high-income countries in Europe and North America – and consistent with plans designed for responding to a pandemic influenza – has been a "suppression" strategy, where the goal was to reduce spread and control any outbreaks that arose. A mitigation approach, such as that adopted in Sweden, sought to flatten the epidemic curve while protecting health services and the most vulnerable groups, while keeping the economy going. The strategy relied on personal responsibility, underpinned by high levels of trust in political decision-making, and rejecting strong regulatory instruments (Sperre Saunes, 2021). In December 2020, a special Swedish Corona Commission deemed that this approach, which allowed widespread transmission, was the single biggest factor responsible for the large number of deaths (Claeson & Hanson, 2021) compared with the other Nordic countries, Denmark, Finland and Norway, which rejected this approach because the impact on health was considered to be too high.

Since late 2020, there has been growing acceptance that elimination would have been the optimal strategy at the outset of the pandemic. It takes a precautionary approach to newly emerging infectious diseases that have severe effects on health, particularly while key parameters are not fully understood (Baker et al., 2020b). Hong Kong, the People's Republic of China and the Republic of Korea pursued such a strategy, often using highly restrictive measures that, at the time, may have struggled to find acceptance in most European countries. New Zealand and Australia, after briefly pursuing their existing national influenza pandemic plans (Baker et al., 2020a), also chose elimination (although in Australia this has been described as "aggressive suppression"). In those countries, success was measured by metrics such as the number of days with zero active COVID-19 cases.

Several disease outbreaks in recent decades, such as the 1997 H5N1 influenza outbreak in Hong Kong, the 2009 H1N1 pandemic, the 2012 Middle East Respiratory Syndrome (MERS-CoV), and the 2003 Sudden Acute Respiratory Syndrome (SARS-CoV) prompted countries in regions that were most affected to develop protocols and infrastructure to respond to and

manage such threats (Patel et al., 1978). For example, in Taiwan, China, pandemic response was developed following extensive planning in a way that could be adapted to new pathogens (Summers et al., 2020). A coordinating structure, which later became the Central Epidemic Command Centre (CECC), was established during the 2003 SARS outbreak with responsibility to

coordinate cross-ministry efforts in handling the new epidemic. Since then, much investment has been made into developing capacity at the Centers for Disease Control hospitals and infectious disease laboratories. In 2020, the Centers for Disease Control took the lead in managing the COVID-19 outbreak, along with the CECC, as outlined in the pre-COVID-19 pandemic plan.

However, in many countries around the world, including New Zealand and most countries in Europe, national pandemic plans were for pandemic influenza and had limited applicability to COVID-19 (although it has since been discovered that at least one country did conduct an exercise to prepare for cases of MERS but failed to follow-up) (Dyer, 2021a). In some cases, even their applicability to pandemic influenza was limited because they were severely outdated. In general, it is unwise to assume that plans will work, and their influence might even be counterproductive if, for example, they encouraged public health measures appropriate to influenza at the expense of attention to the airborne transmission of COVID-19 from asymptomatic individuals. The process of planning is nevertheless useful, since it obliges participants to think outside their normal routines, start to understand other organizations which they would only meet in a crisis, and develop a sense of what kinds of challenges exist.

Emergency laws were adopted in some countries where they were needed to impose restrictions, such as lockdowns and bans on public gatherings. In many cases where pandemic influenza plans included emergency powers, those powers were expanded and extended beyond the scope of the original plan (e.g. Nordic countries). In others, governments already had powers in existing legislation to enact emergency measures. In South Africa, India and Singapore, for instance, existing public health laws provided the legal basis for the emergency response to the COVID-19 pandemic. Emergency legislation can be permanent or time-limited and may be subject to judicial review, especially where it infringes constitutional principles. This last point arises because such measures often infringe on what were taken-for-granted rights. The pandemic, and putatively pandemic-related emergency legislation, has been used as a project of authoritarianism in many countries. It is for this reason that emergency legislation should be time-limited, subject to legislative scrutiny and have very transparent procedures that, ideally, should be scrutinized by legislators prior to a crisis. In systems with high levels of conflict between parts of government (e.g. between legislatures and executives, as in the United States when the President and Congress leaders are from

different parties, or in the same situation with federal and state governments), understanding the particular political context is crucial to understanding the meaning and use of powers.

2.3 Strengthening monitoring, surveillance and early warning systems (Strategy 3)

Key observations

COVID-19 exposed weaknesses in the national, EU-level and multilateral early warning systems. Addressing these will be important in dealing with future and emerging threats. At the European level, this has resulted in proposals to strengthen the EU's and WHO's capacities to respond to future health threats.

- Strengthening existing disease surveillance and monitoring systems and capturing data not only on disease spread, hospitalizations and deaths but also on essential services, access and vulnerable groups is central to informing pandemic responses.
- Improving the identification of at-risk populations was particularly valuable, although more needs to be done on ethnicity and underlying conditions.
- Mechanisms to coordinate across a range of actors and, in particular, the use of digital health tools were highly supportive of surveillance and monitoring activities.
- The One Health approach, which fosters sharing of data and expertise across multiple sectors and encourages national and global cooperation, on animal, human and environmental health, needs to be strengthened, addressing critical knowledge gaps and other weaknesses.
- In view of the challenges to respond quickly in the early stages of the pandemic, the European Commission has made a series of proposals to strengthen the EU's capacity to respond to future cross-border threats. Similarly, proposals have been made to strengthen WHO's response capacity, including through strengthening its health systems surveillance powers.

Key role of epidemiological monitoring and surveillance systems

Disease monitoring and surveillance are core functions of public health and fundamental to enabling health systems to prepare for and respond to shocks. Comprehensive epidemiological monitoring and surveillance systems can facilitate the early detection and ongoing monitoring of disease outbreaks, allowing countries to develop effective and timely public health containment measures, strategies for health care delivery and policy actions that may be needed in sectors outside health. To be effective, surveillance and monitoring systems must continuously and systematically collect,

analyse, interpret and disseminate data from a wide range of sources and sectors. Common items include the numbers of cases, their severity, hospitalizations and deaths, broken down by demographic factors (e.g. age, sex, ethnicity), region and health care setting, to understand who and where may be most affected and at which times (ECDC, 2020b). Other data should capture changes in availability of services, access and quality of care, to inform allocation of resources and delivery of services (Chapters 3–6). Essential data also include indicators of financial and other access barriers (e.g. language and cultural, physical, technological, etc.), waiting times, forgone care, etc. Unfortunately, very few countries collect data on ethnicity or migration status, key determinants of outcomes during the pandemic. The United Kingdom is a rare exception.

The COVID-19 pandemic is unique in recent times in generating broadly comparable health data (albeit far from perfect) in every country in the world within a very short time frame. But monitoring and surveillance has not been limited to tracking cases and virus transmission. Monitoring resources in hospitals (e.g. staff, available beds, personal protective equipment (PPE) and other medical equipment) has proved pivotal in informing the responses of health providers and in some cases has informed the transfer of patients from more to less affected regions or hospitals (e.g. in England) (see Section 6.1). More recently, countries have set up or adapted monitoring systems to monitor vaccination progress, including the number of doses received by the country, by individuals and by particular, often vulnerable groups. Within the EU/EEA (European Economic Area), the European Centre for Disease Prevention and Control (ECDC) has established the COVID-19 Vaccine Tracker to monitor progress in vaccine programmes across the region (ECDC, 2021b). The WHO Coronavirus (COVID-19) Dashboard presents information on vaccine introduction and administration globally, including the share of the total population that has received at least one dose, the share that is fully vaccinated, and the number of vaccines used. The Dashboard uses information supplied by Member States, other publicly available official data and data collated by third-party sites (WHO, 2021f). Other widely used sources include Our World in Data (2020) and the Johns Hopkins Coronavirus Research Center (2021). Other more specialized resources include the Short-Term Mortality Fluctuations database, created by the Max Planck Institute for Demographic Research (2021) providing data on excess mortality during the pandemic, and the COVID Government Response Tracker, created by the Blavatnik School of Government

(2021), which provides measures of the stringency of policy responses (see Section 2.4).

Throughout the COVID-19 crisis, countries in Europe and beyond have adapted and enhanced existing disease surveillance and monitoring systems to inform pandemic responses, including deployment of effective FTTIS systems (see also Section 5.1) (Chung et al., 2021). Israel, Singapore and the Republic of Korea used a combination of location data, video camera footage and credit card information to track the spread of the virus. New Zealand also adopted novel approaches; for example, linking digital public transportation cards with the contact tracing system and requiring businesses to display QR codes (Ministry of Business, 2020). Upgraded surveillance systems allowed countries to identify who was most likely to be exposed to or die from COVID-19 due to their job or, more rarely, ethnic background; which communities were most affected by the health and socioeconomic consequences of the pandemic; and where resources should primarily be allocated. In some cases, these data were embedded in the decision-making process. In others, lack of surveillance capacity or national approaches to ethnicity – such as France's "colour-blind policy-making" – ignored or even intensified health care disparities.

Although countries in Europe have taken steps to strengthen disease monitoring and surveillance systems during COVID-19, national and regional disease surveillance systems remain inadequate. Critical knowledge gaps have been exposed, with key data not routinely collected, such as on ethnicity or underlying health conditions, from different settings including long-term care facilities and workplaces or from sectors outside of health. There are also critical weaknesses in laboratory capacity in many countries, in particular in the very limited capacity for sequencing viral isolates in most countries. Moreover, integrated systems that systematically collect real-time information on animal and human health and are embedded with artificial intelligence or other big data analytic tools to predict the probability of an infectious disease outbreak remain scarce (Osterhaus et al., 2020) (Box 2.6).

Coordinating monitoring and surveillance

Surveillance activities have required extensive coordination among national and regional public health authorities, health care providers and others, both in the public and private sector. In France, for example, the monitoring and surveillance strategy is coordinated by the National Public Health Institute but relies on collaboration with a network of numerous stakeholders

Box 2.6   *The One Health approach is not yet commonly applied in epidemiological surveillance*

Collaboration regarding One Health on the international level has occurred only in recent years, prompted by global avian and swine influenza outbreaks in the early 2000s, when WHO, the World Organisation for Animal Health (OIE) and the Food and Agriculture Organization (FAO) created joint strategic frameworks. Collaboration remains a challenge because One Health brings together such a wide array of stakeholders, ministries, donors and researchers with diverse interests (Dos et al., 2019).

Few surveillance and monitoring systems globally are designed to take a One Health approach, promoting national and global cooperation, data sharing across interoperable systems, and action across multiple sectors to bring together expertise on animal, human and environmental health (Osterhaus et al., 2020; Ruckert et al., 2020). One setting where this approach is pursued is Sciensano – Belgium's National Public Health Institute – whose core area of work is scientific research in the fields of public health, animal health and food safety. Its mission covers six areas: animal health; the effectiveness and safety of vaccines, medicines, and health products, including the quality of medical laboratories; food consumption and food safety; health and disease monitoring; health and environment; and quality of health care. Sciensano is explicitly tasked to work across all levels including federal, regional and community levels but also European and international levels (Sciensano, 2021).

In Europe, while all Member States of the EU are required to collect comparable data on the occurrence of zoonoses, zoonotic agents, antimicrobial resistance, animal populations and foodborne outbreaks at national level, according to Directive 2003/99/EC, many

harmonization and interoperability problems between countries remain (Boqvist et al., 2018). In collaboration with the ECDC, the European Food Safety Agency (EFSA) monitors these reported zoonoses in both produce (fruits and vegetables) and livestock supply chains across the European Region, releasing yearly summary reports regarding viral, bacterial, and parasitic diseases, including Campylobacter, Salmonella, *E. coli*, and Yersinia, all common foodborne illnesses, in addition to bovine spongiform, rabies and influenza among animal populations, to name a few.

The One Health European Joint Programme (OHEJP), a consortium of 44 partner organizations, including food, veterinary and medical laboratories across 22 countries, was launched in 2018 to increase collaboration, methodologies, and sharing databases and procedures for assessing and managing foodborne zoonoses, antimicrobial resistance, and emerging infectious threats by funding research projects and developing a code to encourage shared surveillance guidelines (Brown et al., 2020). The rapid global transmission of SARS-CoV-2 has demonstrated the importance of closely monitoring animals at domestic, regional and global levels. Yet, regional research consortiums are in their early years of development, and their ability to influence policy decisions and preparedness is unclear. The need to urgently implement a One Health approach to respond to future health threats has been recently recognized by the Pan-European Commission on Health and Sustainable Development, which called for strengthening mechanisms for coordination and collaboration between relevant international agencies, such as WHO, the FAO, OIE and the United Nations Environment Programme (UNEP) (Pan European Commission on Health and Sustainable Development, 2021).

such as regional health agencies, networks of GPs and the national reference centre for viral respiratory infections among others (HSRM, 2020b). While traditional methods have been relied on to support surveillance and monitoring during COVID-19 (e.g. hospitals reporting positive cases to infectious disease surveillance systems), a number of novel methods have also been employed. In many countries, the presence of virus particles in wastewater samples has been monitored, with the Netherlands, for example, publishing data on the national Corona Dashboard (HSRM, 2020c). In Denmark, blood banks in all regions have tested blood for COVID-19 antibodies from donors to help develop estimates of the spread of the disease (HSRM, 2020a). In the United Kingdom, two large-scale population surveys exist, the Real-time Assessment of Community Transmission (REACT) Study (Riley et al., 2020) and the Coronavirus (COVID-19) Infection Survey from the Office for National Statistics (ONS, 2021). However, these surveillance activities are exceptions

and most countries lack any detailed monitoring of infections in the general population, instead depending on data from those who come forward for testing.

Using digital tools for monitoring and surveillance

Digital health tools have been used in a number of ways to support monitoring and surveillance activities. Many countries have launched dashboards that publish data on COVID-19 cases and deaths, with data sometimes broken down by geographical area and, much less often, demographic variables such as age and sex. A number of low-and-middle-income countries have utilized District Health Information Software 2 (DHIS2) for case detection, situation reporting and active surveillance for COVID-19. In Israel, the biggest health insurance provider in the country (Clalit) has also developed a tool based on seasonal-influenza data that identifies people at high risk of severe symptoms and alerts them. Genomic surveillance is a vital part of surveillance

Box 2.7	*The Republic of Korea had an early warning system in place for COVID-19*

The Republic of Korea has a national Infectious Disease Risk Alert System in place, which divides risk levels into four stages, ascending from Level 1 to Level 4. Each stage is clearly linked to response measures and expected actions from Government ministries and other public-sector actors. Alert levels are determined by an Emergency Committee, led by the Minister of Health and Welfare, and containing the Director of the Korea Disease Control and Prevention Agency (KDCA) and other scientific and technical experts. The alert level is set based on a range of criteria including disease virulence, speed of infection, impact, public opinion and the Government's ability to respond.

The four alert levels are as follows.

- Level 1 – Blue: an early crisis stage, with no domestic cases reported. A KDCA task force monitors the crisis and organizes countermeasures teams, which vary by type of infectious disease.
- Level 2 – Yellow: this is declared when a domestic case is confirmed. The Central Disease Control Headquarters at KDCA is operationalized, activating a cooperation system between government agencies.
- Level 3 – Orange: there is limited spread of the infection in the country. Quarantine, surveillance and provision of government-wide support is strengthened and the Central Disaster Management Headquarters is launched.
- Level 4 – Red: community transmission or national-level spread is reported. A whole-of-government response is activated and the Central Disaster and Safety Countermeasure Headquarters operationalized.

During COVID-19, this alert system has informed decisions over implementation of travel restrictions, quarantine measures, implementation of physical distancing measures and testing procedures among other measures.

Source: Government of the Republic of Korea (2020).

Updating early warning systems

Early warning systems should form a central component of a comprehensive disease monitoring and surveillance system. Early warning systems help to anticipate and alert countries or regions to infectious disease outbreaks and other environmental hazards of concern, informing which pre-emptive or early actions should be taken to mitigate the impact. The European Early Warning and Response System (EWRS) has been created by the European Commission to allow the ECDC and public health authorities in EU Member States and to allow EEA countries to report and share data on public health emergencies, as well as to coordinate appropriate responses. Based on a first threat assessment from the ECDC, the Directorate-General for Health and Food Safety (DG SANTE) alerted Member States of a potential cross-border health threat via the EWRS on 9 January 2020 and subsequently shared ECDC's first rapid risk assessment on COVID-19 (17 January 2020). Over the coming months, the EWRS was further used by the EU to facilitate coordination and by most Member States to exchange real-time information on response and communication measures, as well as for file requests for medical countermeasures (see Section 6.1 for more information on solidarity measures) (European Commission, 2020a). However, with many EU/EEA countries failing to take early action in the pandemic, questions have been raised about the role of the EWRS (European Parliament, 2020). At the country level too, COVID-19 has exposed weak national early warning systems. The European experience contrasts with that in some countries in Asia and the Pacific that took action to strengthen early warning systems following their experience with the SARS outbreak in 2003 and have (with a few exceptions) proved more successful at managing COVID-19 so far than European counterparts. The Republic of Korea, for instance, has successfully operationalized its four-tier alert system to manage COVID-19 (Box 2.7).

In view of the shared challenges and the struggle to respond quickly in the early stages of the pandemic, the European Commission has made a series of proposals to strengthen the EU's capacity to respond to future health adversities. Forming the basis for a more robust health security framework, and under the general framework of the European Health Union, these proposals envision a new Regulation on Serious Cross-Border Health Threats, upgrading the 1082/2013 Decision on Serious Cross-Border Threats to Health, and an expansion of the mandate of two key EU agencies to assist the EU with implementation: the ECDC and the European Medicines Agency (EMA). A strengthened legal basis

systems, enabling new genetic variants of SARS-CoV-2 to be detected and tracked, feeding into GISAID – a global initiative established in 2008 that provides open access to genomic data on influenza viruses and now also on the SARS-CoV-2 virus (Cyranoski, 2021). However, the volume of genomic sequencing of viral isolates remains unacceptably low except in a few countries such as the United Kingdom and Denmark.

at the EU level would allow for increased coordination in the case of a health emergency, including an integrated surveillance system and a joint approach in developing, stockpiling and procuring crisis equipment and medicines.

At the global level, the International Health Regulations (IHR) (last revised in 2005 following the SARS outbreak) underpin global alert systems for early detection and risk assessment of all public health hazards, irrespective of type, origin or source (Gostin & Katz, 2016). The IHR require WHO Member States to develop core capacities for surveillance and response of public health threats to reduce gaps in alert and response mechanisms and to report any event of international public health importance to WHO under law. WHO can then take action to declare a Public Health Emergency of International Concern (PHEIC) to guide international and national responses. However, the operation of this process during the COVID-19 pandemic has attracted much criticism (Independent Panel for Pandemic Preparedness and Response, 2021). In its final report, published in September 2021, the Commission recommended strengthening health systems surveillance powers for WHO, including periodic assessments of preparedness, with these assessments feeding into monitoring by the IMF, development banks and other technical and financial institutions. It also called for scaling-up investments in the measures to reduce threats, provide early warning systems and improve the response to crises. The Commission recommended the establishment of a Pan-European Network for Disease Control to improve responses to emerging threats by strengthening early warning systems, including epidemiological and laboratory capacity, and supporting the development of an interoperable health data network based on common standards developed by WHO (see also Section 2.9).

2.4 Transferring the best available evidence from research to policy (Strategy 4)

Key observations

Evidence on COVID-19 has been generated at astounding speed and with unprecedented level of international collaboration that enabled open access to this information for all countries to benefit from. Not all countries had formal mechanisms in place to transfer scientific evidence into policy. Evolving and sometimes inaccurate evidence contributed to some divergence of policy responses in different countries and occasional policy U-turns, which can decrease popular trust in these responses.

- International collaboration on an unprecedented scale has contributed significant evidence. Open access to research is crucial if countries are to benefit although caution is also required in using early results.
- Formal mechanisms to enable scientists and experts to provide evidence helps guide policy-makers in the face of complex challenges. Countries where these mechanisms already existed benefited from activating and developing them.
- Multidisciplinary advisory groups seem to have particular added value although in practice there were concerns about the underrepresentation of essential disciplines, such as social care, and population groups, such as women and ethnic minorities.
- National public health agencies have a wealth of relevant expertise and contribute an important population health perspective in assessing evidence from a range of other (epidemiological, statistical and clinical) disciplines. In most countries, the COVID pandemic was seen as a national security problem and the role of public health agencies or institutes was to support decision-makers in assessing the situation.
- Knowledge brokering works best where there are close links between scientists and experts and policy-makers not least because familiarity and trust facilitate effective relationships. There is, however, a need to ensure the transparency, rigour, objectivity and independence of expert advice.
- Independent knowledge brokers such as the EU, the European Observatory on Health Systems and Policies and WHO, as well as civil society, play an important role in connecting research and policy.

Generating rapid evidence about COVID-19

At the start of the pandemic very little was known about COVID-19, with a lack of clarity about how it was transmitted, its clinical manifestations, outcomes, at-risk groups, effective preventive measures and potential treatments. The ability to generate and/or access evidence across multiple disciplines was therefore pivotal to developing effective evidence-informed responses. Thankfully, many of the early questions raised by COVID-19 have been answered with unprecedented speed following the production of vast amounts of global research. Much of this research was published on a myriad of open-access data sources and webpages provided by international agencies, journals and more, based on the principles of openness and transparency and the recognition that COVID-19 was a global problem that required global solutions and cooperation (Williams et al., 2020c). Table 2.1 summarizes some of the open-access sources that are freely available to researchers, policy-makers, health professionals and the

Table 2.1   *Many open-access sources provided key COVID-19 information*

Source	Details of the open-access information
COVID-19 Government Response Tracker, Blavatnik School of Government, University of Oxford	• Collects information on policy responses that governments have taken since January 2020, covering more than 180 countries. • Policies are coded into 23 indicators and recorded on a scale to reflect the extent of government action.
European Centre for Disease Prevention and Control (ECDC)	• Publishes situation reports with an overview of data available. • Provides a range of COVID-19 datasets available for download, covering a variety of topics, from COVID-19 cases to testing, hospital and intensive care unit admission rates, and more.
European Commission Response to COVID-19 website	• Reflects on the EU action to tackle the COVID-19 crisis in the EU, with specific information regarding the areas of the Commission's response, including on: public health, travel, research and innovation, fighting disinformation, transportation, jobs and economy, crisis management and solidarity, digital solutions, emergency support, among others. • Links to surveillance data as provided by ECDC (see above). • For more information on the role of the EU as a knowledge broker during COVID-19 see Box 2.8.
European Council	• Collects information on the EU's response to the COVID-19 pandemic. • Aims to provide information to the general public on how the EU is supporting health care systems, responding to the economic fallout caused by the COVID-19 pandemic, coordinating travel and transport measures, helping partners around the world and developing safe COVID-19 vaccines.
European Observatory on Health Systems and Policies' COVID-19 Health System Response Monitor (HSRM)	• Collects and organizes up-to-date information on how countries are responding to the crisis as a joint initiative of the WHO Regional Office for Europe, the European Commission and the European Observatory on Health Systems and Policies. • Focuses primarily on the responses of health systems but also captures wider public health initiatives. • For more information on the role of the European Observatory on Health Systems and Policies as a knowledge broker during COVID-19 see Box 2.10.
International Labour Organization (ILO)	• Publishes information on country responses organized around four pillars defined by the ILO to lessen the impact of COVID-19 on businesses, jobs and the most vulnerable members of society; collected information includes information about support for the health sector and ensuring access to health services.
Johns Hopkins Coronavirus Resource Center	• Continuously updates COVID-19 data on cases, deaths, tests, vaccines and hospitalizations. • Provides expert guidance.
Lancet COVID-19 Resource Centre	• Contains all COVID-19 material published across the different Lancet journals, including research, reviews, commentary, news and analysis.
Nextstrain SARS-CoV-2 resources	• Presents publicly available data on the pathogen evolution and pandemic spread through analytics and visualizations. • Aims to increase the epidemiological understanding of the pandemic as well as to aid the response to the COVID-19 pandemic.
OECD Policy Responses – Key policy responses of the OECD	• Compiles data, analysis and recommendations on different topics to tackle the COVID-19 crisis, including the health, economic and societal angle. • Aims to provide guidance on the short-term measures needed in affected sectors and a specific focus on the vulnerable sectors of society and the economy.
Our World in Data	• Compiles data on deaths, cases, tests, hospitalizations, mortality risks, policy responses and more from governments and health ministries worldwide.
Policy Tracker of the International Monetary Fund (IMF)	• Collects policy responses to COVID-19 from 197 countries. • Summarizes the key economic responses governments are taking to limit the human and economic impact of the COVID-19 pandemic.
Population Health Information Research Infrastructure project (PHIRI project)	• Aims to establish a research infrastructure to facilitate and generate the best available evidence for research on health and well-being of populations impacted by COVID-19. • Seeks to improve coordinated efforts at European level to create a high-quality COVID-19 population health knowledge. • Tackles potential inequalities in health information by facilitating the exchange across national and European stakeholders.
Short-Term Mortality Fluctuations (DTMF) data series, Max Planck Institute for Demographic Research	• Compiles weekly death counts and rates for 38 countries. • Also publishes original input data in standardized formats.
World Health Organization (WHO)	• Provides advice for the public, health workers and administrators, questions and answers as well as material (e.g. situation reports) and WHO's response in countries. • Contains technical guidance on COVID-19, including vaccines and a global research database. • For more information on the role of WHO as a knowledge broker during COVID-19 see Box 2.10.
WHO Regional Office for Europe	• Publishes newsletters, webinars, media briefings, publications, tools, country stories and other information collected at a daily and weekly basis on the COVID-19 pandemic in the WHO European Region and beyond; this includes the information collected in the COVID-19 Health Systems Response Monitor (HSRM) (see above).

Sources: Blavatnik School of Government (2021); ECDC (2021a); European Commission (2021g); European Council (2021b); HSRM (2021); IMF (2021); Johns Hopkins University of Medicine (2021); Nextstrain (2021); Our World in Data (2020); PHIRI (2021); Taylor et al. (2020); The Lancet (2021); WHO (2021c).

general public. The astounding pace at which evidence on COVID-19 has been produced is a testament to not only the hard work of researchers, but also ongoing investments in education and scientific research and development in many countries, across multiple disciplines. This is perhaps most aptly demonstrated by one of the greatest achievements of the pandemic so far: the rapid development, evaluation and approval of several effective vaccines within a year of the novel coronavirus first being identified (see Section 5.2). This success was only made possible due to years and in some cases decades of internationally collaborative research – in particular on SARS and MERS, successful public–private partnerships (PPPs) and substantial investment in global vaccine initiatives both before (e.g. Gavi, the Vaccine Alliance (GAVI) and the Coalition for Epidemic Preparedness Innovations (CEPI)) and during (e.g. the COVID-19 Vaccines Global Access (COVAX) facility) the pandemic (Ball, 2021).

While the vast amount of evidence generated during the pandemic has proved crucial in generating effective public health responses, it should also be acknowledged that emerging evidence has rarely been definitive, may have been contradictory, has even been inaccurate or, in a few cases, falsified, as in some extreme cases where findings published in high-profile journals later had to be retracted due to concerns over data veracity (Williams et al., 2020c). Evolving and inaccurate evidence has generated significant debate and contributed to divergent policy responses being adopted in different countries, while the necessary U-turns when the evidence changes risk undermining public confidence. It has also raised the critical question of how policy-makers, scientists and experts can best ensure emerging scientific evidence is used to inform policies during times of crisis.

The role of public health agencies in the response

In 2020 and 2021, national public health agencies were tested on their ability to advise policy-makers facing one of the worst public health crises of recent times. In Europe, many were found wanting, in part reflecting long-term underinvestment in capacity.

In some countries in Asia, such as the Republic of Korea, public health agencies exerted a de facto monopoly of advice and action during most of the COVID-19 pandemic. In the Republic of Korea, the rapid activation, consolidation and reorganization of a network of public health agencies dedicated to responding to emerging threats, played a critical role in containing the COVID-19 pandemic. Initially

placed under the supervision of the Ministry of Health and Welfare, the Korean Centers for Disease Control (KCDC) was elevated to the Korea Disease Control and Prevention Agency (KDCA) on 12 September 2020. This granted the KDCA "more independence in decision making" (Park 2021) and the ability to exert control over budgetary, staffing and organizational matters (KDCA 2020). The newly promoted agency acquired vice-ministerial rank and acted as a disease "control tower", overseeing national and regional efforts to combat COVID-19. Responsible for manufacturing COVID-19 tests, deploying the contact tracing strategy and holding daily press briefings, the newly established KDCA was at the forefront of the Korean COVID-19 management strategy and was relatively insulated from political influence.

Similarly, the Swedish Public Health Agency, created in 2014 through a merger of the Institute for Communicable Disease Control and the Swedish National Institute of Public Health, led the country's COVID-19 control efforts (in particular during the first wave of the pandemic in spring 2020), providing scientific advice to the government and coordinating infection control efforts nationally. However, its primary goal was to mitigate the impact of the virus rather than limit its spread (Andersson & Avlott, 2020). It did not prioritize systematic testing and contact tracing, nor did it encourage the population to wear masks in public settings. Sweden provides an interesting case where, despite being central to the response and relatively insulated from political and private interests (Andersson & Avlott, 2020), the Swedish Public Health Agency was less successful than its Korean counterparts at taking proactive measures and containing the pandemic, with outcomes markedly worse than in its Nordic neighbours.

Surprisingly, some countries whose public health infrastructures ranked highly in the Global Health Security Index (GHSI), such as France and the United States, sidelined their public health experts, turning to other sources of scientific expertise (Rozenblum et al., in press). The French government set up its own sources of expertise, in the forms of two ad hoc scientific committees, rules and procedures, de facto shifting crisis management efforts away from traditional public health actors, including *Santé Publique France* (Rozenblum et al., in press). In the United States, where the public health profession is highly consolidated and institutionalized, the CDC were also sidelined by other agencies with different policy tools, such as the military and emergency managers (Rozenblum et al., in press). The Trump administration set up its

own taskforce, politicizing most dimensions of the COVID-19 pandemic.

In the United Kingdom the decision was taken during the pandemic in 2020 to dissolve Public Health England, an agency established in 2012, and to replace it with the UK Health Security Agency and an Office for Health Improvement and Disparities in April 2021 (Scally, 2020). Public Health England was an executive agency of the Department of Health and Social Care. While it played an integral part in the response to the pandemic, it was clearly subordinated to government. The UK Health Security Agency brings together the United Kingdom's health security science capabilities, data analytics and genomic surveillance, as well as testing and contact tracing capability. These functions had previously been split between Public Health England, the newly established (in 2020) NHS Test and Trace service and the Joint Biosecurity Centre.

In many countries in Europe and beyond, the COVID-19 pandemic was seen as a national security problem and the role of public health agencies or institutes was to help assess the situation and advise decision-makers. This was also the case in Belgium. In early 2020, the National Security Council and the National Crisis Centre were put at the centre of decision-making, extended later to include the heads of regions and communities. These collegiate bodies took all policy decisions for managing the crisis. However, the national public health agency Sciensano was represented in some of the new national governance mechanisms and had a key role in surveillance and monitoring, risk assessment and risk management, and testing and tracing (see Box 2.6).

Developing formal channels for transferring science into policy

Most countries have taken steps to develop formal mechanisms to enable scientists and experts to guide policy-makers through the crisis. This has most often been through the formation or activation of multidisciplinary advisory or working groups that have been tasked with providing scientific and technical guidance to policy-makers on public health measures, reorganizing health systems, potential treatment options for COVID-19 patients and necessary support actions in other sectors (Table 2.2). These include pre-existing groups, such as the Scientific Advisory Group for Emergencies in the United Kingdom, that are long-standing and are activated to advise on different health and environmental emergencies as needed, as well as new groups formed specifically to advise on COVID-19. Some countries (e.g. Finland and Ireland) have also set up task forces specifically to advise on economic responses both during the crisis and the recession that is expected to follow (Williams et al., 2020c).

Advisory groups have been multidisciplinary in nature, recognizing that COVID-19 is not just a health crisis, but requires action across multiple sectors and the implementation of wide-ranging social and economic policies. However, this has raised some concerns that expertise from public health professionals have been sidelined (see above), while views from some essential disciplines such as behavioural and social scientists have been underrepresented. Moreover, women and ethnic minorities have lacked representation on most advisory groups, and few countries have mechanisms in place to capture the views of civil society or community groups (Rajan & Koch, 2020). It is likely that better

Table 2.2 *Approaches to bringing evidence into policy during COVID-19*

Model	Country examples	Roles	Characteristics
Pre-existing expert advisory groups	Belgium, Cyprus, Slovenia, United Kingdom	Review the available evidence and provide directions and communicate advice on appropriate health system measures to policy-makers and the public.	Contains scientific experts from multiple disciplines. Convened by governments and embedded in the political process. Chaired either by Chief Scientific or Medical Officers, public health experts or government actors. Comprises independent experts.
Pre-existing institutions advising governments	Slovenia, Finland, Sweden	Review evidence and communicate advice on public health measures to policy-makers and the public.	Usually universities or national institutes of public health.
Newly established expert advisory groups	Belgium, Bosnia and Herzegovina, Canada, Estonia, France, Ireland, Italy, Luxembourg, the Netherlands, Spain	Review the available evidence and provide directions and communicate advice on appropriate health system measures to policy-makers and the public.	Contains scientific experts from multiple disciplines. Convened by governments. Chaired either by Chief Scientific or Medical Officers, public health experts or government actors. Comprises independent experts.
Task forces to advise on economic recovery	Estonia, Finland, Ireland	To advise governments on social and economic impacts of COVID-19 and to aid an inclusive recovery.	Contains scientific experts from multiple disciplines. Convened by governments.

Source: Williams et al. (2020c).

engagement and learning from these groups during times of emergencies could help build trust and facilitate adherence to public health policy measures (Rajan & Koch, 2020) (see Section 2.8).

In most countries, scientists and other experts have taken centre stage during the COVID-19 responses, playing a critical role in keeping the policy-makers and the public abreast of the most useful and relevant emerging research and sharing information in a timely and credible way. Using respected scientists and experts has helped identify the "right" evidence and in many cases has contributed to it being translated into appropriate public health policy measures. Nevertheless, it does raise some questions over their closeness to policy-makers and the transparency, rigour, objectivity and independence of their advice (Williams et al., 2020c). This raises the prospect that other kinds of intermediaries, or so-called knowledge brokers, who are independent and neutral individuals or institutions and positioned between policy-makers and researchers may be better placed to advise governments during pandemics.

Knowledge brokers and experts can be independent scientists, especially those in higher education institutions. They can be drawn into government work on an episodic basis, organize themselves in civil society (whether learned academies or special COVID-19-related groups), and publish in the mass media as well as scientific and policy publications. In countries with a culture of free scientific inquiry, there was often some independent scientific input, often connected with civil society. Independent scientists, in debate with others, are an efficient mechanism to weed out unsupported ideas and develop higher-quality debate that can inform governments and the public. Another approach to sharing evidence with government and the public is the approach taken by the Independent SAGE group in the United Kingdom, created by a former Chief Scientific Advisor to the government (Independent SAGE, 2021). This multidisciplinary group has been presenting weekly briefings on the progress of the pandemic, typically watched by many thousand people, publishing detailed reports on evidence and policy, and engaging extensively with the mass media. Several of its members also sit on official government bodies. The work of such groups might not always be comfortable reading for governments and there is no guarantee that the scientific quality will be better in any particular case, but science proceeds by argument.

International institutions can also play a key role, which is of particular value to governments that do not have strong scientific research establishments working on relevant topics and which need practical policy guidance. One such example is WHO, which has acted as a knowledge broker during the pandemic, globally (Box 2.8). Similarly, EU institutions have been a valuable source of information, recommendations and guidelines, while also providing various platforms to collaborate and exchange experiences among Member States (Box 2.9). Another example is the European Observatory on Health Systems and Policies, which provided evidence on pandemic responses within Europe (Box 2.10). Going forward, it will be important to find ways to embed knowledge brokering entities and expertise in the policy-making process beyond the current crisis in different contexts and under different

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Box 2.8   *WHO as knowledge broker during COVID-19*

WHO has played a central role as a knowledge broker during the pandemic alongside its other roles. WHO and partners founded the COVID-19 Evidence Network to support Decision-making (COVID-END), which aims to help decision-makers find and use the best available evidence on COVID-19 and to reduce duplication of research efforts (McMaster Health Forum, 2021). WHO has also scaled-up the work of the Evidence-informed Policy Network (EVIPNet) that aims to help countries develop the capacity to move towards evidence-informed policy-making and action.

WHO has also published evidence-based advice, technical guidance and planning and monitoring tools, which have been adapted as new evidence has emerged and been tailored to Member States' needs. These have covered a range of topics such as the health workforce, surveillance, country-level coordination, planning and monitoring, essential resource planning and guidance for schools, workplaces and institutions, among many others. More example of country and technical guidance can be found here: https://www.who.int/emergencies/diseases/novel-coronavirus-2019/technical-guidance. Many countries have used this information in a number of ways, such as to inform the development of treatment protocols or adopting WHO case definitions of COVID-19 to inform testing, isolation and quarantine measures (e.g. in Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Cyprus, Estonia, Finland, Georgia, Ireland, Italy, Montenegro, Moldova, Portugal and Uzbekistan). It has, however, been criticized for the delay in recognizing the airborne nature of transmission of SARS-CoV-2 (Baraniuk, 2021).

In addition, WHO supported generation of knowledge by coordinating international research efforts, developing a global COVID-19 research roadmap early in the pandemic and launching the multicountry Solidarity Trial and the Access to COVID-19 Tools Accelerator (ACT-Accelerator) together with partners to support the rapid development, testing and access to effective treatments and vaccines for COVID-19 (Kuchenmuller et al., 2021).

Box 2.9   *EU institutions as knowledge brokers and facilitators for information exchange*

In March 2020, the European Commission set up the Advisory Panel on COVID-19 composed of expert members from relevant scientific disciplines including epidemiology, virology, public health, crisis management, civil protection and others. The panel has been lending expert support to the Commission in formulating response mechanisms, identifying and mitigating gaps in pandemic management and making recommendations for policy measures at both EU- and Member State-level (European Commission, 2021c). Several other EU expert groups and Member State committees, including the Health Security Committee, have provided a space for Member States to cooperate in exchanging information and best practices. Furthermore, substantial funding for COVID-19-related research has been mobilized from Horizon 2020 – the EU's funding programme for research and innovation that ran throughout 2020 – to support researchers in generating new evidence to fight the virus (European Commission, 2021f). Funding for COVID-19 research will also be available through the Horizon Europe funding programme, which replaced Horizon 2020 since 1 January 2021.

EU agencies have also played an important role as knowledge brokers during the coronavirus pandemic. In particular, the ECDC has been continuously collecting epidemiological data from EU countries, as well as rapidly harmonizing and evaluating it since the early stages of the pandemic. ECDC's rapid risk assessments, daily and weekly situational updates and colour-coded country mappings are freely accessible online and have served as guidance to both researchers and policy-makers across the EU (ECDC, 2021a; 2021b). Among many other resources, ECDC has also set up an open-

access COVID-19 Vaccine Tracker which monitors the vaccination campaign's progress.

The Commission's Expert Panel on Effective Ways of Investing in Health has published reports on topics related to the pandemic, including health systems resilience, procurement and mental health of health workers.

The Commission has further established several new online portals to facilitate the information exchange and coordination of actions across Member States. For instance, the Re-open EU portal collects information on current restrictions, quarantine and testing requirements enforced in different Member States, and Council recommendations on free movement to enable safe travel and resume free movement within the EU (European Union, 2021). In March 2020, together with the WHO Regional Office for Europe and the European Observatory on Health systems and Policies, the Commission has created the Health System Response Monitor (HSRM) to collect information on national responses to the crisis (see Box 2.10). Another useful online resource is the European COVID-19 Data Portal, which allows researchers to collect and share available data on ongoing coronavirus research, including viral sequences and relevant literature, to accelerate the evidence building process (COVID-19 Data Portal, 2021). In June 2021, Directorate General for Research and Innovation launched the Coronavirus Global R&I Collaboration Portal, which will serve as a matchmaking platform for researchers to collaborate and connect about research projects focused on the socioeconomic impacts of COVID-19 (European Commission, 2021e).

Box 2.10   *The European Observatory on Health Systems and Policies as a knowledge broker during COVID-19*

The Observatory has played a pivotal role as a knowledge broker in Europe. In response to the outbreak it has developed the Health System Response Monitor (HSRM) to systematically collect up-to-date information on how countries have been responding to the crisis. The monitor was launched in March 2020 and focuses primarily on the responses of health systems but also captures wider public health initiatives and support measures introduced in other sectors (HSRM, 2021). The HSRM is a joint undertaking of the WHO Regional Office for Europe (Box 2.8), the European Commission (Box 2.9) and the European Observatory on Health Systems and Policies. It therefore covers all 53 Member States of the WHO European Region plus selected OECD countries.

Evidence collected through the HSRM platform has been translated into a range of analytical products, including the policy "snapshots", which present cross-country analyses of health system responses and draw key policy lessons, and a suite of articles in a special issue of *Eurohealth* (the Observatory's quarterly publication) (European

Observatory on Health Systems and Policies, 2020) and peer-reviewed articles published in a special issue of the *Health Policy* journal. It has also published policy briefs on health systems resilience (Thomas et al., 2020) and Long COVID (Rajan et al., 2021).

Building on this evidence, the Observatory has developed various face-to-face knowledge brokering formats. Since October 2020, it has run weekly lunchtime webinars, covering various aspects of the pandemic response across countries in Europe and focusing on practical experiences of selected countries. In 2021, the focus of these webinars has shifted to the post-pandemic recovery and the topic of building back better. In addition, Observatory has had strong presence at key European conferences such as the European Health Forum Gastein, the European Public Health Conference and the European Health Management Organization conference. It has also organized smaller-scale online policy dialogues for governments, focusing on specific aspects of the COVID-19 response, such as on the financial aspects of the health response or data collection and sharing policies.

conditions to continue the necessary shift towards evidence-informed decision-making and to ensure future health policy is based more on science than on politics as is often the case now.

2.5 Coordinating effectively within (horizontally) and across (vertically) levels of government (Strategy 5)

Key observations

Both centralized and decentralized approaches have their advantages and disadvantages during a pandemic and have to be balanced. After the initial tendency to centralize power, both within and across the levels of government, there has been a shift to more decentralized, territorially sensitive approaches albeit with central governments retaining a coordinating role.

- Centralization of power in the executive is seen as a way of enhancing coordination of the response across sectors and requires well-functioning mechanisms if it is to work.
- Horizontal coordination within government is often difficult. Countries employed a mix of primarily new mechanisms from coordinating and emergency committees to interagency groups but there were tensions on leadership even in countries with strong traditions of consultation and pre-existing coordinating bodies and processes.
- Vertical coordination across levels of government can also be difficult – not least because of competition over power and the distinct political agendas of regional and

local governments. Alignment of decision-making authority with implementation responsibilities and established formal and informal ways to manage and channel competing perspectives supported coordination.
- Countries have had to evolve over time the understanding of the roles of different actors and transparency, including on legitimacy and accountability of actors and their roles, has supported this.

Centralization versus decentralization in COVID-19 decision-making

The scale of the challenge presented by COVID-19 necessitated a remarkable level of involvement in policy responses, going beyond the health sector. Territory also matters in a pandemic, epidemiologically and politically, and all governments must manage this kind of territorial differentiation. Epidemiologically, the pandemic does not hit different places in the same way (Fig. 2.2). First, movement of people across national borders may differ across regions. Second, many of the factors that shape patterns of infections and fatalities are territorially uneven: age structure, poverty, inequality, vulnerable populations and health characteristics, such as obesity or hypertension.

Some of the risk factors relate to longer-term public policy decisions that are in the hands of regional and local governments. Policies can create epidemiological risks over time. While population density per se is not a problem, high housing density may be problematic (e.g.

Figure 2.2 *There were large within-country differences in COVID-19 fatalities*
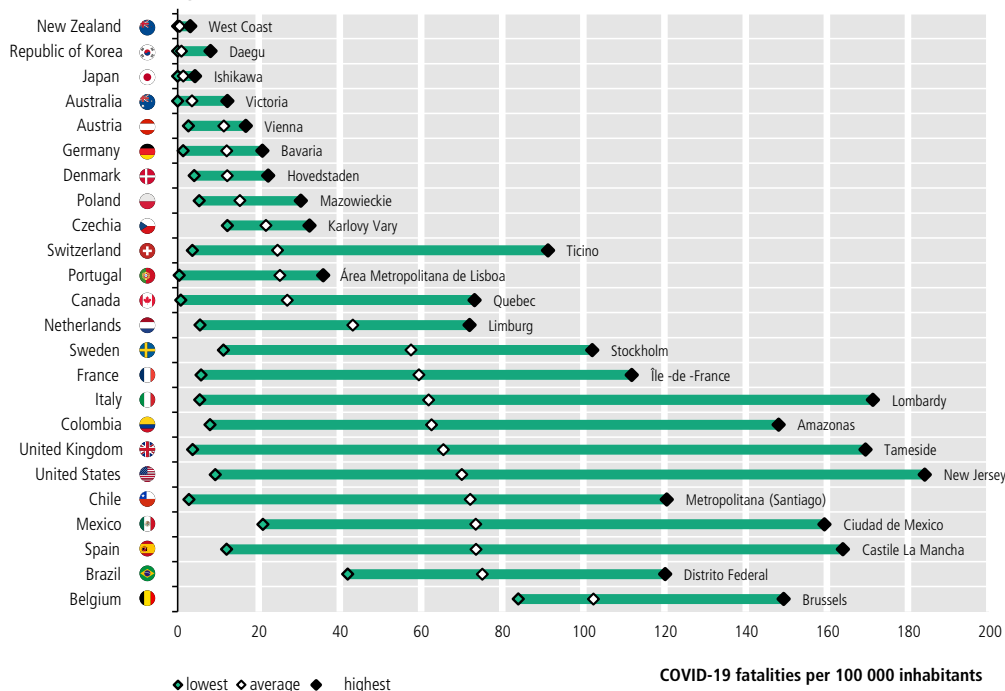
Note: COVID-19 fatalities per 100 000 inhabitants, NUTS-2 (TL2) regions as of November 2020. See https://ec.europa.eu/eurostat/web/nuts/background/ for NUTS classifications.

Source: OECD (2021b).

Table 2.3 *Centralization or decentralization occurs both within and between governments*

	Existing mechanisms	Centralization	Decentralization
Intragovernmental (within government)	No change in autonomy and prominence of ministries, agencies or in coordination mechanisms.	Increased prominence of heads of government/key ministers; reduction in autonomy of agencies and ministries.	Increased prominence of public health agencies, science advisers and ministers; increased autonomy for agencies and ministries.
Intergovernmental (between governments)	No change in intergovernmental relations or subnational power and autonomy.	Central government pre-emption of local and regional government resources and powers.	Central government withdrawal and increasing autonomy and responsibility for regional and local government.

Source: Authors.

number of people per household, people per housing unit or square metres per person) and it is influenced by public policy decisions such as regulations for new construction or provision of public housing. There are other ways in which the legacy of local and regional political decisions affected the course of the pandemic; for example, the strength of workplace protection enforcement, the strength of local health care systems, and the financing and organization of public health systems. COVID-19 carries lessons for governments about how seemingly unrelated decisions in areas such as housing can affect public health.

Understanding how governance adapts in a crisis such as COVID-19 requires thinking about two dimensions, summarized in Table 2.3. One dimension is the extent of change within (vertically) and the other dimension is the

extent of change between (horizontally) governments. *Intragovernmental* coordination means coordination between units of the same government, such as different ministries and autonomous agencies. Many studies of intersectoral governance and coordination focus on this topic of coordinating actions of different departments. This is related to a long-advocated (but often neglected or failed) collaborative approach to health policy-making called "Health in All Policies" (HiAP) (WHO, 1986). *Intergovernmental* coordination means relations between governments: between central and regional, between central and local and between regional and local.

Governments could opt for one of three broad approaches on these two dimensions. One uses existing mechanisms, leaving the balance of power, visibility and prominence unchanged (see below). Thus, using an intragovernmental example, some governments (see Table 2.4) deferred to their existing public health agencies for advice while others sought new sources of advice. A second was centralization. Intragovernmentally, this meant increasing the power and visibility of the head of government at the expense of other ministers or autonomous agencies by, for example, sidelining public health agencies (see Section 2.4) when creating crisis management bodies. Intergovernmentally, it meant increasing the power of the central government over local and regional governments (and, in some cases, the power of regional governments over local ones; for example, regional curfews overrode local ordinances on opening and closing times). The third approach was decentralization (see below).

Shifting between centralization and decentralization over the course of the pandemic

As Table 2.4 shows, there was a clear tendency to centralization early in the pandemic. These efforts often involved top-down approaches and in some cases were supported by health intelligence systems. Horizontal coordination was a challenge in many federations; even in countries with strong traditions

Box 2.11 *Why can it be difficult to coordinate across levels of government?*

In the actual emergency response phase of the pandemic, the powers and political agendas of regional and local governments matter greatly. There could be disagreement about policies, political and partisan disagreement about credit and blame, and misalignment of responsibilities.

For example, in some cases the division of powers between federal, regional and state governments created perverse incentives, with regional governments in charge of economically important public health powers but the federal or central government resourced to compensate for associated losses. In those cases, the success of the response in the short or long term depended on the federal or central government's willingness to pass large-scale economic and social policy measures and state willingness to enforce public health measures.

Much could and did go wrong in these situations (Greer et al., in press). Even where financial powers were more centralized, local government enforcement of central guidelines could be highly variable. Regardless of constitutional form, governments that controlled key resources such as police and health care provision could affect the course of the pandemic. Crisis and conflict can reveal how de jure and de facto power diverge.

Table 2.4 *Most countries in Europe tended towards centralization in early response to the pandemic*

	Spring/summer 2020		Autumn/winter 2020		
Domain of intervention	Centralization within government	Centralization between governments	Centralization within government	Centralization between governments	Decentralization (any kind)
Governance					
Interministerial committee Coordination agency National Security Council	AL, AM, AT, BA, BE, BG, CA, CH, CY, CZ, DE, EE, FR, GE, GR, HR, IE, IL, IT, KG, LT, LU, LV, ME, NL, PL, PT, RS, RU, SK, UA, US	BE, DK, FR, KZ, RU	DK, ES	BE, BG, RS	BE, BG, CA, CH, DE
Expert/vaccine committee	AL, BE, BG, CA, EE, FR, HR, IE, MK, SI, TR, US	CA	FI, FR, IE, LT, LU, NL, RU		
State of emergency/ emergency laws	AM, BA, BE, BG, EE, ES, FR, GE, HU, LU, MD, MK, MT, PL, RO, RS, US	CH	FR, PT, ES		
Centralized governance of the health care system		AT, DE, IT, LT		LT	
Preventing transmission					
Health communication	GR, HU, IT, ME, RS				
Physical distancing		BE, CA, DE			DE, FR, ES
Contact tracing		ME			
Isolation and quarantine		FI			UA
Monitoring and surveillance, contact tracing, reporting cases and hospital capacity	BE, BG, CY, DK, IL, MK, PL, RO	AT, BG, CA, CH, DE, ES, UK, IT, MK, NO, PL	IE	DE	DK, NO
Testing	GR, IE, IL, ME	LT, ES		DE	IT
Physical infrastructure and workforce capacity					
Physical infrastructure	DK, HR, IE	DE		DE	
Workforce				DE	
Providing health services effectively					
Planning services	BE	IT, RO	GR		BG
Managing cases		LT			
Maintaining essential services					
Paying for services					
Health financing	BE, ME	CA, DK, FI		BG, CA, CH, ES, RU	
Entitlement and coverage					

AL: Albania; AM: Armenia; AT: Austria; BA: Bosnia and Herzegovina; BE: Belgium; BG: Bulgaria; CA: Canada; CH: Switzerland; CY: Cyprus; CZ: Czechia; DE: Germany; DK: Denmark; EE: Estonia; ES: Spain; FI: Finland; FR: France; GE: Georgia; GR: Greece; HU: Hungary; HR: Croatia; IE: Ireland; IL: Israel; IS: Iceland; IT: Italy; KG: Kyrgyzstan; KH: Kazakhstan; LT: Lithuania; LU: Luxembourg; LV: Latvia; MC: Monaco; MD: Moldova; ME: Montenegro; MK: Macedonia; MT: Malta; NO: Norway; NL: Netherlands; PL: Poland; PT: Portugal; RO: Romania; RS: Serbia; RU: Russian Federation; SI: Slovenia; SK: Slovakia; TR: Turkey; UA: Ukraine; UK: United Kingdom; US: United States.

Source: Greer et al. (in press).

of consultation and coordinating processes, regional governments found it difficult to commit to any kind of collective action. Vertical coordination across levels of government could also be difficult (Box 2.11). Such problems are nothing new, and most countries have established formal or informal ways to manage and channel them. In Germany, the constitutional law (*Grundgesetz*) gives federal states (*Länder*) responsibility for public health, with the federal government having only an advisory role on infection control measures. The Infection Control Act was revised in April 2021 in response to widely varying infection control measures

at federal, state and local level during the pandemic to ensure they apply consistent measures when specified COVID-19 incidence thresholds were reached.

Over time, many countries have quite reasonably attempted to develop more place-based approaches to public health measures. This seems to reflect disenchantment with the experiences of early 2020 when national lockdowns for regional outbreaks did what appeared to be unnecessary harm to economies and goodwill, as well as other considerations (Box 2.12). Defining and implementing local and regional measures

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Box 2.12 *Why centralize or decentralize authority in a crisis?*

There are many reasons to centralize or decentralize authority in a crisis, and the effects on crisis response and the course of the pandemic are so context-specific that it is hard to generalize.

Broadly, the policy logic that governments contend with seems to be about externalities, efficiency, and perhaps perceived fairness: if there are cross-border externalities then some kind of coordination is required and that often requires centralization even if in some cases efficiency demands more local decision-making and action. Local adaptation, such as local lockdowns or local authorities' discretion over pandemic measures, can also lead to concerns about unfairness that undermine policy legitimacy. This complexity and context sensitivity is why public health responsibilities, unlike responsibility for most other dimensions of health policy, tend to be spread across all levels of government; there does not appear to be a stable, functional case for any particular allocation of public health responsibility to any particular level of government (Adolph et al., 2012).

In many cases, the logic of seeking political credit and avoiding blame explained decisions (Greer et al., in press); when there is credit to be had, politicians seek it and centralize – intragovernmentally, by centralizing decisions and communications around the head of government, and intergovernmentally, by centralizing decision-making powers. When there is blame to be had, they decentralize in order to deflect it onto others (intragovernmentally, by increasing the prominence of scientists, ministers, and public health agencies and decreasing the visibility of the head of government; intergovernmentally, by giving increasing responsibility to regional and local governments). Organizational design and policy advice should be attentive to such political dynamics.

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has been a constant challenge (Jarman et al., 2020a). These often worked out poorly, whether for political reasons (governments were not able to maintain the policy in the face of local resistance), policy reasons (poorly defined criteria or questionable data), or social and economic reasons (no European economy, and not even the EU, works well when internal borders are suddenly imposed). To the extent that there were durable place-based strategies, they were a function of the powers of established federal and local governments.

Relations between different levels of governments have thus changed in response to the pandemic. But there is no generalizable answer to the question of whether a response should be centralized or decentralized. Context matters; unsurprisingly as, for example, some German *Länder* are larger than many countries (a

discrepancy that is even greater outside Europe: the Brazilian state of Sao Paulo has almost as many people as Spain). Rather, what is important is that decisions are taken at the level at which there are the powers to implement them, while recognizing the importance of coordinating with neighbouring areas, some of which may lie across national frontiers. During the first wave of the pandemic (March–May 2020), each Italian region adopted its own approach to testing and isolation. As testing capacities greatly varied by regions, national guidelines were issued by the central government to harmonize approaches (Falkenbach & Cajani, 2021). In Austria, regional governments were responsible for implementing the inner border closures decided by the federal government but were also free to implement stricter measures, such as quarantine for smaller regions severely hit by the crisis (Desson et al., 2020). An emphasis was placed on measures being taken at the appropriate organizational tier, balancing local knowledge with economies of scale. Thus, although the German federal government delivered stocks of PPE to the *Länder*, the latter were responsible for allocating and distributing the material to regional health care providers. In these federal systems, optimal strategies relied on transparency, formal and informal coordination mechanisms between different units of governments, and reliable data that fostered effective coordination and power alignment.

Using coordination mechanisms – new or pre-existing

In many countries, the pandemic response was led by the head of government's office (e.g. Estonia, Finland, France, Israel, Serbia and Ukraine). In other countries, the Minister of Health was at the forefront of the governmental response to COVID-19 (e.g. Czechia, Greece, Lithuania and Slovenia), while in some others heads of government worked in tandem and shared equal responsibility with ministers of health (e.g. Estonia, Lithuania, Latvia and Malta). Another tool, often found in special COVID-19 legislation or existing law, was the creation of a coordinating committee that enhances intersectoral governance by centralizing authority in a body that represents the key sectors involved in the response (Greer et al., 2020). Most countries have established or activated such a body, led by senior politicians or their delegates.

While a few governments used pre-existing inter-ministerial committees, most established new bodies, usually designed to empower the head of government vis-à-vis existing sources of authority in the bureaucracy. For example, the Russian government created a

Coordination Council led by the Prime Minister and the Mayor of Moscow to coordinate all actions at the federal, regional and municipal levels. Other federal countries brought decision-making into central government, including Spain, Italy, and Belgium (Greer et al., 2020). In Spain, for instance, all publicly funded health authorities were placed under the direct supervision of the Ministry of Health for the duration of the crisis, although this was not without political challenges given the different parties involved. More centralized countries also created new entities, such as special government emergency committees (Finland, Lithuania, North Macedonia, Ukraine), an Operational Intersectoral Headquarter (Serbia), or an interagency working group led by the Ministry of Health or the Ministry of Social Affairs (Estonia) (Greer et al., 2020). By creating ad hoc bodies, several governments sidelined pre-existing coordinating structures. In France, for instance, the pandemic response was originally led by the Ministry of Health but then shifted to the office of the Prime Minister (Rozenblum et al., in press), while also using the National Defence Council (which existed before the crisis) and Scientific Councils set up in March 2020 (Rozenblum et al., in press).

One of the clear lessons of the COVID-19 pandemic is that organizations can be jolted into new routines by crises, including by crises that go on for so long as to turn special adaptations into habits. Thus, for example, intergovernmental coordination forums in federations got more use, with existing ones helping with coordination in countries such as Canada and Germany, and forums which had functioned less smoothly before the pandemic becoming newly useful to policy-makers in countries such as Spain. Coordinating councils and mechanisms need not produce coordination if politicians and policy-makers do not want to coordinate or see political advantage in creating conflict, but their presence and operation can create new policy options and arenas to negotiate positive-sum bargains (as arguably happened in the EU in 2020). As an OECD report concluded (OECD, 2021b):

> Successful short-, medium- and long-term responses to the coronavirus-induced crisis [do] not depend heavily on whether a country is federal or unitary or on its degree of decentralization. Rather, [they depend] more on the coordination mechanisms applied, as well as on the ability of government actors to align priorities, implement joint responses, support one another, and foster information sharing, including with citizens.

Having (or establishing) clear roles and effective mechanisms to implement decisions (e.g. executive orders and other regulations) is thus key to implementation of emergency responses.

2.6 Ensuring transparency, legitimacy and accountability (Strategy 6)

Key observations

There is a tension between acting fast to meet emergency needs and following the due process designed to protect systems from abuse, which governments need to manage with care.

- The pandemic demanded urgent action which in turn required flexibility. Countries responded to the urgency in a number of ways including by relaxing procurement procedures and by restricting civil liberties. Many have seen instances of corruption and other abuses of process.
- There is a need for governments to be mindful of the compromises being made and to follow good governance standards so far as is possible. Countries that were transparent about changes in procurement are well placed to review recent practice and address any shortcomings.
- Detailed presentations of response measures and performance indicators support accountability of decision-making.
- Sustaining parliamentary scrutiny is an important part of the oversight and can help prevent corruption. Many legislatures adapted or established dedicated committees to monitor response policy or found innovative ways to oversee emergency legislation, despite physical distancing and other constraints.
- The judiciary and civil society initiatives also act as scrutineers and may restrain executive excess.
- Dedicated transparency and anticorruption organizations have also proved useful in many countries supporting transparency and anticorruption measures and seeking to protect whistle-blowers.

Risk of corruption and to civil liberties

Health systems in many countries suffer from systemic weaknesses that make them vulnerable to corruption. These risks are amplified by the urgency and flexibility required during emergencies. Many governments have responded to the emergency by loosening their procurement checks and balances; for example, by choosing to abandon competitive bidding in open tenders or awarding contracts to suppliers they have never dealt with before or ones that have little or no prior track record (see Section 3.2). Corruption in pandemic-related procurement is unsurprising, given the often panicky conditions (e.g. the scramble for

PPE), the relaxation of many procurement rules (which is usually permitted in emergencies), and the generally corruption-prone nature of the health sector (European Commission, 2014). Yet it is always unacceptable. Some governments have sought to evade accountability exercised through freedom of information requests although such requests are seen as an effective anticorruption tool, often being the only official mechanism for transparency in otherwise opaque areas such as health procurement (Wright & Darby, 2020).

There were also other risks. Emergency powers allowed governments to take exceptional steps to deal with the crisis; for example, temporarily curtailing freedom of movement and other civil liberties in order to limit the spread of the virus. In some cases, this created a risk that emergency measures would not be repealed when no longer required, nor implemented in a proportionate way, leading to a permanent shift in power towards the executive, potentially undermining public trust in the national pandemic response. Notwithstanding the need for speed and flexibility, governments should follow good governance standards in the design, implementation and evaluation of the response package within and beyond the health sector.

Table 2.5 summarizes the International Monetary Fund's (IMF) guidance for ensuring transparency, accountability and legitimacy of fiscal policy responses during the pandemic that could also be useful for ensuring good governance of non-fiscal policy responses more broadly. We discuss some of these measures below.

Paying attention to how measures are designed and presented

Detailed and granular presentation of measures and embedding accountability mechanisms in their design, for example, by establishing clear goals and performance indicators, have been used to support accountability of decision-making. Proactive strategies that reach the vulnerable and at-risk populations with the information they need in accessible formats has been used to increase the effectiveness of measures. For example, countries such as Iceland and the United Kingdom have created webpages where citizens can find information on their eligibility to access support for vulnerable households.

Sustaining parliamentary and judicial oversight

Maintaining parliamentary oversight of policies is crucial, particularly when participation by the public and key stakeholders in other ways is restricted (see Section 2.8). Parliaments have found innovative ways to strengthen oversight of the scope, budgetary consequences, timespan, implementation methods and unintended consequences of emergency legislation, while working around physical distancing and gathering restrictions (United Nations, 2020). For example, many legislatures have adopted procedures to allow virtual discussions and used social media to provide updates on the pandemic and engage with their constituents. The Interparliamentary Union (IPU) has offered support to parliaments by sharing information on how parliaments are responding, including by developing guidance for legislators and offering technical support to parliaments on remote working methods. Still, the crucial function of the parliament providing constitutional oversight on the executive and regulations has often faltered during

Table 2.5   *What can be done to safeguard transparency, legitimacy and public accountability of fiscal policy responses during COVID-19?*

	Examples of measures
Policy design	• Ensuring parliamentary scrutiny and securing legal authorization of policy measures.
	• Specifying crisis-related measures in the budget with clear eligibility criteria and ensuring granularity of information.
	• Establishing clear policy goals and performance indicators to facilitate the ex-post assessment of impact.
	• Assessing and disclosing the impact of the crisis on public finances and the economy.
	• Consulting with key stakeholders to ensure appropriate design and targeting of policy measures.
Policy implementation	• Tracking additional COVID-19 related spending through dedicated programmes or sections of the budget.
	• Channelling donor funding through the budget with full transparency on its utilization.
	• Applying international standards of transparency to the implementation of off-budget measures.
	• Where relevant, ensuring transparency when adapting existing rules to provide more flexibility in the implementation of actions.
	• Strengthening ex-post controls when ex-ante and upstream controls are streamlined for rapid response.
	• Informing citizens about policy measures that are available and how to access them.
Policy oversight	• Regularly reporting on the progress of implementing the support package – both on and off-budget operations.
	• Instituting parliamentary oversight of implementation either through conventional or specific tools.
	• Involving civil society organizations in monitoring and ex-post assessments.

Source: Wendling et al. (2020).

the pandemic. Some countries, such as Finland, which mandates immediate constitutional and parliamentary scrutiny over government regulations as part of the Emergency Powers Act, were able to ensure continuous oversight (Scheinin, 2020).

The judiciary can also play an important role, acting as a constraint on the executive (see Section 2.1). Similar to parliaments, courts have found new ways of working, yet some could only take on urgent or priority cases. Some countries did not have a legislative framework to enable remote hearings, which limited their ability to review new regulations and address corruption. Courts in several countries, including Slovenia and Italy, evaluated the constitutionality of emergency legislation against its constitution (Grogan & Beqiraj, 2021). One example of good practice is the work of the Good Law Project in the United Kingdom, which has held the government to account by means of a series of judicial reviews (Good Law Project, 2020).

The role of civil society and other organizations

In addition to judicial branches of government constraining the opportunities for corruption, internal and external auditors can also identify risks in public financial management and procurement systems. In particular, they can provide critical information to hold governments accountable; for example, by publishing transparent information about public transactions.

Public authorities can collaborate with leading transparency and anticorruption organizations to ensure transparency, prevent corruption and strengthen whistle-blower protection during a COVID-19 state of emergency. Civil society organizations, such as the Institute for Development of Freedom of Information, have also developed guidelines on public procurement in the pandemic (United Nations, 2020). This can help foster public support and build institutional legitimacy of the measures implemented in the longer term, increasing their effectiveness and reducing the risk of funds being misappropriated.

2.7 Communicating clearly and transparently with the population and stakeholders (Strategy 7)

Key observations

Effective communication with the public and relevant stakeholders is key to delivering public health messages to prevent infection and to share expectations and requirements. It is also central to trust and compliance.

- Disseminating public health and other "pandemic" information through a variety of channels (broadcast, print

press, social media etc.) increases its reach, particularly when these reflect popular preferences. It can also create inconsistency, information overload and confusion.

- Coordinating communication across channels and actors is the "obvious" way to ensure consistency but few countries were able to put a national communication strategy or coordinated messaging plan in place.

- Specific population groups including the young, the vulnerable and those not speaking the country's official language were often overlooked with "one-size fits all" messages. Some countries did make effective use of targeted communication and tailored messaging to reach particular audiences and other countries could learn from their approach.

- The presentation of data by governments can be surprisingly poor leaving populations struggling to interpret the information. Done well, data presentation has a high impact and countries that were able to share data transparently or that developed participatory approaches to data sharing were more effective in messaging and inspired trust.

- The "infodemic" or overabundance of misinformation and disinformation during COVID-19 are a major challenge particularly on social media. Countries, the European Commission and WHO all made efforts to minimize impact but further measures on fact checking and moderation, including by platform providers, are needed.

Communication and trust

The pandemic response can be strengthened by effective communication to the public and relevant stakeholders. This reduces ambiguity and increases understanding and, most likely, acceptance of measures (Mintrom & O'Connor, 2020). In the longer term, it can help sustain compliance, reassure the public and combat misinformation. It also cultivates trust between citizens and their governments (Tworek et al., 2020). Upholding the principles of good governance, including transparency, can help build trust in leaders and institutions and support effective implementation of policies both during the pandemic and in "normal" times. However, public communication has been frequently under-resourced or neglected by decision-makers during the pandemic (Tworek et al., 2020).

Coordinated messaging across multiple channels

Governments have been disseminating two types of public health messages: 1) public health messages on infection prevention; and 2) official communications to inform the public of the current situation and policy. If they are to ensure wide coverage and maximum impact

Figure 2.3 *A variety of health communication strategies were used in the context of COVID-19*

Health communication strategies
Regular press conferences and briefings by government and/or public health agencies
Public health campaigns on traditional media, such as TV, radio and print ads
Public health campaigns on social media, such as Facebook, Twitter, Instagram and YouTube
Regularly updated information on COVID-19 webpages of existing official websites
Dedicated COVID-19 website as online information portal for population
COVID-19 telephone hotline for questions and/or feedback from population
Display of Information in public spaces and public transport through posters, billboards, leaflets
Individual text messages via SMS, emails and messaging services (e.g. WhatsApp, Viber, Telegram)
Information leaflets and letters via post
Chatbots for standard COVID-19 questions
Online information portals for health professionals
Webinars

■ Often used ■ Sometimes used ■ Rarely used

Communication features
Early Risk Communication on COVID-19 (until early February)
Information available in foreign or minority language
Public health campaigns targeted at specific communities or social groups
Monitoring of media to prevent mis- and disinformation
Reporting restrictions on COVID-19

■ Often ■ Sometimes ■ Rarely

Source: Weitzel & Middleton (2020).

of these messages, a mix of different communication channels are needed.

Ministers have traditionally used television or radio broadcasts and, increasingly, social media to address their citizens in times of crisis. During COVID-19, public broadcasting services have aired regular press conferences where politicians announce and explain measures to the audience (Fig. 2.3). These may be supplemented by press briefings with technical experts who explain the epidemiological situation. Health advice and interviews in print media and advertisements can further amplify these public health messages. Social media platforms, such as Facebook, Twitter, Instagram and YouTube, are now key elements of most public health campaigns. Official websites are another means of communication. Several countries also employ direct channels of communication, such as hotlines, text messaging and chatbots. Other common channels to convey COVID-19 information include posters, billboards, or public service announcements (PSAs) in health care institutions, public spaces or public transport. The chosen channels should align with local communication cultures. For example, countries with a strong e-health tradition, such as Denmark, Estonia and Finland, utilize more online-based and individual communication.

The use of multiple communication channels can create inconsistency and fragmentation of official public health messages. It can also create information overload and confusion about which sources are reliable. A national communication strategy, with a coordinated messaging plan, has considerable merits. Yet only few countries have developed a plan. As a minimum, many countries have a dedicated COVID-19 website, which pools information and news related to mitigation measures in different government sectors, such as health, the economy, employment, travel, etc. Such resources can be used not only as a source of reliable COVID-19 information, but also for building trust with the public.

Reaching different population groups

With increasingly diverse societies, it is ever more important to avoid exclusion of disadvantaged groups, including the substantial share of many populations who are digitally excluded. For example, only a few countries make their information available in languages used by minorities, excluding people who are not fluent in the official languages. Moreover, many public health messages are "one-size-fits-all", failing to take account of the needs of certain groups, such as migrants or children. But there are notable exceptions, such as the United Kingdom, where many publications are published in a range of Asian, African and other European languages. Finland's communications strategy included campaigns with celebrities targeting younger people and dedicated press conferences for children.

Participatory approaches to data interpretation

Effective public communication requires a high degree of transparency, including about risk and uncertainty, as well as community engagement, with participatory approaches that move away from old-fashioned one-way communication. The COVID-19 Global Risk Communication and Community Engagement (RCCE) Strategy offers valuable guidance (WHO, 2020a). For example, clearly communicating what data means and how to interpret it can help people to understand risks and manage expectations, thereby enhancing public support for the response.

Managing the "infodemic" and tackling false information

The word "infodemic" was coined by WHO in 2020 to denote an overabundance of information and the rapid spread of misleading or fabricated news, images and videos (WHO, 2020c). Even before the pandemic, social media had become a platform for disseminating

misinformation, including harmful information about health. During the COVID-19 pandemic, individuals and, in at least one case, a state agency, have been spreading misleading advice about both prevention and treatment, fuelling distrust of scientists and experts and potentially threatening public health initiatives and policies. Misleading information is not always intentionally malicious, but there has been a growing volume of disinformation, or "fake news", intentionally being spread by organizations or individuals to promote their political, economic or ideological agendas (Williams et al., 2020c). Effective communication thus also involves confronting misinformation (false information) and disinformation (false information that is intended to deceive), based on a detailed understanding of the role of the many cognitive biases that shape how people interpret information.

In response, national authorities and WHO created and publicized multiple, shareable infographics to debunk COVID-19 myths. However, in many cases more robust risk communication strategies were needed to combat misinformation about efficacy of treatments and preventive measures, such as encouraging individuals to share accurate information created by expert organizations within their social networks (Vraga & Bode, 2021).

European institutions have also stepped up and developed targeted initiatives to counteract COVID-19 disinformation. In the first place, the European Commission has expanded existing resources, such as those set up by the Commission's 2018 Action Plan against Disinformation which calls for: 1) an improved detection of disinformation; 2) a better coordination of responses, including the establishment of a Rapid Alert System for Member States to communicate on related threats; 3) the empowerment of citizens; and 4) the cooperation with actors from online platforms and the private industry (European Commission, 2018). For instance, the Code of Practice on Disinformation, already signed by companies such as Facebook, Google, Twitter and Microsoft in 2018–2019, requires signatory platforms to promote the dissemination of fact-checked information, as well remove illegal and misleading contents on COVID-19 and regularly report on adopted measures to the Commission. For example, in July 2021, TikTok reported the roll-out of a vaccination support campaign in cooperation with the Irish government, which reached over one million viewers (European Commission, 2021a; 2021d). Among its new tools, the Commission counts a dedicated website to debunk COVID-19 myths and to provide a comprehensive overview of reliable resources

for citizens to access (European Commission, 2021l). It has also released a Joint Communication on "Tackling COVID-19 disinformation – Getting the facts right", which summarizes actions already undertaken and planned by the EU to better tackle the challenges posed by COVID-related disinformation (European Commission, 2020e).

Despite these efforts, misinformation and disinformation remain a widespread problem, and further national measures are often necessary. For example, engaging the broader public and civil society in decision-making and communicating the decisions helps prevent misinformation and mistrust (Section 2.8) but public health authorities should also ensure that they have capacity to monitor disinformation on social media and develop responses, including engaging with social media companies, taking care not to give added visibility to it. Unfortunately, in some countries, contrarian scientists and health professionals have played major roles in promoting disinformation, often linked to their beliefs in conspiracy theories.

An OECD report lists four concrete action points that governments and online platforms can take to combat disinformation and misinformation on the Internet platforms: 1) supporting a multiplicity of independent fact-checking organizations; 2) ensuring human moderators are in place to complement algorithms; 3) voluntarily issuing transparency reports about COVID-19 disinformation; and 4) improving users' media, digital and health literacy skills (OECD, 2020a). Maintaining societal trust is important – deteriorating trust in public institutions and leaders makes it more difficult to implement a successful risk communication strategy that attempts to combat misinformation.

Data flaws and weaknesses in its presentation

Many criticisms of data during the pandemic have focused on the data itself – the production, flaws (such as lack of data on at-risk populations and other gaps, see Section 2.3), timeliness and management. But the pandemic has also revealed flaws in the presentation of data as well as problems with effective brokering of scientific data to policy-makers (Section 2.4). One might imagine that presentation of simple, updated information such as case counts is a problem that had been solved, but that is not the case. As a consequence, many have turned to international sources, such as ECDC and WHO, and high-quality third-party data sources such as Our World in Data, Johns Hopkins University and the *Financial Times*. This is because of the often strikingly poor quality of presentation even

when the data is of good quality and where governments show no other signs of trying to obscure data. Some countries' strategies are unusual, such as presenting key COVID-19 data on a daily basis on Facebook, with no time series available (observers would have to scroll through the Facebook feed and note the numbers by hand). But there were a wide variety of other unhelpful strategies, including data available only on PDFs, changing presentation of data (both on a technical level, such as changes in geographical scope, and also more dramatic, with entirely different statistics from week to week in some cases). Coding notes were often unavailable and websites difficult to understand. This should be easy to overcome (Lillvis & Greer, 2016). As a rule, infographics, reports, press releases and social media are all helpful but should be supported by a simple webpage that presents access to time series data, properly explained, downloadable in a standard file format (e.g. .csv). Data should not disappear, even if there is a change of website design or format; once a file is posted, it should stay. If it contains errors, they should be noted. These good practices facilitate external data services, such as Our World in Data (see Table 2.1), to work more effectively while also allowing the media, scientists and civil society to develop their own analysis to support accountability. Donors might consider offering assistance to governments and public health agencies with web design and presentation; supporting a full-time web designer familiar with good practice in data presentation might be a very low-cost and high-impact project.

2.8   Involving nongovernmental stakeholders including the health workforce, civil society and communities (Strategy 8)

Key observations

Engaging with nongovernmental actors, including citizens and communities, health workers, civil society and the private sector strengthens emergency responses.

- Non-state actors can support mobilization of resources and transmit key information.
- Coordination of non-state actors is a way of aligning effort and ensuring coherence. Some countries leveraged pre-existing structures and tools, such as medical associations, while others set up new coordinating structures.
- Engaging with non-state actors ought to be an important tool for policy-makers both in formulating informed, appropriate and acceptable responses to the pandemic and in increasing trust in the government's measures so as to enhance implementation.

- Many countries scarcely included civil society and community groups in COVID-19 decision-making, particularly at the outset. Over time, more countries have recognized the importance of community engagement and are working with diverse groups to reach marginalized populations and improve the uptake of public health measures.

Engaging with non-state actors to mobilize resources and share information

The pandemic required a widespread mobilization of resources which required coordination across many different actors, including public administrations, professional bodies, members of civil society and private companies. This was often achieved by leveraging pre-existing structures, such as medical associations to develop and disseminate new clinical guidelines (see Section 6.2), or by establishing new roles and accountability mechanisms, including new coordinating structures (see Section 2.5) and streamlined reporting (OECD, 2021b). For example, Ireland created a Medicines Criticality Assessment Group (MCAG) which used a multistakeholder approach involving the Department of Health, the Health Service Executive, clinicians, pharmacists, the Health Products Regulatory Authority and private bodies (e.g. trade associations, primary wholesalers, companies) to avert potential shortages of medicines. This allowed Ireland to increase capacity, increase oversight of supply and demand of medicines, and identify alternative medicinal products. In Iceland, a collaboration set up between the National University Hospital and a private biopharmaceutical company enabled population-wide screening testing, and sequencing the virus from every person who tested positive from early 2020, creating some of the earliest research available on the spread throughout the population.

On their own initiative, many civil society organizations have used digital technologies to crowdsource the provision of public health services in situations where the government has failed to respond rapidly (e.g. the non-profit Covid19Italia Help created by volunteers in Italy or Norway's Urban District Mothers' Actions). In several countries, the Red Cross supported public health efforts such as testing and communication campaigns (Section 5.2). The National Red Cross Societies in Austria, Germany, Greece, Italy, Malta, Portugal and Spain increased their testing capacity to support the work of national health authorities, with funding from the European Commission (Red Cross EU Office, 2020).

Table 2.6   *Examples of inclusive decision-making during COVID-19*

Mechanism	Country examples
Inclusive deliberative bodies, e.g. ad hoc citizens' assemblies, permanent citizens' panels, advisory councils	• Australia: COVID-19 Culturally and Linguistically Diverse Community Forums in South Australia. • England: Citizens' Panel Planning the West Midlands' Recovery. • United States: Oregon Citizens' Assembly on COVID-19 Recovery.
Hearings (mandated in law or optional)	• France: *Commission d'enquête pour l'évaluation des politiques publiques face aux grandes pandémies à la lumière de la crise sanitaire de la COVID-19 et de sa gestion* [Commission of inquiry for the evaluation of public policies in the face of major pandemics in the light of the COVID-19 health crisis and its management]. • Norway: Corona-law and regulation hearings.
Open, self-selective public participation mechanisms, e.g. town halls, village meetings (face to face or online), radio and television call-in programmes, petitions and crowdsourcing, initiated by either government or civil society	• Brazil: mechanism for transparency and public engagement on COVID-19 in the federal health system. • France: Citizens' committee in Grenoble. • Scotland: Coronavirus (COVID-19): National crowdsourcing exercise.

Source: Norheim et al. (2021).

Engaging with non-state actors in policy-making and implementation

Responsive, inclusive and participatory representative decision-making at all levels should be a useful tool for sustaining support for responses. Engaging with non-state actors, whether with citizens and communities, health workers, civil society or the private sector (e.g. pharmaceutical companies, small business organizations, unions, airline industry, etc.) can help policy-makers formulate the best responses to the pandemic and enhance the chances of their effective implementation. For example, many European governments engaged in some consultations with employers' and employees' unions, or representatives of sectors especially affected by the crisis, to improve the design of government support packages. Participation helps develop trust in government and institutions which in turn impacts policy adherence and success. However, such consultations were, in some cases, perfunctory.

Non-state actor participation can provide insights into how the crisis is affecting impacted communities, supporting policy adjustments. For example, including advocacy groups in decision-making and ensuring targeted outreach to vulnerable populations for their feedback on health policy decisions can help address health disparities and promote health equity. Civil society organizations play a critical role of representing views of marginalized communities, providing services and programmes to vulnerable populations, including undocumented migrants, and helping identify the particular needs of migrants in refugee camps or informal settlements as of October 2020 (Nezafat Maldonado et al., 2020).

Unfortunately, many countries have failed to include civil society and community groups in COVID-19 decision-making processes and few countries have formal, well-functioning communication channels linking government and civil society (see Table 2.6) (Civil Society Engagement Mechanism for UHC2030, 2020). Instead, at least initially, many governments adopted a command-and-control model of telling communities how to act without asking for any community input. Failure to leave out such groups can lead to potentially disastrous consequences. Even governments with generally successful COVID-19 responses faced problems if they failed to listen to civil society, particularly about more vulnerable populations such as migrant workers (Wai, 2021).

For example, modelling of the epidemic trajectory in England failed to include the situation whereby many health care staff would work in multiple facilities (Rajan, 2020). Over time, the importance of community-sensitive approaches has grown, reflecting the key roles communities play in reaching marginalized populations; for example, through neighbourhood volunteer groups or associations, increasing adherence to nonpharmaceutical interventions and improving vaccination take-up, among others.

2.9   Coordinating the COVID-19 response beyond national borders (Strategy 9)

Key observations

While the "global response" to COVID-19 was uncoordinated at first, the alignment of efforts and approaches across countries, regions and continents is critical to long-term success against the pandemic.

• Prior and direct experience of pandemics prepared some countries, such as the members of the Association of Southeast Asian Nations (ASEAN), to respond more quickly and effectively.

• Commitments to international cooperation, the pooling of scientific expertise and knowledge sharing (in Europe) did not automatically translate into willingness to

coordinate health emergency responses. The fact that the organization and delivery of health care services, including preparedness and response, are still largely a matter of national competence for EU countries tended to support a "home nation first" position.

- EU Member States encouraged by the Commission have progressively increased cooperation despite the initial (short) period of disunity, using existing routes, such as the Civil Protection Mechanism, and coming together around new initiatives, such as the Vaccine Strategy.

- A long-term perspective has been observable from the start of many of these cross-border initiatives, with a desire to strengthen preparedness for future threats complementing action to deal with immediate challenges.

- WHO has played an important role in coordinating global efforts against COVID-19, not least by supporting the development of vaccines and their equitable worldwide distribution through the COVAX facility. A range of governance mechanisms has been proposed to strengthen health governance at the global and pan-European levels, including WHO's role within it.

From hesitation to international collaboration

Soon after the COVID-19 outbreak was declared a PHEIC on 30 January 2020, 194 countries unilaterally introduced a cross-border restriction in the following months. In essence, this represents one of the first missed opportunities for cross-border collaboration and coordination.

This period of disunity lasted a surprisingly short time. EU Member States have progressively mutualized their efforts against COVID-19 while committing to the infrastructure for a longer-lasting EU health policy focused on infectious disease prevention and treatment and resilience (see below). Similarly, solidarity and cooperation gradually took hold in other parts of the world. For example, Cuba sent more than 2 000 health care professionals to 23 countries to strengthen workforce capacity. South America's Southern Cone countries, including Argentina, Chile, Paraguay and Uruguay, sought to protect trade flows, sponsored cross-border research and enabled citizens to return to their home countries.

Despite the initial general lack of international coordination, examples of early international cooperation can be found in some parts of the world. In south-east Asia, for example, regional cooperation through Association of Southeast Asian Nations (ASEAN) has been helpful in helping countries contain the pandemic early on (Greer et al. forthcoming). The region's prior experiences with pandemics have allowed ASEAN Member States to develop their own lessons

and priorities which proved highly applicable to an emerging coronavirus. Among their responses, they established a number of important mechanisms for pandemic preparedness and response, which health authorities immediately activated when news of the unknown virus broke out in the People's Republic of China. These mechanisms include the ASEAN Emergency Operating Centre Network for Public Health Emergency and the ASEAN BioDiaspora Virtual Centre, which facilitated timely and accurate exchanges of information and technical inputs on the nature of the disease, the Regional Public Health Laboratories Network that provided expertise and technical support to laboratories of its Member States, and the ASEAN Risk Assessment and Risk Communication Centre that helped disseminate preventive and control measures, including combating false news and misinformation (Caballero-Anthony, 2021).

Coordinating the response within the EU

Europe was the first region outside of Asia to be severely affected by the COVID-19 pandemic in February 2020. In February and early March 2020, the EU was largely sidelined. Past infectious threats, such as SARS in 2003, only had a marginal impact on EU countries, but led to the establishment of some specialized EU-level infrastructures, such as the ECDC, the Health Security Committee hosted at the European Commission and the European Early Warning and Response System (European Commission, 2021m). However, EU-level cooperation prior to COVID-19 was largely based on pooling scientific expertise and knowledge sharing rather than implementing coordinated health emergency response mechanisms. Ultimately, the organization and delivery of health care services, including preparedness and response, are still largely a matter of national competence and many EU countries entered the pandemic with outdated preparedness plans and insufficiently equipped surveillance and health systems.

Initial reactions among Member States went against core EU principles, such as free movement and solidarity (Brooks et al., 2021; Greer, 2020). Most countries thus restricted travel and in some cases closed borders, which resulted in breakdown of supply chains and shortages of vital medicines and medical equipment. Contrasting containment strategies were deployed with minimal coordination (see Section 5.1). This is not to say that there was no coordination in this initial period. Important existing EU-level structures were activated from the outset of the pandemic. As early as January 2020, Member States were in contact via the Early Warning and Response System, while

the Health Security Committee started convening for risk assessments and to exchange information on national responses. Coincidentally, the ECDC started monitoring, collecting and harmonizing data at the EU level to track the epidemiological scenario and formulate recommendations. Other EU instruments which are not specialized for health emergencies, such as the EU Civil Protection Mechanism, were mobilized and boosted to repatriate citizens, deliver and stockpile key supplies, deploy health personnel and transfer patients across different EU regions. Other immediate EU measures taken included reopening borders for medical and other critical goods, initiating a joint procurement process for PPE and releasing funds for urgent health care spending (Brooks et al., 2021). Thus, although a burdensome process, solidarity was restored relatively soon (De la Mata, 2020).

By late spring 2020, export bans were being lifted progressively in the EU. Solidarity mechanisms were soon (re)established between Member States whose health systems were saturated. This included the development of pharmaceutical and vaccine strategies and the digital COVID-19 certifications to safely restore free movement within the EU (see Sections 3.2 and 5.1). The Emergency Support Instrument, with a total funding of €2.7 billion, was activated in April 2020 to bolster the COVID-19 response. The Emergency Support Instrument is a complementary tool that can be combined with other instruments, such as the RescEU programme, to provide emergency support to Member States and mitigate the human and economic consequences of a crisis such as COVID-19. First established through the Council Regulation 2016/369 on the provision of emergency support within the EU, the Emergency Support Instrument can be activated and distributed to Member States on a needs basis (European Commission, 2021j). The Coronavirus Response Investment Initiatives (CRII and CRII+) launched in April 2020 enabled Member States to make flexible use of their allocations of European Structural and Investment Funds, in order to respond to the COVID-19 pandemic (European Commission, 2021b). The Recovery and Resilience Facility entered into force in February 2021 as the main financial instrument to mitigate the socioeconomic impact and consequences of the crisis, including the strengthening of health, economic and social resilience (European Commission, 2021p). Since early 2021, the ECDC has been assessing the implementation of national vaccination campaigns. EU Member State health ministries coordinated their actions within the Health Security Committee (Brooks et al., 2021) and at a broader level through the integrated political crisis response (IPCR) mechanism. EU Member States made greater use of supranational authorities, relying on scientific advice provided by the ECDC and WHO. From March 2020, the joint procurement and distribution of PPE was initiated, supported by funds from the pre-existing Emergency Support Instrument, which, with funding of €2.7 billion, was activated for the COVID-19 response and is also being used to secure COVID-19 testing, treatments and vaccines (European Commission, 2021u).

It is important to note that many of these actions were taken on a schedule that make them an investment in the future of European health action rather than for immediate responses (Box 2.13).

Some attempts at cooperation were also made regionally. This included transfers of patients across borders, which were performed both within and outside the framework of the Civil Protection Mechanism (see Section 6.2). For a time, there was a common travel zone between Estonia, Latvia and Lithuania, so-called Baltic Bubble. The three Baltic countries collaborated on reopening the borders within the region in early May, as soon as the first easing measures became feasible. The ministers of health approved a joint strategy to control the spread of COVID-19 in this common travel zone. Although some border checks remained in the following weeks, travel between the countries was largely free until September 2020. However, this only worked while the number of new cases was low. Once the situation worsened in September, the "bubble" was dissolved (Webb et al., in press).

WHO and its support to the global response

Control of communicable diseases is one of the oldest areas of modern international cooperation, dating back to the Pan American Sanitary Bureau's foundation in 1902. It is also an intensely political area; issues such as disease eradication programmes are often shaped by geopolitics and great power competition (as we have seen with COVID-19 vaccines) while global public health measures are often caught in the tension between the objectives of traders and mobile populations. Despite the long tradition of international cooperation in the area of communicable diseases control, there have been criticisms of a lack of global leadership and governance in the response to COVID-19. There are many reasons, including fragmentation of the existing global emergency response architecture, power politics as mentioned above, lack of effective enforcement mechanisms and a low priority being given to responses (Wenham, 2021). The result is a thicket of contradictory incentives (as shown in a simplified

Box 2.13   *Developing a longer-term EU health policy to manage cross-border threats*

There is an unprecedented commitment to establish new infrastructures for a longer-lasting EU health policy focused on infectious disease preparedness and response and health systems resilience. COVID-19 hit the EU in the transition period between two financial cycles, with a new Multiannual Financial Framework starting in 2021. This provided the unique opportunity to apply the lessons learned from the pandemic to channel resources and introduce health objectives into new tools such as the Recovery and Resilience Facility, but also to rethink and boost many existing EU instruments, such as the Health Programme to better manage future cross-border health threats.

In addition to a Vaccine Strategy and a Pharmaceutical Strategy, in July 2021, the European Commission allocated a €5.3 billion budget to the 2021–2027 EU4Health programme. The EU4Health programme has four priorities: improve and foster health; protect people from serious cross-border threats to health; make medicines available and affordable; and strengthen health systems, their resilience and resource efficiency. Part of the budget is foreseen to go towards strengthening the ECDC and creating a new Health Emergency Preparedness and Response Authority (HERA) to oversee preparedness for future health emergencies. The Commission originally proposed a €9.6 billion budget, but the agreed-on budget represents a large increase from previous Health Programme budgets of around €450 million. Before the pandemic, incorporating the Health Programme into the European Social Fund had been planned,

but it was decided that the Health Programme should remain as a freestanding budget. The RescEU programme, which includes options for civil protection, received a large budget increase of €2 billion for 2021–2027 (European Commission, 2019).

In addition, the European Commission has expressed plans to strengthen the EU's preparedness and response capacities by creating a new EU authority to deal specifically with cross-border health threats. The Health Emergency Preparedness and Response Authority (HERA) will serve as a permanent structure to ensure Europe's preparedness and ability to mount coordinated health system responses, including the long-term management of manufacturing, supply chains, stockpiling and deployment of resources to Member States in the case of health emergencies. In early 2021, the Commission launched a public consultation for feedback on the proposals for HERA and is expected to draft a legislative proposal in the third quarter of 2021 (European Commission, 2021v).

As one of the preparatory steps for HERA, the Commission has launched the HERA Incubator. Acting as blueprint for the EU's long-term preparedness plan to tackle health emergencies, the Incubator defines the actions needed to fight COVID-19 variants. This includes detecting new variants by large-scale genomic sequencing, enhancing the exchange of research data, developing new vaccine and treatment candidates and scaling-up their production. Emergency funding from Horizon Europe has already been mobilized to set some of these actions in motion.

representation in Fig. 2.4) and, frequently, failure to provide global public goods for health.

The United Nations (UN) has played a role in the international governance of the pandemic response, but it has been hampered by problems such as a limited mandate, global political tensions and misalignment between agencies. The UN Security Council met for the first time 3 months after the beginning of the pandemic and struggled to agree on resolutions. Since then, the UN Secretary-General, UN Crisis Management Team, UN General Assembly and UN Supply Chain Task Force have all become more active, but continue to face challenges. For example, the latter has delivered essential supplies yet the global supply chain challenges and fragility during COVID-19 limited the breadth of the response. Further, the UN agencies do not always operate in coordination (WHO, 2020g).

Within the UN system, WHO has played a prominent role leading the international health sector response during the pandemic. On 30 January 2020, WHO issued its highest-level warning about the impending pandemic, when it deemed the spread of the

SARS-CoV-2 virus a PHEIC under the IHR (2005), and disseminated crucial early guidance. While the US CDC, which had long been not just internationally influential but was the centre of a global network, the Global Health Security Alliance, that seemed to rival WHO, was disempowered by national issues, WHO's guidelines and data were influential around the world. WHO's authoritative coordinating role was influential despite in-house scientific and response capacity being much reduced after decades of austere budgets (Kavanagh et al., 2021). Although WHO's performance has been marred by many problems and its relationship with China has been challenged, and despite calls for reviews of its actions during the pandemic, including from the Independent Panel for Pandemic Preparedness and Response (IPPPR), WHO has been instrumental in many areas. Its key roles included supplying materials and equipment, generating and disseminating research about diagnosis and treatment, issuing key guidance and advice, educating the public about the virus, and monitoring global spread (see Section 2.4).

Figure 2.4 *Global architecture of health emergency preparedness and response before COVID-19*
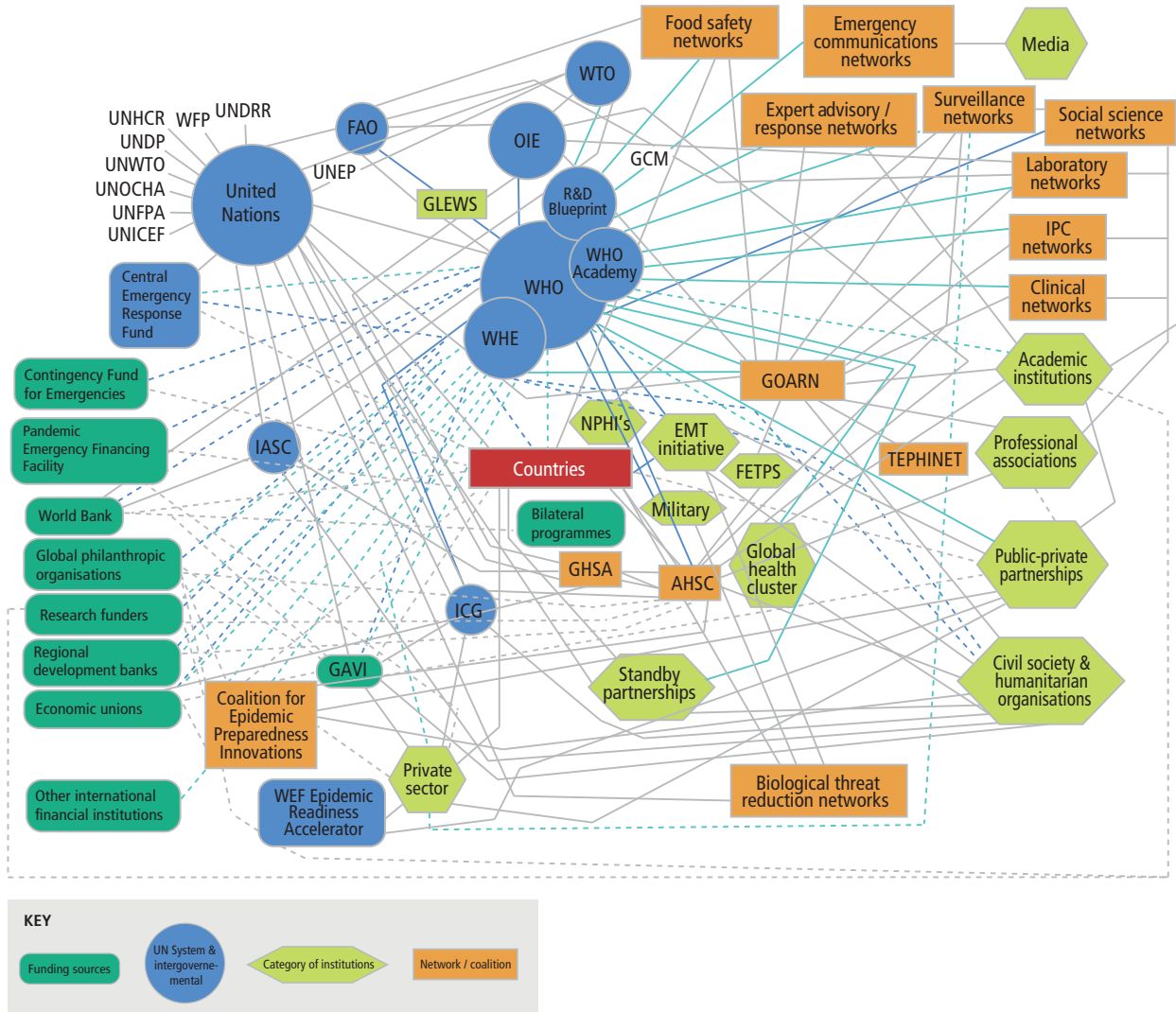
AHSC: Alliance for Health Security Cooperation; EMT: emergency medical team; FAO: Food and Agriculture Organization; FETP: Field Epidemiology Training Programme; GAVI: Gavi, the Vaccine Alliance; GCM: Global Coordination Mechanism; GHSA: Global Health Security Agenda; GLEWS: Global Early Warning System; GOARN: Global Outbreak and Response Network; IASC: Inter-Agency Standing Committee; ICG: International Coordinating Group on Vaccine Provision; IPC: infection prevention and control; NPH: national public health; OIE: World Organisation for Animal Health; TEPHINET: Training Programs in Epidemiology and Public Health Interventions Network; UNDP: United Nations Development Programme; UNDRR: United Nations Office for Disaster Risk Reduction; UNEP: United Nations Enviornment Programme; UNFPA: United Nations Population Fund; UNHCR: United Nations High Commissioner for Refugees; UNICEF: United Nations Children's Fund; UNOCHA: United Nations Office for the Coordination of Humanitarian Affairs; UNWTO: World Tourism Organization; WEF: World Economic Forum; WFP: World Food Programme; WHE: World Health Emergencies Programme; WHO: World Health Organization; WTO: World Trade Organization..

Source: WHO (2020g).

WHO also used its convening role as one of the leaders of the COVAX facility, as part of the Access to COVID-19 Tools (ACT) Accelerator, which was designed to support the development of vaccines and their equitable worldwide distribution. Although COVAX has received far less financial support than it needs to achieve its goals and has been buffeted by a variety of problems including vaccine nationalism and resulting disruptions to the supply chain, it is an impressive attempt at solidaristic multilateral action and a major source of vaccines for the world's low-income countries.

As the world looks to a post-COVID-19 political reality, debates are springing up everywhere about the right way to reconfigure global health governance. The Pan-European Commission on Health and Sustainable Development convened by the WHO Regional Office for Europe proposed a set of recommendations for improving health governance at both the global and pan-European levels (Box 2.14). COVID-19 has certainly shown the need for greater solidarity, transparency and information, but how the pandemic will affect global health governance remains to be seen.

Box 2.14   *How to improve health governance? Recommendations from the Pan-European Commission on Health and Sustainable Development*

In its final report, "Drawing light from the pandemic: A new strategy for health and sustainable development", the Pan-European Commission on Health and Sustainable Development (2021) has made a set of recommendations with the aim of achieving seven key objectives to prevent a catastrophe on the same scale as COVID-19 from happening again. Two of these objectives centre on improving health governance – both at the global level (Objective 6) and in the pan-European region (Objective 7). To meet the first of these objectives, the Commission recommended establishment of various mechanisms to raise funds for global public goods and to hold countries to account for their contributions to them. These include establishment of a Global Health Board under the auspices of the G20; agreement of a Pandemic Treaty; and development of a global pandemic vaccine policy. In terms of strengthening health governance within the pan-European region, the Commission recommended establishment of a Pan-European Network for Disease Control led by the WHO Regional Office for Europe; convenance of a Pan-European Health Threats Council by the WHO Regional Office for Europe; prioritization of investments in data sharing and data interoperability platforms by multilateral development banks and development finance institutions; and securing the necessary funding for WHO to fulfil its mandate.

Financing COVID-19 services

Financing is a core function of health systems that aims to ensure that resources are available and in the right places to deliver quality, accessible and needed health services, while protecting the population from financial hardship. For health financing to be effective in achieving these objectives, there must be sufficient and predictable levels of funding. Funding must be allocated throughout the health system according to need and those funds must actually reach their intended destination in a timely fashion. Lastly, the burden of paying for health care should be based on one's ability to pay – not on people's need for health care – so that those who cannot afford to pay for health care do not forgo needed services or otherwise experience financial hardship (WHO, 2007).

While these are timeless objectives, the COVID-19 pandemic has become a salient reminder of both the essential function of health financing systems, as well as their fragility when exposed to shocks. The pandemic has led to major changes and disruptions in the flow of funds through health systems. There have been significant financial challenges for health service providers as the volume of services, types of services provided and materials needed dramatically changed. Some providers who were paid on the basis

of the volume of services provided faced sharp falls in revenues due to the reduction in non-COVID-19 services, both because people postponed seeking care as well as facilities temporarily postponed non-essential care in order to treat COVID-19 patients or reorganize provision in a safe way. Health systems were also faced with additional costs, not only because many COVID-19 patients required intensive and costly medical care but also because of a need to secure necessary supplies and equipment, such as PPE, testing supplies and ventilators. Facilities had to reorganize how they worked to implement new hygiene and safety measures and reorient patient pathways, all of which could be costly (Section 6.2). And to maintain an adequate workforce, additional payments to health professionals were needed to compensate for overtime work (Section 4.3).

These shifts in both how much money was needed for health systems (and where it came from), and where (and how) that money was spent occurred in the context of sharply falling government revenues in many countries (Fig. 3.1). These declines in government revenues were brought about by (sometimes multiple) national lockdowns and anxiety about engaging in

Figure 3.1 *General government revenues fell in many countries in Europe between 2019 and 2020*
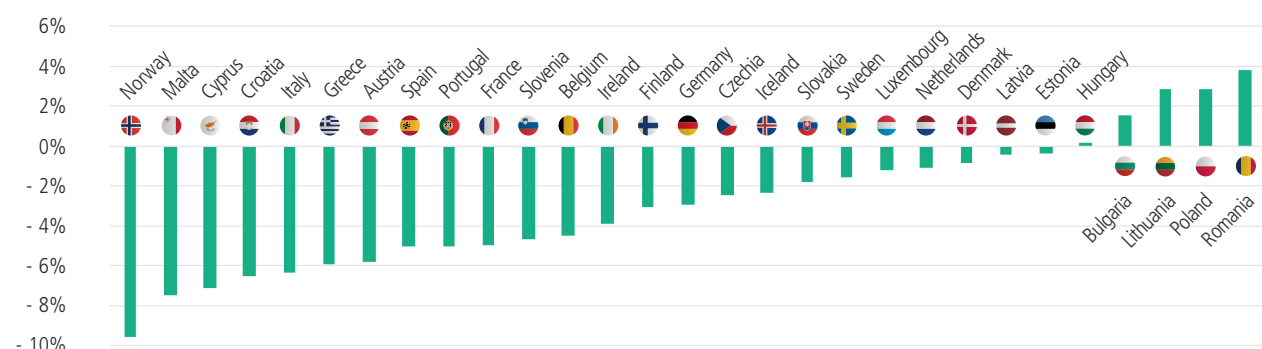
Note: Calculated from revenues expressed in nominal national currency units.

Source: Authors, based on Eurostat data.

normal daily activities, and naturally have major repercussions for health system revenues.

What did countries do (or not do) to support health financing systems during the COVID-19 pandemic? This chapter identifies three strategies that were used. The first was to reallocate existing funds and raise additional public funds (Section 3.1). In 2018, the share of health spending from public funds already varied among countries in the EEA from 85.7% in Norway to 43% in Cyprus; these differences and how revenues for health are raised a priori have implications for countries' abilities to mobilize resources for health during the pandemic. Yet even systems without generous funding in so-called ordinary times were still able to respond by reallocating funds to the health sector or by public borrowing – both dependent on political will and financial management rules in place.

The second strategy involved changing purchasing and payment systems to redirect resources to where they were needed most. It included compensating providers for unforeseen costs or lost revenue during the pandemic (Section 3.2). The need to maintain transparency, including measures to prevent fraud and corruption, is also highlighted.

The last strategy described in this chapter involves changes to coverage to maintain access to quality services and protect individuals from financial risks (Section 3.3). Many households have faced financial strain during the pandemic, causing delays in seeking care due to concerns about affordability. Others refrained from seeking COVID-19-related services (e.g. testing and treatment) if these were not fully accessible and free at point of use, potentially resulting in higher disease transmission, morbidity and mortality rates. Addressing barriers to care has thus been crucial for strengthening resilience and many countries have implemented a range of tools to maintain or improve on the various dimensions of coverage. This included extending the breadth of coverage or the share of population that is covered, widening the scope of benefits, and increasing the depth of coverage or how much of the cost of services is covered. Beyond these three dimensions of coverage, monitoring barriers in access allows policy-makers to address coverage gaps that may exist, particularly in vulnerable groups (see Section 2.3).

Section	Strategy
3.1	Ensuring sufficient and stable funds to meet needs (Strategy 10)
3.2	Adapting purchasing, procurement and payment systems to meet changing needs and balance economic incentives (Strategy 11)
3.3	Supporting universal health coverage and reducing barriers to services (Strategy 12)

3.1 Ensuring sufficient and stable funds to meet needs (Strategy 10)

Key observations

Countries with well-funded health systems are better placed to absorb unexpected costs but all countries need to be able to mobilize additional monies in a crisis.

- The ability to draw on financial reserves and/or to undertake public borrowing helps countries meet evolving and unpredictable spending needs. Countries that had built-up reserve funding specifically for health found it easier to cover financing gaps.
- Public financial management rules play a crucial role in determining how easy it is to reprogramme public funds and reallocate them quickly to the health system. Countries with line item budgeting had less flexibility even where there was the political will to adjust funding.
- Countries with countercyclical health financing mechanisms were better able to shield their health systems from the effects of the sudden rise in unemployment precipitated by the pandemic.
- Borrowing provides another avenue for raising funds. Most countries used mechanisms such as bonds and debt service relief to bring in additional funds. EU Member States benefited from a dedicated recovery fund while other countries were able to harness humanitarian relief and support from the European Commission, the UN or the World Bank.

Tools for providing extra health systems funding quickly: reallocation and reserves

All countries mobilized resources to fund pressing health needs during the pandemic, but in diverse ways. Health systems that were already adequately funded before the pandemic had some degree of flexibility to absorb the unpredictable costs. Yet even countries that did not have such financing readily available were able to mobilize resources quickly by using unearmarked general government funds or reallocating funds that were earmarked for other sectors. This was true both in countries predominantly financed from general taxation, such as the United Kingdom, as well as countries relying more heavily on contributions to social health insurance

funds. For example, countries such as Austria, Croatia, Czechia and Estonia allocated additional financing from the government budget to their social health insurance funds. In Estonia, the budget of the National Health Insurance Fund was topped up with additional budget support to fill the funding gap (HSRM, 2021).

The ability to reallocate funds rapidly is largely dependent on the public financial management (PFM) rules in place. For example, countries with programme-based budgeting, where budgets are based on policy goals as opposed to line items, had much greater flexibility to shift spending quickly. Likewise, it was important for countries to have the ability to release these funds very quickly to providers (Section 3.2).

Countries with reserve funding for health built-up during so-called ordinary times, such as Germany, Estonia and the Netherlands, could use this source to fund unforeseen expenses during COVID-19, again conditional on PFM rules. Some countries could draw on national emergency reserves (contingency funds). Lithuania, for example, has both a reserve and a countercyclical system in place that helped to maintain revenues from lost contributions due to unemployment and to stabilize health financing in the short term – a system which proved highly effective during the 2009 financial crisis. While Lithuania also relied heavily on general government revenue reallocations to finance its pandemic response, its explicit countercyclical mechanisms are unusual, as otherwise funds will seek support from governments, but helpful for health systems that depend heavily on labour market contributions. In systems that depend predominantly on general tax revenues, there were also likely to be severe public revenue shortfalls as economies contracted as a result of the lockdowns (Cylus, 2021). Swift implementation of furlough and other income support schemes in some cases indirectly protected the health systems from acute revenue shortfalls in many countries by recycling funds to them (Section 5.1).

Securing additional funding through loans and grants

The scale of the economic and fiscal impact of COVID-19 meant that most countries had to resort to borrowing, by selling bonds (e.g. Israel, Italy, Spain and the United Kingdom), by financial assistance and debt service relief from international lending institutions such as the IMF (e.g. Ukraine). This was a viable strategy for many countries because of historically low borrowing costs, with interest on bonds being negative in many countries. Other countries, including

Armenia, Georgia, Kyrgyzstan, North Macedonia, Serbia and Ukraine, complemented government funds with humanitarian aid, often in coordination with the European Commission, the UN, the World Bank or other organizations. Within the EU, a €750 billion recovery fund for Member States, composed of grants and loans was agreed at the end of July 2020 (Cylus, 2021).

3.2 Adapting purchasing, procurement and payment systems to meet changing needs and balance economic incentives (Strategy 11)

Key observations

Countries, once they have secured funding, need to address the way funds flow through the health system to maximize the efficiency of procurement, to secure additional services, and to ensure that core providers are able to survive the financial disruption.

- Centralized and more flexible approaches to procurement can facilitate a more efficient approach to meeting urgent needs quickly but some countries found it resulted in abuses of process. EU Member States benefited from centralized procurement at the EU level.

- Changing payment systems allows governments to incentivize provision of certain services, including to vulnerable populations, and can facilitate the introduction of innovative models of care. Countries that have introduced incentives for extra services will need to revaluate after the pandemic to avoid overprovision or the continuation of care that proved ineffective.

- Adjusting payment systems and channels to allocate emergency funds to providers is critical in offsetting income losses for health institutions and professionals and ensuring they continue to function. This included replacing activity-based payments with budgets or flat-rate compensation, implementing new fee-for-service payments for COVID-19-specific needs, or reimbursing extra capital spending.

Employing centralized and more flexible approaches to procurement

Rapidly getting funds to the places where need is greatest is essential. Countries have taken a range of approaches to allocate emergency funds. Sometimes it has been most efficient to make use of normal financing channels to deploy funds as these are well established and, in many instances, operate efficiently. For example, in Croatia, COVID-19 funds followed the usual channels from the state budget, to the Croatian Health Insurance Fund, which transferred additional funds to hospitals.

Box 3.1   *EU-level initiatives supported procurement of COVID-19-related supplies*

The H1N1 pandemic in 2009 highlighted gaps in EU countries' capacities to access and purchase vaccines and therapeutics. As a result, the European Commission developed a Joint Procurement Agreement (JPA) for the procurement of medical countermeasures in 2014. At the time of writing (August 2021), 37 countries have joined, and the European Commission has launched seven calls for tenders. Under the agreement, Member States can place orders for PPE (including masks, gloves, goggles, face shields and coveralls), ventilators, laboratory equipment, therapeutics, including remdesivir for the treatment of COVID-19, and any other goods or services aimed at combating serious cross-border health threats. The European Commission manages the procurement process and negotiates joint procurement contracts, increasing the buying power of participating Member States and securing access to medical countermeasures at reasonable prices. The European Commission has also played a leading role in coordinating procurement for COVID-19 vaccines (see Box 5.2).

A new Pharmaceutical Strategy launched in November 2020 foresees a number of actions to make all pharmaceuticals more accessible and affordable in the EU. Importantly, it aims to enhance the EU's ability to diversify supply chains and react swiftly to shortages when faced with cross-border health threats in the future. The strategy also aims at building up the research, development and production capacity of pharmaceuticals. The next step will be to revise the existing general pharmaceutical legislation to provide a stronger regulatory framework, with public consultations coming up in late 2021 and the adoption of a regulation planned for the end of 2022.

Sources: European Commission (2021o); McEvoy & Ferri (2020).

Using such channels is best where public financial management capacity is already strong, and where there are no a priori barriers to deploying funds.

However, for some types of emergency procurement, for example for PPE or ventilators, which were hugely competitive, many countries opted for new centralized procedures. For example, Portugal and Spain temporarily moved to centralized procurement and purchase of PPE and testing kits, but devolved this task to local authorities after the first wave (Waitzberg et al., 2021a). Smaller countries, such as Cyprus, Israel and Malta, had always, of necessity, centralized much of their procurement, and continued to procure and purchase PPE this way during the pandemic. Yet, in some cases this was through new mechanisms entirely. Box 3.1 describes centralized approaches to procurement at the EU level.

In some cases, a lack of coordinated, centralized procurement contributed to major challenges. In Czechia, there were independent PPE purchasing teams at both the Ministry of Health and the Ministry of the Interior, resulting in large differences in prices and quality of PPE, and ultimately wasting limited resources.

Flexible and fast-track procurement has been key to securing access to PPE and other equipment. Many countries used emergency procurement procedures that made it possible to do away with tenders and other safeguards. On 23 April 2020, the Spanish General Secretariat for Industry and Small and Medium-sized Enterprises, under the Ministry of Labour, issued a resolution authorizing use of PPE lacking the CE (Conformité Européenne) marking (HSRM, 2021). Such flexibility enables speedy responses in the face of urgent needs but also brings dangers and there were examples of abuse (see Section 2.6).

Incentivizing provision of needed services and innovations in service delivery

Payment incentives were put in place to incentivize provision of needed services or improve access to care for vulnerable populations. A widely used strategy to incentivize providers to provide needed services, while mitigating income losses, has been incentivizing remote care (Section 6.2). Countries have loosened restrictions on digital or phone consultations (e.g. Czechia, Germany, Luxembourg, the Netherlands, Sweden, Switzerland) and have paid for remote health services at the same or higher fees as for face-to-face consultations (e.g. Denmark, Estonia, France). In England, GPs could get reimbursement for setting up or enhancing their information technology (IT) capacity and equipment. This allowed health professionals to keep providing services and for patients to receive the necessary care, thereby also securing revenue flow for providers to some extent (Waitzberg et al., 2020).

France introduced add-on fee-for-service (FFS) payments for GPs visiting patients in nursing homes. New FFS payments were also created especially for COVID-19 patients often for extra services, such as triage, consultations, contact tracing and diagnostic tests (e.g. Belgium, Bulgaria, Czechia, Denmark, England, France, Germany, Italy, Luxembourg, Poland, Romania and Switzerland). These were intended to incentivize the provision of such services while compensating professionals for the higher risks of infection. Nevertheless, policy-makers should note that FFS payments can also result in overprovision of ineffective care. Therefore, it is important to rethink

Table 3.1 *Many countries compensated health professionals for income losses due to COVID-19*

Country	Non-health sector specific	Health sector specific			
	COVID-19 related compensation to any self-employed professional or business	Flat compensation, e.g. extra capitation or temporarily higher fees	Compensation based on previous year turnover up to a fixed percentage	Temporarily suspending FFS or P4P while increasing the share of fixed payment	Subsidies to cover fixed costs such as rent and employees
Czechia	Self-employed health professionals	PCPs that perform tests at the end of quarantine of patients; Dentists	All providers (under discussion)	—	Dentists and private health care providers
Denmark	—	—	GPs	—	—
England	—	—	—	GPs	—
Estonia	Non-EHIF contracted physicians	—	EHIF contracted providers	—	EHIF contracted providers
France	—	GPs	All health professionals	—	All health professionals
Germany	Solo ambulatory practices considered as entrepreneurs	Physicians, psychotherapists and all allied health professionals	Physicians, psychotherapists, all allied health professionals	—	—
Israel	Outpatient self-employed specialists	—	Inpatient professionals infected or quarantined	—	—
Italy	—	GPs and paediatricians working after hours	—	—	—
Lithuania	—	—	Physicians	—	—
Luxembourg	—	GPs and specialists treating COVID-a9 patients	—	—	—
The Netherlands	Allied health professionals	GPs	Allied health professionals	—	GPs
Spain (in some regions only)	—	Health professionals	—	—	—
Switzerland	Self-employed outpatient professionals	—	—	—	Self-employed outpatient professionals

PCP: primary care providers; GPs: general practitioners; FFS: fee-for-service; P4P: pay-for-performance; EHIF: Estonian Health Insurance Fund; PPE: personal protective equipment.

Source: Waitzberg et al. (2020).

the balance of incentives created by new payments once the acute phase of the pandemic is over (Waitzberg et al., 2021b).

Compensating providers for income losses and extra expenses

Providers have faced extra expenses related to the COVID-19 outbreak; for example, because they had to reconfigure clinics to implement physical distancing measures or new hygiene and safety regulations, or because they had to purchase PPE. They have also faced income losses due to reduced provision of elective care and because patients have been forgoing services out of fear of getting the infection. Providers had to be compensated for these extra expenditures and income losses to enable them to maintain services and pay staff wages. This mainly affected providers whose income was predominantly activity-based rather than salary-based.

Table 3.1 shows the various mechanisms that countries used to offset the income losses for health professionals. These included flat-rate compensation, payment based on past turnovers or budgets, and temporarily suspending activity-based payments. Providers in many countries were also reimbursed for extra capital spending; for example, for adaptation of clinics and for fixed costs such as rent. If not eligible for the aforementioned support, self-employed health professionals could also be included in non-health care-specific COVID-19-related compensation schemes.

The bottom part of Fig. 3.2 shows how hospitals have been compensated for revenue shortfalls during the pandemic. In many countries, hospitals continued to receive their usual budgets despite reduced activity or received resources through new payment approaches. In Germany, for example, a new law was approved at the end of March 2020 guaranteeing that hospitals

will receive per diem payments (€560 per day) for every empty bed until the end of September 2020. The new tariffs were calculated as the difference between the number of occupied beds in 2020 and in 2019 and were adjusted for hospital case-mix and type of hospital in July 2020 (Waitzberg et al., 2021b). In Belgium, the federal authorities provided a short-term cash advance to hospitals (of €2 billion), to compensate for revenue losses – and also to cover the extra costs of COVID-19 patients.

The top part of Fig. 3.2 provides an overview of payment systems used by different countries to pay hospitals for COVID-19 patients. Several countries have – at least initially – used their regular hospital payment system, but these were often modified subsequently or new payment models were introduced. In Israel, for example, hospitals were initially paid based on existing per diem codes for internal medicine wards and intensive care units (ICUs). However, since mid-April 2020 new per diem codes have been created for patients treated on dedicated COVID-19 wards of geriatric and general hospitals, treating moderately/severely ill COVID-19 patients (including with ventilation). In Finland, hospital districts (i.e. hospital owners) have been compensated for additional costs related to the care of patients with COVID-19. Governments in several countries (e.g. Czechia, England, Israel, Malta, Slovakia, Slovenia) have purchased ventilators, beds and/or PPE and distributed these to hospitals – at least during the early stages of the pandemic. Hospitals were reimbursed for additional costs of capital and running costs in England, Estonia, Finland, France, Lithuania, Slovenia and Romania.

Only relatively few countries seem to have put in place specific rules to pay for services provided by non-contracted (public and private) providers, either to increase capacity for treating COVID-19 patients or to compensate for reduced capacity in public hospitals, which are busy taking care of COVID-19 patients. For example, in England, the NHS agreed a block contract with the vast majority of private hospitals to make their capacity available for NHS patients, while being reimbursed for services provided based on the full costs of care. Similar agreements with the private sector were also concluded in Malta.

Compensation of health professionals for additional spending related to COVID-19 also varied substantially

Figure 3.2 *Various approaches have been used to pay hospitals in response to COVID-19*
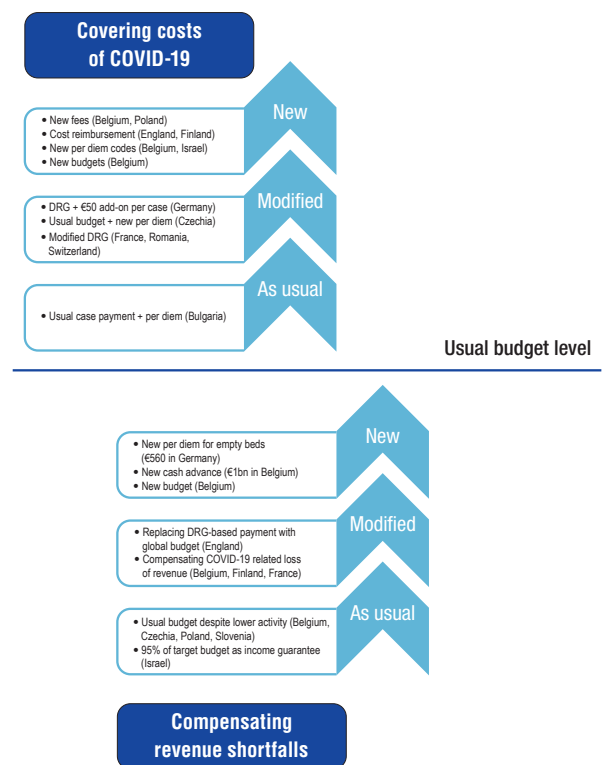
DRG: diagnosis-related group.

Source: Quentin et al. (2020).

across countries. Those working in ambulatory care were fully or partially reimbursed for extra spending such as on PPE, hygiene products and adapting clinics in many countries. Regardless of the means by which countries compensated or reimbursed providers, it is clear that governments assumed many of the financial risks involved (Waitzberg et al., 2021b). Some countries also enabled payment of additional fees for services for (suspected) COVID-19 patients (e.g. Germany, the Netherlands for GPs) or reimbursed extra spending such as to improve e-health platforms. Czechia implemented new fees for antibody tests, the Netherlands and France set incentives for GPs to treat COVID-19 patients with a higher tariff for visits. Germany set higher tariffs for GPs treating patients in long-term care institutions and German hospital professionals received bonuses for treating COVID-19 patients that varied according to the prevalence of the disease in their region.

3.3 **Supporting universal health coverage and reducing barriers to services (Strategy 12)**

Key observations

Health systems have to adapt to reflect new health needs while sustaining essential services which means adjusting or expanding service coverage, including ensuring access to new technologies, and ensuring sufficient cost and population coverage, including protecting vulnerable populations.

- Implementing fast-track health technology assessment (HTA) helps ensure access to COVID-19 technologies. Countries that quickly accommodated new technologies or used existing technologies differently will need to review decisions to ensure these technologies are effective.
- COVID-19-related services were often offered to everybody and at no cost to facilitate uptake. Paying special attention to those who are not eligible for health coverage, such as undocumented migrants and the unemployed, is critical not least because these groups are often at higher risk of infection and in turn pose a wider public health risk.
- Many countries have recognized that there is not just a need to remove user charges to encourage uptake of COVID-19 services but also to secure access to routine services at a time of intense economic shock.

Updating coverage to include COVID-19 services

Maintaining effective coverage requires not only having comprehensive standard benefit packages but also ensuring that the scope of services is extended to cover new services that are necessary for treating COVID-19 patients. Health systems have thus temporarily prioritized COVID-19 services when updating the scope of statutory coverage. A strategy commonly used to enhance availability of COVID-19 services was the implementation of a fast-track health technology assessment (HTA) pathway for COVID-19 technologies and ensuring appropriate funding for those that were approved. However, this creates risks of acquiring ineffective technology and deprioritizing needs of patients with other conditions. Thus, existing mechanisms for reviewing packages of services should be maintained. But inclusion in the benefits package is not on its own a guarantee of effective coverage. To achieve this, delivery of the new services should be organized (Sections 5.1, 5.2 and 6.2) and financed (above) in a way that minimizes access barriers, and these barriers should be continuously monitored.

Ensuring coverage for vulnerable population groups

Non-residents, including undocumented migrants, refugees, and asylum seekers, are at a high risk of being excluded from health care coverage in many countries. This is a particular risk during the COVID-19 pandemic because those who do not seek care may be at greater likelihood of transmitting the disease to others. Recognizing this, several countries have moved swiftly to reduce access barriers by identifying and supporting the people most in need. For example, the Portuguese government decided to grant temporary residency rights to all immigrants and asylum seekers who applied before 18 March 2020, when the state of emergency was announced, which meant that these individuals were fully entitled to social and health benefits, until at least 1 July 2020 (DRE Portugal, 2020). These populations gained eligibility for all COVID-19-related services, including diagnostic tests, space for isolation if unable to self-isolate at home, and treatment of the disease and its symptoms. France extended entitlements for migrants, while Belgium provided free access to health services for undocumented migrants for a limited period. Undocumented migrants are also eligible to receive free COVID-19 vaccinations in many countries, although they may be hesitant to be vaccinated or unaware of their eligibility status. However, other countries have maintained or even strengthened the hostile environment.

In addition to non-residents, people who work in the informal economy or non-stable work, the self-employed and unemployed people may not be able to afford payments in health systems based on health insurance, losing coverage when the economic situation worsens. The governments in many such systems have taken account of this. For example, Belgium has allowed self-employed people to request a deferral of paying health insurance contributions for 1 year. The governments of Greece and Slovenia decided to cover contributions on behalf of self-employed individuals for a limited period of time. Hungary reduced health insurance contributions for employees in heavily affected sectors.

Addressing financial barriers to using health services

Out-of-pocket payments are regressive and create important financial barriers to accessing services. Many countries minimized the use of co-payments for both COVID-19 and non-COVID-19 services during the pandemic, or exempted people from paying co-payments altogether. For example, when Belgium

established teleconsultations in primary care, they did not require co-payments. Ireland removed user charges for remote primary care consultations with people who may have COVID-19. Some countries, including the United Kingdom and North Macedonia, drew on private sector capacity without requiring co-payments (Section 6.1). Removing payment for testing and more recently for vaccines has been key in reaching vulnerable groups and increasing the effectiveness of testing and vaccination campaigns in many countries.

Mobilizing and supporting the health workforce

The COVID-19 pandemic has confronted health systems with extraordinary challenges, often placing extreme pressure on the health workforce and requiring rapid changes in their deployment. However, rapidly increasing the surge capacity of the health workforce is challenging, particularly in countries with pre-existing workforce shortages, geographical inequalities in distribution or suboptimal skill-mix profiles. Prior to the pandemic, the size of the health workforce in Europe varied widely and COVID-19 has exposed underlying disparities. For example, Latvia had fewer than five

nurses per 1 000 population in 2019, while Norway had 18 (Fig. 4.1). The variation in physicians is not as extreme, with most EU countries ranging between 3 and 5 physicians per 1 000 population. Beyond these national averages, there are also large differences within countries, with rural and deprived areas worst served. They also mask disparities in the profile of the workforce, affecting those with particular skills (such as ICU doctors and nurses, respiratory therapists and public health workers) and those with an expanded scope of practice (e.g. advanced practice nurses) that

Figure 4.1 *There is a large variation in the numbers of practicing doctors and nurses in the EU*

Doctors vs nurses, 2019

PRACTISING NURSES PER 1000 POPULATION

PRACTISING DOCTORS PER 1 000 POPULATION
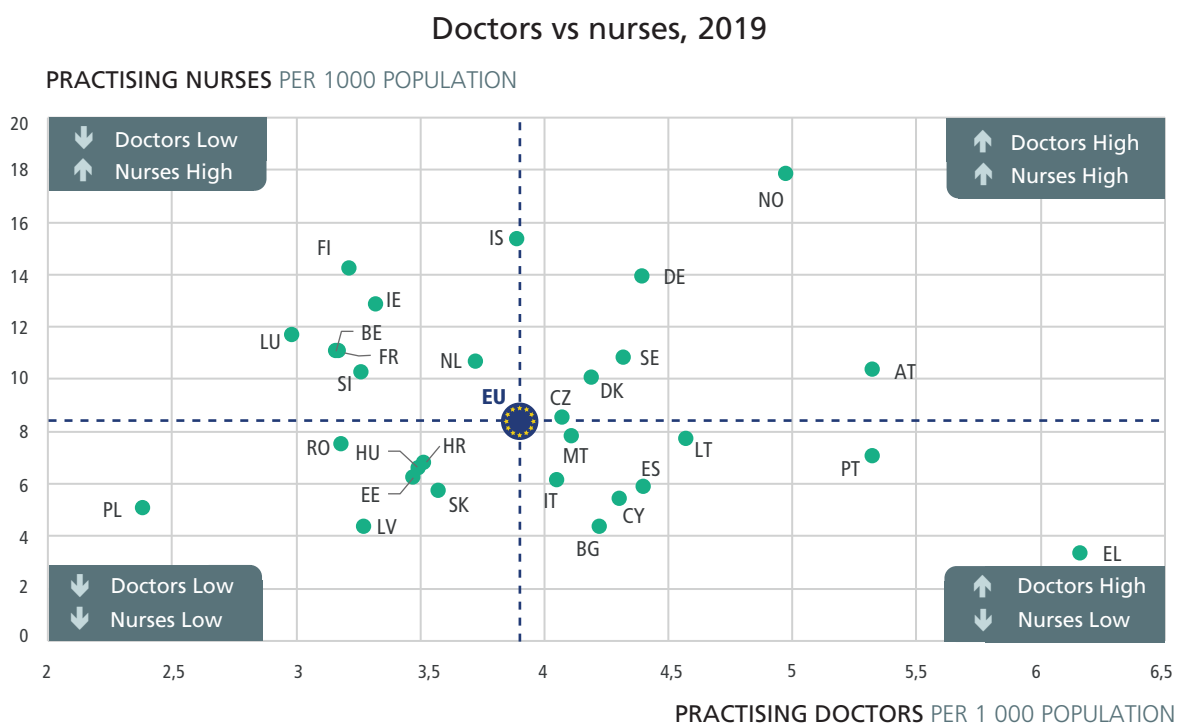
AT: Austria; BE: Belgium; BG: Bulgaria; CY: Cyprus; CZ: Czechia; DE: Germany; DK: Denmark; EE: Estonia; EL: Greece; ES: Spain; FI: Finland; FR: France; HU: Hungary; HR: Croatia; IE: Ireland; IS: Iceland; IT: Italy; LT: Lithuania; LU: Luxembourg; LV: Latvia; MT: Malta; NO: Norway; NL: Netherlands; PL: Poland; PT: Portugal; RO: Romania; SE: Sweden; SI: Slovenia; SK: Slovakia.

Note: The EU average is unweighted. In Portugal and Greece, data refer to all doctors licensed to practice, resulting in a large overestimation of the number of practicing doctors (e.g. of around 30% in Portugal). In Austria and Greece, the number of nurses is underestimated as it only includes those working in hospital.

Source: Eurostat Database (data refer to 2019 or the nearest year).

were in high demand during the pandemic. The pre-existing profile of the workforce has informed countries' abilities to rapidly scale-up, redeploy and introduce new ways of working that were required to respond to the pandemic. Yet, many countries have limited data and information on the health workforce especially at lower levels of granularity (WHO, 2020e).

This chapter considers measures that countries have taken to ensure the ability of the health workforce to respond to surges in demand and the governance mechanisms required to support change. Given the protracted nature of the pandemic, surge capacity planning has been needed not only for acute care but also to ensure the continuation of other essential and non-essential services and to support the rapid roll-out of COVID-19 vaccination programmes. The chapter begins by describing what countries have done to redeploy and scale-up existing workforce capacity and bring in additional health workers to meet higher demand during the pandemic (Section 4.1), before considering strategies that have been implemented to introduce or expand on alternative and flexible workforce approaches such as task shifting and skill-mix (Section 4.2). Finally, an essential component of maintaining surge capacity over a long time frame is reducing absenteeism and ensuring health workers are able to continue working. The last section in this chapter describes several tools utilized to provide physical, mental health, family and financial support for health workers (Section 4.3).

Section	Strategy
4.1	Ensuring an adequate health workforce by scaling-up existing capacity and recruiting additional health workers (Strategy 13)
4.2	Implementing flexible and effective approaches to using the workforce (Strategy 14)
4.3	Ensuring physical, mental health and financial support for health workers (Strategy 15)

4.1 Ensuring an adequate health workforce by scaling-up existing capacity and recruiting additional health workers (Strategy 13)

Key observations

The health workforce has faced a huge burden during the pandemic and governments have responded by increasing the capacity of the existing workforce or mobilizing/recruiting additional personnel. This may have been more difficult in settings where there were pre-existing staff shortages or unevenness in the distribution of staff. Issues such as patient and staff safety, staff burnout, and sustainability were not always sufficiently considered.

- A good understanding of health workforce availability and of existing skill profiles is critical to informing actions to increase surge capacity. Not all countries had the information needed.
- Surge capacity is created by increasing/adapting workload of the existing workforce or mobilizing/recruiting additional personnel.
- Asking staff to work additional hours; cancelling leave; suspending limitations on working hours, night shifts and minimum staffing; redeploying staff to areas with more need; and upskilling health workers all increase workforce capacity.
- Bringing additional health workers into the public health workforce expands capacity but is likely to require exceptional recruitment procedures and legal provision for insurance, pensions and so on. Countries have utilized medical and nursing students, accelerated graduation, contracted private sector workers, brought back inactive or retired health personnel, and used volunteers but this has not been wholly unproblematic.
- The ability to change legislation and the regulation of health workers and to coordinate national policies and local responses from employers and managers underpins scaling-up surge capacity. Some countries have found administrative hurdles insurmountable.

Scaling-up existing workforce capacity

Scaling-up workforce capacity can be achieved by increasing the capacity of the existing workforce or recruiting additional personnel (Table 4.1), with clear disadvantages in both cases (Williams et al., 2020a).

Options used to scale-up capacity of the existing workforce include cancelling elective procedures, increasing working hours, suspending restrictions on night shifts and cancelling leave. Each of these measures risks increasing burnout among the existing health workforce, at a time where they are already facing increased pressures and need to be supported (Section 4.3). These changes have sometimes necessitated changes to legislation such as on working time limits or hiring procedures, and suspension of re-registration requirements. Some countries have also changed minimum staffing requirements; Germany, for example, passed legislation to suspend acute care staffing ratios for nurses, to allow more flexibility on nurse placements in hospitals. Emergency funding to support hiring of new workers or to compensate staff for additional working hours has also been needed. Actions from employers and managers have also been required, for instance to modify employment contracts temporarily, to put in place procedures and infrastructure to support remote working, and to train workers in new ways of working.

Redeploying health workers to where they are most needed is an essential component of surge planning. This has involved moving health workers to assist in ICUs or emergency departments, to work in different settings (e.g. from primary care to hospitals) or to work in facilities or regions with greater need (Williams et al., 2020a). These changes have necessitated additional training and education for redeployed staff to build competencies, and in some cases changes to employment contracts. It should be noted that the reallocation of the health workforce may neglect other areas of health care, such as routine screening and immunization programmes, particularly in areas that may be underserved (see Section 6.1).

Mobilizing inactive health workers and recruiting new health workers

The second option, bringing new workers into the health workforce, has most frequently been achieved during the pandemic by mobilizing medical and nursing students near graduation (Williams et al., 2020a). Approaches included bringing inactive, retired or foreign-trained health professionals into the workforce, with volunteer recruitment also an option for certain tasks (Table 4.1). Some countries have also put in place contracts with private sector staff to work in the public sector. In New York City, staff shortages prompted a nationwide recruitment strategy, engaging private staffing firms (sourcing more than 5 000 nurses and 1 500 other health care providers), the US Department of Defense (over 700 providers), and volunteers (more than 20 000 volunteers). However, later phases of the pandemic, when COVID-19 spread more widely across the country made this more difficult.

These measures may risk burdening the existing health workforce with training and supervision of newly recruited staff. In addition, the administrative burden of bringing new or inactive workers back into the health workforce can be high, involving drawing up new contracts, changing or introducing legislation around malpractice compensation, modifying laws on pension contributions, amending registration procedures to fast-track hiring of new workers and putting in place procedures to allow medical and nursing students to graduate early, among other examples. In countries such as Ireland and the United Kingdom, these administrative hurdles have limited the number of returning health workers that have been recruited despite many inactive health workers volunteering to assist in the response.

Table 4.1 *Various approaches have been used to increase staff levels and mobilize additional health workers during COVID-19*

Scaling-up capacity among the existing health workforce	Mobilizing and recruiting additional health workers and volunteers
• Asking staff to work extra hours. • Changing contracts from part-time to full-time. • Changing staffing requirements. • Changing night shift working patterns. • Cancelling leave. • Changing registration requirements.	• Increasing recruitment quotas. • Recruiting (final year) medical and nursing students. • Bringing inactive or retired health professionals back to the workforce. • Recruiting new health professionals (e.g. environmental health officers and sexual health specialists for contact tracing). • Bringing foreign-trained health professionals into the workforce. • Requesting assistance from other countries or international organizations. • Recruiting volunteers for nonmedical or basic medical tasks. • Using military personnel to supplement the civilian workforce.

Sources: Williams et al. (2020a); Winkelmann et al. (2021).

4.2 Implementing flexible and effective approaches to using the workforce (Strategy 14)

Key observations

Changing what individual staff do and the way tasks and roles are combined are ways of boosting capacity to meet new demands. They also enable those staff whose skills are no longer needed because of changes in service use to contribute. These changes need to be reviewed but demonstrate the scope for innovative adjustments to established practice.

• Modifying work practices and adjusting skill-mix within the existing health workforce is important in ensuring optimal use of staff during a time of increased demand.

• Changes in what staff do requires support in terms of securing medical indemnity and training. Countries that had well-developed task shifting arrangements in place found this easier. Other countries eased the process by working with professional associations and directly addressed the needs of health workers undertaking tasks for the first time.

• Delegating tasks to nonmedical personnel (tracing, testing, vaccination) allowed a wider range of health workers and even volunteers to perform the services needed. Countries have also used skill-mix changes to support provision of outpatient and hospital care.

Adapting and innovating skill-mix

The pressures placed on health systems during COVID-19 and increased demand in some areas (e.g. ICUs) often necessitated changes in skill mixes due to staff shortages. At the same time, reduced provision in other areas (e.g. elective surgeries) provided extra capacity for the health system. The combined effects of this situation led several countries to change the distribution of tasks among the health workforce. Various efforts to implement new ways of working have emerged (Bourgeault et al., 2020). These include shifting tasks to draw upon the full scope of skills available within the health workforce, expanding the role of individual health professions and adapting or introducing teamwork (Table 4.2). Countries that have given staff expanded responsibilities in times of peak demand, such as Austria and Germany, had more flexibility in responding to COVID-19, while a number of countries (e.g. Belgium, Ireland, United Kingdom) have enabled a wider range of individuals, including volunteers from the public who have received appropriate training to administer vaccines, which has helped to speed up vaccination programmes. Personnel outside of the health workforce were also involved in nonmedical tasks to support the COVID-19 response. In Czechia, police officers, civil servants and private sector call centre operators assisted public health authorities where tracing capacity was limited.

Skill-mix changes have provided countries with crucial tools to respond to a rapidly changing situation; however, it should be noted that this adaptability already existed in some countries that had made full use of the range of skills available prior to COVID-19 and had overcome restrictive practices. Skill-mix changes have been facilitated by changes to national policies or legislation that have authorized certain professions to take on new tasks and extended or clarified medical indemnity where needed. This has often been supported by close working with professional associations that have traditionally been wary of changes that might threaten their members' status, power and incomes. Within the EU, the European Commission made €2.5 million available under the Emergency Support Instrument to support training of health care professionals in intensive care skills (European Commission, 2021j).

Table 4.2   *A number of skill-mix innovations has emerged during the COVID-19 pandemic*

Activity	Examples of changes in skill-mix
Preventing COVID-19	• Primary and mental health care staff conducted outreach services to vulnerable groups (United Kingdom).
Testing	• Graduates of natural and veterinary sciences used laboratory methods usually restricted to biomedical analysts (Austria).
Tracing	• Primary health care (PHC) providers supported public health surveillance teams in contact tracing (Albania). • Regional laboratories organized contact tracing and monitoring (Ukraine). • Health workers at risk from COVID-19 (e.g. due to age) have been moved from patient-facing roles to remotely support contact tracing efforts.
Monitoring	• Volunteers asked to help with basic support roles such as manning helplines or delivering medication and food to the most vulnerable, such as those self-isolating or shielding (Cyprus, Estonia, Germany, Greece, Italy, Malta, Poland, United Kingdom) (Williams et al., 2020a). • Mobile teams including a clinician, an epidemiologist, and a driver followed-up with COVID-19 cases in home quarantine (Kyrgyzstan). • GPs assisted with remote monitoring of patients in some countries.
Providing primary health care (PHC)	• PHC-based multidisciplinary teams have been introduced to manage the testing, triage and treatment of COVID-19 cases across many countries in Europe (Kumpunen et al., 2021). • Pharmacists authorized to issue e-Prescriptions for medicines for chronic disease patients (France, Ireland, Portugal) (OECD, 2021a).
Providing specialist outpatient care	• Non-nursing professionals performed nursing tasks if supervised by a coordinating nurse (Belgium). • NHS trusts shared waiting lists across local health and social care regions to more effectively manage elective care (United Kingdom).
Providing inpatient care	• Physicians from other departments with critical care expertise, such as internists, fellows and anaesthesiologists, assist with treating COVID-19 patients (United States) (Abir et al., 2020). • Physiotherapists trained to work in acute respiratory teams (Australia). • Registered Nurses (RNs) trained to operate ventilators to support respiratory therapists (Canada). • Dentists, especially with sedation skills, redeployed to support the NHS during COVID-19 surges (United Kingdom).
Vaccinating	• Paramedics (Austria, Israel, Ukraine, UK), medical students (Austria, Belgium, UK), pharmacists (Portugal, Switzerland), doctors' assistants (Germany, Netherlands), physiotherapists (United Kingdom), speech therapists (United Kingdom) and dentists (Ireland) provided authorization to administer the vaccine (Shuftan, 2021). • Members of the public trained as vaccinators and assistants of other nonmedical tasks such as check-ins, taking vitals, paperwork and monitoring recovery after vaccination (Belgium, Ireland, United Kingdom). • Nurses, pharmacists, physiotherapists, medical rescuers now allowed to conduct epidemiological interview (previously only doctor) and administer vaccine (previously only nurse) (Poland).

Source: Authors based on HSRM materials unless cited otherwise.

4.3 Ensuring physical, mental health and financial support for health workers (Strategy 15)

Key observations

Protecting the physical and mental health of health workers is key to sustaining workforce commitment and minimizing absenteeism and burnout.

- Ensuring the availability of PPE, providing regular testing and training on infection control measures, and taking steps to redeploy vulnerable health workers to avoid face-to-face engagement help protect physical health and signal to the workforce that their well-being is a priority. Many countries struggled to provide PPE at the outset. The need to train health workers on pandemic preparedness and response both before and during the pandemic has been highlighted by some countries.
- Supporting mental health is also important both in terms of helping the workforce to function in the face of the pressure of the pandemic and in asserting a commitment to them. Countries have used a mix of measures including remote counselling, online resources and national helplines.
- Providing practical support allows staff to continue to work. Many countries took steps to provide childcare in the face of school closures, keeping places open for the children of health care workers or paying allowances. Other practical measures included offering accommodation or free transport, and some countries made additional payments to increase financial support.
- Financial support was also a token of recognition of the key role health workers play in the pandemic response.

Pressures on the health workforce

During the pandemic, health workers have faced immense pressure to treat and care for patients with COVID-19, as well as to continue to provide care to non-COVID-19 patients, all while following strict hygiene rules and navigating nonmedical measures to prevent transmission both inside and outside of clinical settings (Williams et al., 2020a). Working with COVID-19 patients on the front line, health workers risk becoming infected with the virus. In Lithuania and Cyprus, for example, health workers accounted for around 20% of all people infected with COVID-19 during the first wave, although reported infection rates are inevitably influenced by the frequency of testing in health facilities. Health workers treating COVID-19 patients have also experienced higher anxiety, stress, trauma and other mental health conditions, with burnout and moral injury, the sense of guilt associated with an inability to provide appropriate care due to resource constraints, especially concerning. In Italy,

49.3% of surveyed health workers reported experiencing post-traumatic stress symptoms, 24.7% symptoms of depression, and 19.8% symptoms of anxiety (Rossi et al., 2020). This mental health burden may lead to burnout or force staff to take sick leave, and even result in health workers leaving the profession entirely (Williams et al., 2020b). In addition, health workers in some countries have had to take leave during school closures if they were unable to find alternative childcare arrangements. Many countries have thus implemented strategies that support health workers in providing safe and high-quality care, while maximizing their protection.

Providing physical protection for the health workforce

To prevent infections among health workers, it has been critical to ensure appropriate safety and support measures are in place, including sufficient supplies of PPE, regular testing, and training on infection control measures, including the use of PPE. However, this was not always possible, especially at the beginning of the pandemic when protective equipment and material supplies faced shortages. Many countries have also moved vulnerable health workers into positions that do not interact face-to-face with patients or provided free accommodation for health workers unable to self-isolate at home, reducing the possibility of transmission (see Table 4.3). Currently, few countries in Europe have embedded pandemic preparedness and disaster medicine training into undergraduate curriculum or continuing professional development requirements. Some countries (e.g. United Kingdom) highlighted the need for health and care workers to be trained on pandemic preparedness and response both before and throughout the pandemic period and have a number of training institutions and professional bodies available to provide this training where requested.

Providing mental health support for health workers

A variety of initiatives have been launched to support mental health of health workers (Table 4.3). Many countries have organized helplines or apps and online support for mental health at the national level (e.g. Bulgaria, Czechia, France, Israel, Malta, Romania, San Marino, United Kingdom), at the regional level (e.g. Belgium, Denmark), by professional associations for specific professions (e.g. France, Ireland, Latvia, Poland, Turkey, United Kingdom), and/or by universities and schools of public health (e.g. Hungary, Croatia) (Williams et al., 2020b). Other countries have

implemented measures including a buddy system for health professionals (Norway), sessions on resilience for the public health response team (Malta), and a database of mental health specialists who offered to provide free support for doctors, nurses, paramedics and other health professionals (Poland).

Providing tangible support in the form of free services, credits and payment bonuses

Health workers have faced challenges from nonmedical public health measures, including closures of schools and childcare (Table 4.3). For example, a survey by the Irish Nursing and Midwife Organization found that 62% of their members with childcare needs had to take annual leave to care for children during the pandemic (Lynch et al., 2021). Several countries (e.g. Austria, Belgium, Czechia, Denmark, France, Germany, Monaco, the Netherlands, Norway, Portugal and the United Kingdom) have kept childcare facilities open specifically for health workers to reduce barriers to working (Williams et al., 2020b). Romania meanwhile paid allowances to cover childcare costs, while in Israel, some hospitals and universities organized childcare for their workers.

Financial compensation is another tool that has been used in several countries to support the health workforce (Table 4.3). In part, this has been to compensate them for lost income (see Section 3.2), but in some countries has also been implemented to recognize their outstanding contributions. This generally took the form of one-time bonus payments (e.g. Bosnia and Herzegovina, Estonia, France, Greece, Germany, Hungary, Italy, Kyrgyzstan, Romania, Russian Federation, Ukraine) or monthly

Table 4.3 *A range of support strategies for the health workforce has been implemented*

Support strategy	Implementation examples
• Physical support	• Ensuring sufficient PPE.
	• Providing regular testing for health and social care staff.
	• Moving vulnerable staff to remote roles.
• Mental health and well-being support	• Providing helplines, websites or apps offering counselling or referrals for additional support.
	• Offering remote counselling sessions.
	• Organizing well-being sessions in health facilities.
	• Relaxing rules to access mental health support.
• Financial compensation	• Creating bonuses for nursing professionals, health and social care workers in hospitals and long-term care.
	• Offering vouchers or financial compensation of childcare for health workers.
• Other practical support	• Keeping schools open for children of essential workers.
	• Providing free parking, free transport and free accommodation if shielding family from potential transmission.
	• Launching campaigns to reduce discrimination against health workers (due to higher risk of infection).
	• Continuing medical education credits.

PPE: personal protective equipment.

Sources: Williams et al. (2020b); Winkelmann et al. (2021).

salary increases for the duration of the crisis (e.g. Albania, Latvia, Lithuania) from the central government.

Other opportunities to show support for the health workforce include continuing education credits as implemented in Italy and free transportation. This demonstrates that countries can show their support for the health workforce and help overcome practical barriers to working in many ways.

Strengthening public health interventions

Public health has faced unprecedented pressures from the multiple demands of designing measures to reduce transmission of SARS-CoV-2, developing policies to counterbalance their unintended or undesirable consequences, for example for mental health, and maintaining delivery of essential public health services, such as screening and vaccination programmes. The initial response was dominated, in the absence of a vaccine, by nonpharmaceutical interventions (NPIs) to control transmission. These were supported, to varying degrees of success, with FTTIS services (Section 5.1). Following the development of effective COVID-19 vaccines that became available in late 2020, public health systems have also needed to develop and implement mass vaccination campaigns (Section 5.2). However, as resources shifted and access to services were constrained, it was difficult to maintain – at least initially – other core public health functions alongside the pandemic response (Section 5.3).

Section	Strategy
5.1	Implementing appropriate nonpharmaceutical interventions and Find, Test, Trace, Isolate and Support (FTTIS) services to control or mitigate transmission (Strategy 16)
5.2	Implementing effective COVID-19 vaccination programmes (Strategy 17)
5.3	Maintaining routine public health services (Strategy 18)

5.1 Implementing appropriate nonpharmaceutical interventions and Find, Test, Trace, Isolate and Support (FTTIS) services to control or mitigate transmission (Strategy 16)

Key observations

The ability to mobilize traditional public health skills and implement preventive measures has the potential to reduce transmission and protect the health system but is not straightforward where evidence is contested and resources are constrained.

- Nonpharmaceutical interventions, such as hygiene measures, face masks, physical distancing, curtailing mass gatherings and restricting movement, do reduce transmission. Countries have used these in different combinations, but have often struggled with the wider implications for the economy, children's education and civil liberties, and with the unintended impacts of individual measures.

- The ability to adapt measures – their scope and design – over time, allows countries to respond to emerging evidence and to their specific national context. Countries have varied guidance on school closures and rules on lockdown but have sometimes found it hard to communicate changes effectively.

- Public perceptions of fairness and equity make a difference to the ability to implement policy. Measures that some countries have taken to introduce vaccine certificates or passports to facilitate internal movement and cross-border travel have been contested.

- Having strong (pre-existing) public health and primary care systems confers an advantage. Countries who had these, particularly where they had a tradition of public health/primary health care (PHC) community linkages, found the implementation of FTTIS services easier.

- Digital technologies including contact tracing or symptom tracking apps have the potential to support FTTIS activities but cannot be the only tool used. Many countries employed them as part of wider efforts, but again there were challenges around what was acceptable or indeed legal. Generally, adoption was low and the measures had varying utility.

- The resources and mechanisms to provide adequate income and social support (sick pay, other financial support or benefits) allow isolation policies to be implemented more effectively and are also critical in supporting those who have lost their work due to the pandemic. Countries who supported people in isolation, people who were unable to work or who lived precariously benefited.

Introducing nonpharmaceutical interventions to control transmission

The public health measures used to reduce transmission varied in their scope, but in all countries, they included some combination of: hygiene measures (handwashing and respiratory hygiene), the use of face masks, physical distancing, curtailing mass gatherings and restricting movement. International organizations, such as the ECDC, have issued guidance on implementing NPIs depending on the epidemiological situation (Table 5.1), but national implementation has ultimately depended on political priorities and weighing the public health benefits against the perceived potential adverse effects on mental health, or the economic and social impacts. Deciding on which measures to implement, when, and how is a complex process that requires the ability to generate and update best practice to inform policy decisions in the context of uncertainty and changing evidence (see Section 2.4). Initial responses were handicapped by the slow emergence, and even slower acceptance, of evidence of the very important role of airborne spread of the new virus (Greenhalgh et al., 2021).

Face coverings

As awareness of the significance of airborne transmission for COVID-19 increased, guidance from WHO and many governments on wearing a face covering evolved (Richardson, 2020). Some governments, especially in central Europe, encouraged the general population to use face coverings early in the pandemic. In some countries, governments directly supported this by encouraging people to make their own masks or distributing them to the population, while other countries were more cautious. At times, especially where shortages were experienced, guidance also directed that supplies should be reserved for health and social care workers (e.g. France, United Kingdom), and regional variations also occurred in federal states. There were also differences in the types of masks people were asked to wear. In Belgium and Ireland, for example, nonmedical masks were initially encouraged. In other countries, such as Hungary or France, both medical and nonmedical masks were advised, but France changed its advice in January 2021, taking the view that home-made nonmedical masks provided insufficient protection. In 2021, Austria, Germany and Slovakia have amended their guidance to recommend FFP2 masks. In most countries, young children are not required to wear a mask, but the exact age varies across countries. For example, in Spain masks are required for children over 5 years old whereas in Switzerland masks are required

for children aged years 12 and older (Rajan et al., in press). A number of countries in Europe supplied a limited number of face coverings free to the population.

Population mixing

Among the earliest measures to be taken were those that reduced the amount of contact people had with others. This usually involved the temporary closure of non-essential shops, bars and restaurants, entertainment venues, public transport, non-essential workplaces and schools. Countries and regions have also enforced stay-at-home orders of varying levels of strictness. These measures were among the few effective ways of reducing COVID-19 transmission before vaccination became possible (Section 5.2), with studies making use of international differences in timing of restrictions showing a clear association with reduced incidence (Oh et al., 2021). These have colloquially come to be called "lockdowns", but the stringency of lockdown measures varied greatly (Jarman et al., 2020a). The need for lockdowns to reduce transmission during the pandemic must be carefully weighed against the economic and social impact they can have, and for this reason the most stringent lockdowns have been implemented when countries have faced very high COVID-19 mortality and health systems have been at capacity. However, a comparison of lockdowns during the first and second waves of the pandemic found that the economic impact during the latter period was greatly reduced, suggesting that many companies found ways of adapting to the new conditions (Blanchard & Pisani-Ferry, 2021). Lockdowns have also been targeted at specific regions within countries when infection rates have been especially high, such as in Guterslöh in Germany, or where particular variants of concern have been circulating, such as in Bolton or Leicester in England.

School closures

Schools are important settings for transmission of the virus but there is a natural desire to reduce disruption to children's education as much as possible (King et al., 2021). While children who get COVID-19 are at a similar risk of suffering from often disabling and long lasting symptoms (termed long COVID) as adults, they tend to be less severely affected in the acute stage. Thus, schools should be among the last place to fully close (ensuring that there are stringent measures to reduce spread in place). The most recent report by the WHO European Region Technical Advisory Group (TAG) released in June 2021 stated

Table 5.1   *ECDC provided guidelines for the implementation of nonpharmaceutical interventions against COVID-19*

Nonpharmaceutical intervention	Low prevalence	High prevalence	Geo-level	Disease impact	Negative societal impact	Comment
Hygiene measures						
Meticulous hand and respiratory hygiene	+	+	National	High	Low	
Face masks						
Recommendation to use face mask in public spaces	+/−	+	National	High	Low	
Isolation and quarantine						
Recommended isolation of confirmed, probable and possible COVID-19 cases	+	+	National	High	Low	
Quarantine for contacts of cases	+	+	National	High	Low	
Quarantine of specific groups (e.g. travellers from a region or a country with high incidence of COVID-19)	+/−	+/−	National	Low	Low	Can be implemented, but: • Challenging to harmonize classification across countries and regions; • Administrative borders may not match epidemiologically relevant areas; • Questionable effectiveness when community transmission is ongoing across EU/EAA and the UK
Physical distancing						
Recommended >1–2 metres physical distance between individuals in public places	+	+	National	High	Low	
Closing of public spaces (e.g. non-essential shops, restaurants, entertainment venues)	−	+/−	Subnational (preferably)	High	Medium	To consider at local/regional level first to minimize socioeconomic disruption and political acceptability. To consider closing largest and most crowded spaces first.
Closing of public transport	−	+/−	Subnational (preferably)	High	High	To consider at local/regional level first. To consider reducing capacity first.
Closing workplaces	−	+	Subnational (preferably)	High	Medium	To consider at local/regional level first.
Recommending teleworking	+	+	National	High	Low	
Closing of schools (preschool, primary, secondary and tertiary)	−	+/−	Subnational (preferably)	High	High	To consider, depending on pupils' ages. Questionable effectiveness, especially in younger age-groups. To consider negative externalities.
Protecting high-risk groups and vulnerable populations	+/−	+	National	High	Medium	To also consider for hard-to-reach populations (e.g. testing in ethnic minorities or deprived populations).
Stay-at-home orders and recommendations	−	+/−	Subnational (preferably)	High	High	To consider at local/regional level first to minimise socioeconomic disruption and political acceptability.
Mass gatherings						
Interventions in place for public gatherings (small, medium and mass gatherings)	+/−	+	National	High	Medium	
Movement restrictions						
International travel restrictions	+/−	−	National	Low	High	May be considered in places with very low prevalence to limit introductions.
National movement restrictions or recommendations	−	+	Subnational	Medium	Medium	Prefer recommendation over restriction. To consider at local/regional level first, avoiding border closures.

+ recommended; +/− can be considered; – not recommended.

Note: The latest guidance was issued in September 2020.

Source: ECDC (2020a).

that transmission in educational settings can be limited by effective mitigation and prevention measures and that school closures should be considered as a last resort measure if large outbreaks occur or transmission in the community cannot be controlled by any other measures (WHO, 2021d). However, given the important role of schools in transmission, authorities should place a high priority on making them as safe as possible, for example through investment in ventilation, air filtration and CO_2 monitors (Morawska, 2021). The decisions to close or open should be made using risk-based approaches, adapted to local epidemiological situations. Compared with the first and second waves in the spring and autumn of 2020, school closures in 2021 have been more targeted. Higher incidence levels, increased hospitalization rates or response to emerging variants of concern are the most common indicators for the implementation of measures in schools. Throughout 2021, countries across Europe have sought to use blended or online teaching for older students (aged 10–18 years) while continuing in-person teaching for younger learners (aged 4–9 years). In 2021, measures have expanded to include new strategies such as vaccinations for educational staff and rapid antigen testing programmes.

Total school closures were seen as effective at preventing further transmission, at least initially, but the negative aspects continue to accumulate, including gaps in schooling, lack of stable learning environments and disruptions to children's socialization. These have manifested as worse mental health, weaker motivation and severe disruption to learning trajectories (Engzell et al., 2021), with already disadvantaged children suffering most (Bacher-Hicks et al., 2021). Additionally, students, teachers and parents must continuously and quickly adapt to constantly changing schooling environments as measures related to distance learning, infection prevention and control and rapid diagnostic testing are often implemented within days or weeks of the announcement by policy-makers.

Mass gatherings

Mass gatherings (such as large sporting, musical, cultural and religious events) and community events (such as large weddings and funerals) are potential superspreading events (Gkekos et al., 2021). Most countries across Europe chose to restrict mass gatherings, often based on the number of attendees, although some large sporting events did play an important role in the very early international spread of infections in Europe (Sassano et al., 2020).

Most countries also introduced different policies for indoor and outdoor gatherings, given the very large difference in associated risk. The number of attendees allowed at mass events increased in most countries when infection rates fell, but tightened when they surged.

As vaccination coverage has increased across Europe, some mass events have been held, ostensibly as pilots, although in most cases evaluation protocols have been difficult to obtain and the methods used to evaluate them have raised serious questions about whether they could answer the questions posed. Some examples were included in the UEFA EURO 2020 football championship, postponed to June/July 2021 and held in 11 different stadiums across Europe (WHO, 2021g). Most stadiums were not at full capacity for matches and different rules were in place for physical distancing, and vaccination and testing requirements were in place for spectators. However, it became clear that the challenge to infection control was not just in the stadiums; football fans watching the televised matches in groups were in high-risk settings and fans travelling around Europe increased transmission of COVID-19.

With increasing vaccination rates, some countries have introduced or considered introducing vaccine certificates, allowing those who are vaccinated, recovered from COVID-19 or who tested negatively for COVID-19 to attend large gatherings or enter certain public spaces. In the People's Republic of China, QR codes had already been used in 2020 to grant entry to public spaces, with digital health certificates launched in March 2021. Israel was the first country in Europe to introduce such a certificate (called a Green Pass). The scheme was introduced in February 2021 and ended in June 2021, as the number of infections declined significantly, and restrictions were lifted. With infection rates increasing again over the summer, the government plans to reintroduce the scheme in September 2021. Despite scientific, ethical and legal concerns related to the use of vaccine certificates and passports, countries around the globe are considering issuing such documents to facilitate reopening of their economies (Brown et al., 2021). The ongoing position of WHO, which was updated on 15 July 2021, is that national authorities should not require proof of vaccinations as the only pathway or condition permitting international travel, given limited global access and inequitable distribution of COVID-19 vaccines, and to continue a risk-based approach to facilitate international travel (The Lancet Microbe, 2021).

While vaccine certificates have demonstrated their value, including as an incentive to be vaccinated, thereby increasing uptake, concerns have also been

voiced, including by WHO, over the potential risks and negative consequences they may bring, such as discriminatory practices and undermining solidarity (Brown et al., 2021).

Internal and external travel restrictions

From the beginning of the COVID-19 pandemic, all countries across Europe have imposed restrictions on international travel. These have included entry bans, visa restrictions, testing and quarantine measures which fluctuate almost weekly based on criteria such as the epidemiological situations in countries of departure and arrival and the emergence of variants of concern. Unfortunately, the criteria used have not always been transparent and, in at least one case, a decision seems to have been made on the basis of a mistake in interpreting data from GISAID. Countries have sometimes prioritized entry of their own citizens, sometimes subject to testing or quarantine requirements. International travel restrictions have caused substantial disruptions to essential travel and trade, consistent with previous evidence on the importance of reducing obstacles at borders in promoting economic growth, despite countries across the European Region putting in place varying exceptions for the maintenance of essential services (Addo et al., 2020; 2021). A particular concern is when countries make seemingly arbitrary decisions about which vaccines they will accept in travellers, especially where this is directly or indirectly discriminatory.

Within the EU, in response to the uncoordinated approach to travel restrictions, on 13 October 2020 the European Council adopted a recommendation to create a coordinated approach to restrictions on movement, based on common criteria and the weekly mapping of countries by ECDC into red, orange, green and grey zones. This mechanism facilitates free movement, only applying testing and/or quarantine measures to travellers from non-green areas. On 25 January 2021, this recommendation was updated to include an additional dark red zone due to the worsening epidemiological situation in many countries (European Union, 2021). Recommendations were further adapted in mid-June to reflect the importance of vaccination uptake and the prevalence of new variants of concern in regulating free movement within the EU (European Council, 2021a).

The introduction of the EU's Digital COVID Certificate (EUDCC) (Box 5.1), which became effective on 1 July 2021, is starting to facilitate cross-border movement within the EU, as Member States are following the Commission's recommendations

Box 5.1   *EU's Digital COVID Certificate facilitates travel within the EU*

The EU's Digital COVID Certificate (EUDCC) is a document designated for both nationals and residents of EU Member States who have been fully vaccinated against COVID-19, with one of the four vaccines currently approved by the European Medicines Agency (EMA), which are marketed by the developers BioNTech–Pfizer, Moderna, AstraZeneca and Janssen/Johnson & Johnson. Member States may offer citizens or residents who have been vaccinated in a third country the possibility to apply for the EUDCC if they can provide proof of vaccination with one of the vaccines authorized in the EU. The EU has also adopted a series of equivalence decisions to automatically recognize vaccination certificates from a selection of third countries, which currently includes Iceland, Lichtenstein, Norway and Switzerland, among others. Those with proof of recovery from a COVID-19 infection in the last 6 months, as well as those who test negative for COVID-19 before their trip, are also eligible to obtain the certificate.

National authorities are in charge of issuing the certificate. The digital version of the certificate can be stored on a mobile device and a paper version can also be requested. Both forms of documentation display a QR code that contains essential information and a digital signature to ensure authenticity. The European Commission has built a gateway through which all certificate signatures can be verified across the EU. It also helped Member States to develop national software and applications to issue, store and verify certificates and supported them in the necessary tests to on-board the gateway.

Source: European Commission (2021k).

to refrain from imposing additional restrictions on EUDCC holders, such as quarantine, self-isolation or testing. However, additional restrictions may be applied if they are necessary and proportionate to safeguard public health; for example, as a reaction to new variants of concern.

The EUDCC has also acted as an incentive to boost vaccination campaigns across the EU, as some countries have started to apply restrictions at the national level, hindering access to certain work and leisure activities for citizens without a valid certificate and sparking some controversies. Nevertheless, the continued threat posed by new variants and emerging evidence on waning vaccine effectiveness raise questions on the certificates' duration and the need to start renewing vaccinations across Europe to secure a continuing freedom to travel.

In the Eurasian Economic Union, three of the five Member States (Armenia, Belarus and the Russian Federation) joined the Travel without COVID-19

project piloted by the Eurasian Development Bank. Since early 2021, citizens of the three countries, and later also Kazakhstan, have been able to freely move between the participating countries by uploading a negative PCR (polymerase chain reaction) test result to the mobile application and presenting the results to officials at borders through a QR code. The Eurasian Development Bank intends to expand the Travel without COVID-19 app based on positive reviews from the Russian Federation and other countries.

Ensuring well-functioning Find, Test, Trace, Isolate and Support (FTTIS)

FTTIS programmes are essential parts of any response to infectious disease outbreaks. Their goal is to find and test all cases suspected of carrying the virus, and trace all those who had close contact with an infected person, and isolate or quarantine them, as appropriate (Chung et al., 2021). The last step, isolation, is the crucial one, but of course it depends on all of the others working. Even when the pathogen has spread widely, contact tracing can still help to reduce transmission, with WHO recommending that authorities then focus on low-prevalence and high-risk settings (Baraniuk, 2020; WHO, 2021b). The success of vaccine roll-out will not render such programmes unnecessary since the existing vaccines, and any others that can be envisaged, do not offer 100% protection and, even if they did, with

the Delta variant having a R0 of 6–8, vaccination will not achieve population immunity alone.

Thus, FTTIS needs to be an integral part of the broader COVID-19 response that includes effective NPIs (see above) that keep community transmission low and prevent FTTIS from being overwhelmed. In Europe, delays in scaling-up FTTIS in the first wave meant that they were unable to halt the early growth of COVID-19 cases, with the added problem that countries faced shortages of tests early in the pandemic and other problems which reduced the effectiveness of programmes; for example, by failing to make adequate provision for support for those asked to isolate (see below).

FTTIS is a complex system with many interlinking components that must run smoothly together to avoid gaps and bottlenecks and to ensure that positive cases are isolated as quickly as possible (Fig. 5.1). All these require careful planning and coordination, for example, to avoid setbacks that occur in the health system and beyond due to insufficient capacity or logistic problems.

Implementation of effective FTTIS systems faced multiple hurdles in Europe. Many countries lacked an adequate public health workforce or infrastructure, especially laboratories, although some countries did use capacity in veterinary laboratories. While some of these barriers, such as the lack of testing sites, could be increased relatively quickly, and logistic bottlenecks (e.g.

Figure 5.1 *Implementing effective FTTIS services required careful coordination*
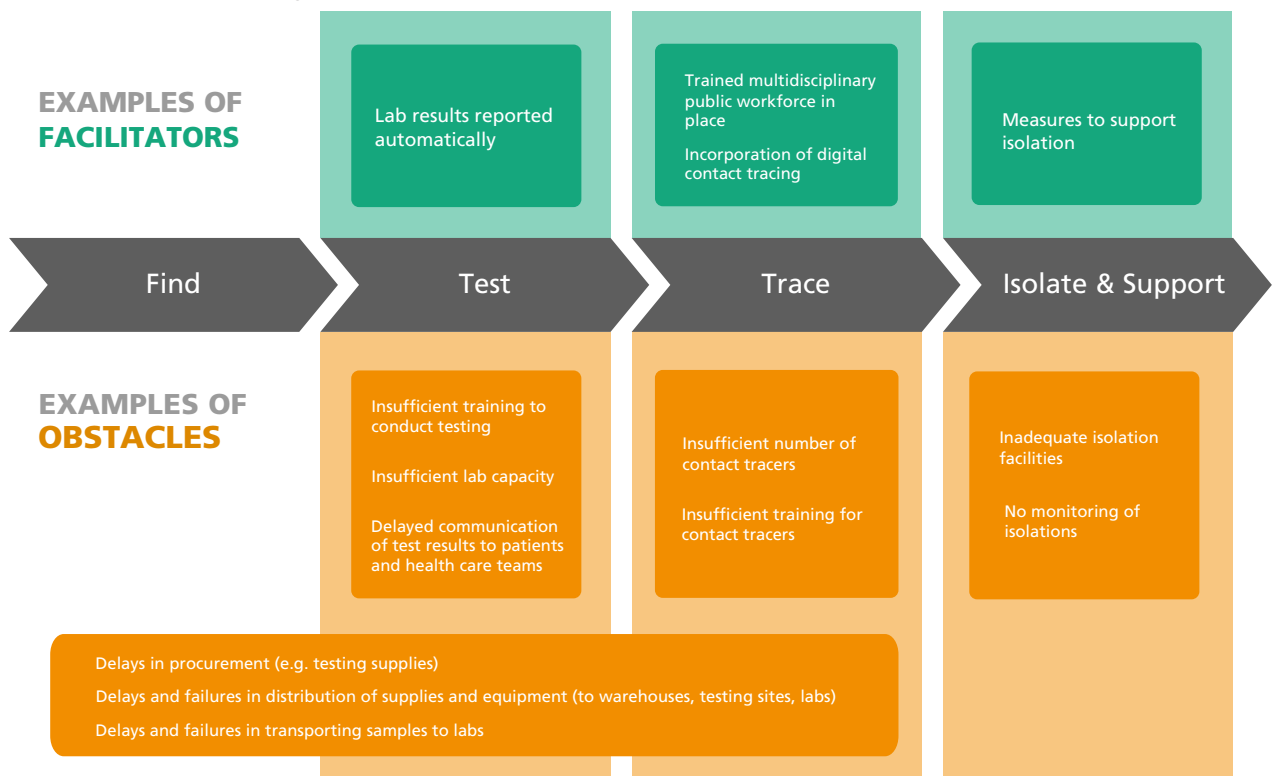
Source: Authors, based on Rajan et al. (2020a).

securing and distributing testing materials) could be overcome, shortages of staff to take and analyse swabs and to trace contacts was often a limiting factor. At the beginning of 2020, most countries in Europe were only able to trace contacts of symptomatic cases, and often inadequately (Rajan et al., 2020a). Finding new cases was also initially constrained and, in many countries, focused on passive strategies, i.e. asking symptomatic cases to come forward for testing. Active case-finding (seeking out asymptomatic carriers), for example, screening of health and social care workers and other high-risk groups, only emerged when testing capacity increased and testing of all travellers on entry only became widespread with emergence of new variants. This reflected a wider problem, in that there was often a misunderstanding of the nature of contact tracing, which involves not just forward tracing, to ensure that contacts of those found to be infected isolate, but backwards tracing (at least for as long as logistically possible) to identify the sources of transmission. This was not helped in some countries, such as the United Kingdom, that contracted these processes to outsourcing companies more used to direct marketing or similar, whose business model was based on using staff with minimal training (Scally et al., 2020).

In the absence of a large public health workforce, PHC and other community-based health care have played pivotal roles in supporting delivery of FTTIS in some countries (see Section 6.2). They have taken on expanded roles, and may serve as the first point of contact for public health activities, such as case notification, testing referrals, contact tracing and disease surveillance. A range of other approaches has been used to make up for workforce shortages. For example, to compensate for lack of contact tracers, some countries resorted to using volunteers (Sections 4.1 and 4.2) and using contact tracing apps, as well as the outsourcing mentioned above. These responses achieved mixed results and highlight the importance of adequate training and quality control for the implementation of public health programmes (Rajan et al., 2020a).

At the outset, some FTTIS systems outside Europe were better prepared. For example, in Japan, Viet Nam and the Republic of Korea, traditional capacity for manual contact tracing has been expanded over recent years, drawing on strong public health capacity that had been developed in the aftermath of previous epidemics such as SARS and MERS (Roy, 2020). Having sufficient availability of trained public workforce is crucial for finding new cases and even more so for contact tracing in the community, as those involved require not only special training but also local knowledge to

be effective. This proximity to local populations fosters trust and helps contact tracers persuade people to share personal information about their health and social contacts. Some countries were thus able to implement comprehensive contact tracing measures, including investigating multiple layers of contacts (e.g. in Viet Nam, tracers sometimes reached out to third-order contacts of the infected person, resulting in as many as 200 contacts tested for one identified case), outbreak clusters and using backward tracing (e.g. tracing a new case's contacts as far back as a fortnight before they got infected) (Lewis, 2020).

Digital technologies in support of FTTIS services

In the Republic of Korea, manual contact tracing was complemented with digital sources of information, including security camera footage, facial recognition technology, bank card records, and global positioning system (GPS) data from vehicles and mobile phones to provide real-time timelines of people's travels (Whitelaw et al., 2020). Government-implemented surveillance infrastructure has also been used to support COVID-19 tracing and enforce isolation or quarantine in the People's Republic of China and the Russian Federation. However, there are obvious human rights issues to consider. Privacy concerns limit many people's willingness to have data linked even for the benefit of public health, in the way it has been in the Republic of Korea and other countries mentioned above.

Another potential impediment to the wider adoption of approaches that can link individual data from different sources is the availability of digital infrastructure. Such infrastructure is relatively more developed in some of the countries that have previous experience with similar epidemics. For example, in some of the Asian countries mentioned above, the rapid response to COVID-19 was technologically (and institutionally) enabled by disaster management systems established after the 2003 SARS outbreak. Within 1 day, responsible institutions integrated travel histories of infected patients with their identification data, which facilitated mobile tracking (Huang et al., 2020).

However, there are other examples of effective use of digital health tools to support pandemic response in Europe, although evidence on their effectiveness is limited. For example, data from transport and mapping information (e.g. information gathered by Google and digital public transport ticketing systems) have been widely used to track movement patterns and to help monitor the spread of the virus (Szocska et al., 2021).

Other countries have made use of surveillance software such as Go.Data, District Health Information Software 2 (DHIS2) and SORMAS (Surveillance, Outbreak Response Management and Analysis System), that were developed to respond to previous infectious diseases outbreaks but have been adapted for COVID-19 (see EOHSP et al. (2021) for more details). Much of the available data on mobility is limited by being generated only by certain types of phones, such as iPhones or those using the Android operating system or requiring installation of certain apps (Vannoni et al., 2020). However, authorities in Hungary have developed a partnership with mobile phone companies that enables anonymized data to be obtained from all mobile phone users, something that is especially important in countries where uptake of smartphones is still limited (Szocska et al., 2021).

Many countries in Europe have developed and implemented contact tracing apps. These are usually mobile phone apps that utilize Bluetooth technology, but in some cases use geolocation services (e.g. monitoring bracelets in the Russian Federation). Some apps can communicate with those from other countries but, in general, interoperability is limited both because of technical barriers and concerns about data protection (European Commission, 2021n). Nevertheless, the EU's eHealth Network, which brings together representatives from Member State authorities responsible for e-health, has developed guidelines and technical specifications to promote the interoperability of contact tracing applications in the EU. This ensures that approved applications are linked through an EU interoperability gateway service and can exchange the minimum information necessary to detect a possible exposure to COVID-19, allowing citizens to travel across the EU with a single application (European Commission, 2020c; 2021i). Most of the contact tracing apps developed can be downloaded voluntarily and vary in how much they allow users to opt-in on different features (e.g. geolocation, data sharing). However, the practical value and the willingness of the population to participate is not clear. Some research has suggested that contact tracing apps can be effective if 80% of people with smartphones use a contact tracing app, corresponding to 56% of the population overall (Oxford University, 2020). In practice, however, the usage rates of contact tracing apps have been much lower (Milsom et al., 2020). This also assumes that these apps provide accurate and reliable contact tracing, and some have expressed concerns on this (European Observatory on Health Systems and Policies et al., 2021). Thus, while apps have the potential to support contact tracing operations, they cannot be the only solution, particularly without large-scale uptake by the public.

Offering income support for those isolating at home and/or unable to work

Income support is vital to enable people to stay at home, to ensure they can pay for food and other basic needs, and help to alleviate the indirect costs of seeking health care, such as transport costs and lost labour time. If people's ability to access to basic needs depends on violating public health orders, many of them will be forced to do so. These measures were important not only for increasing adherence to lockdown measures but have also helped support the economy and to mitigate the negative health effects of the economic crisis itself.

Many countries in Europe have introduced or increased available income support measures specifically during the COVID-19 pandemic period (Table 5.2). These include furlough schemes or increased public spending on existing programmes with simplified administrative requirements. Complementary measures such as the deferral of rent, taxes, mortgage and loan payments have been implemented in many countries, often on an unprecedented scale. The approaches to social support are diverse. Social policy measures that stabilize economies and enable public health policies can include special measures for vulnerable populations (e.g. the homeless); unemployment insurance; income protection measures, including for precarious or independent workers (e.g. in the arts); basic income schemes; short-time work (*kurzarbeit*); measures to ensure access to health care; active labour market policies, such as special support for high-risk workers to stay home; support for people facing food insecurity; and housing support.

In some countries, isolation facilities were provided at no charge for people who cannot isolate at home. However, to be effective, support for isolation needs to go beyond that, ensuring that people have financial means to stay off work for the period of isolation, without suffering further economic consequences, such as being laid off. Furthermore, isolation support requires a dedicated workforce who can support those isolating. In some countries volunteers and civil society organizations played an important role.

While the previous paragraphs have focused on incentives to isolate and support for those isolating, there is also a role for sanctions, albeit designed in ways that take account of the lived reality of those affected and the constraints they face. Most countries have introduced various means of enforcement, including fines. However, these risk penalizing marginalized

Table 5.2 *Countries implemented a variety of approaches to support people to stay at home*

	Income support for people self-isolating	Accommodation/supplies provided?
Belgium	70% of average earnings (capped at €2 755 month) plus nominal allowance of €150 per month	No
Canada	$500 a week for up to 16 weeks (statutory sick pay of 55% of regular earnings thereafter)	Yes – for those unable to isolate at home (only available in some regions)
Finland	100% of lost income suffered during isolation	Yes – for those unable to isolate at home
France	90% of gross salary + daily allowance (50% of daily basic wage) for 30 days	Yes – for those unable to isolate at home
Germany	100% of average annual salary for 6 weeks, (statutory sick pay of 70% of regular earnings thereafter)	No
Norway	Covered by statutory sick pay, which is 80% of salary (capped at NOK 60 000 per year)	Yes – for those unable to isolate at home
Ireland	€350 per week; Separate illness benefit for those not currently working	No
Italy	Covered by statutory sick pay, which is 50% of average daily pay (excludes self-employed)	Yes – for those unable to isolate at home
The Republic of Korea	Rates depend on household size (KRW 454 900 per month for individuals living alone); the Republic of Korea has no national paid sick leave system for non-COVID-19 illness	Yes – daily necessity kits provided to all in home isolation; quarantine facilities provided for severe symptoms or people without individual room
United Kingdom	£500 support payment for eligible lower earners (England, Wales, Scotland). Financial support grants available to eligible individuals in Northern Ireland. Statutory sick pay: £95.85/week	No

Source: Reed & Palmer (2021).

populations disproportionately and may also reduce public trust in institutions. A critical tension inherent in FTTIS programmes is that the people who are least able to get tested and isolate are also the most vulnerable to COVID-19. There is now overwhelming evidence of structural inequalities that make people living in poverty, who have crowded housing or work in essential, public-facing jobs disproportionately affected by the virus (Paremoer et al., 2021). They are also least likely to be able to obtain care when needed. Key approaches to support compliance with isolation include increased income support, temporary accommodation and supported isolation. But countries have also enforced isolation with financial penalties. Punitive fines are regressive and could burden populations that have already been hit hardest by COVID-19. For instance, early data suggests that young men from Black, Asian and ethnic minority communities in the United Kingdom are 1.6 times more likely to be fined than white people for breaking COVID-19 restrictions (BBC, 2020). Enforcement can be a key tool in supporting adherence, but it is essential that any unintended consequences that widen inequalities are carefully considered, and that people without appropriate resources and support to self-isolate are not unfairly penalized. Further monitoring needs to be done about how tactics might impact vulnerable and high-risk communities differently.

5.2 Implementing effective COVID-19 vaccination programmes (Strategy 17)

Key observations

Vaccination is the clear route out of the pandemic and, after a slow start, vaccines have come on stream and are being procured and delivered. There is a need to do much more to achieve global vaccine equity, in particular given the emergence of the new variants.

- Vaccine development and distribution is inherently international and mechanisms to coordinate efforts across countries are essential. EU Member States managed COVID-19 vaccine procurement with access facilitated by EU-level procurement. Countries outside of the EU relied on bilateral negotiations and COVAX.

- The development of vaccines depended heavily on investment from public sources. Countries that took on risk did not benefit as they might have expected. Some reappraisal of the role of medical industrial strategies to better balance the needs of public and private sectors would be timely.

- Careful planning at the national level is essential in managing purchasing, distribution and dispensing and to provide adequate venues, supplies and workforce. Countries coordinated as effectively as they could but not all had the national monitoring systems and real-time data needed to manage seamlessly.

- Flexibility is a key asset in approaches to using health workers and existing infrastructure. Countries that were

able to adapt structures and staffing models facilitated the rapid roll-out of their vaccination programmes.

- National level decision-making is appropriate in guiding prioritization lists for who to vaccinate first. Many countries prioritized health and social care workers and older people but in all cases there was a need for mechanisms to avoid doses being wasted when invitees for vaccination did not attend.

- Communication campaigns are a crucial part of tackling vaccine hesitancy. Countries that have actively combated misinformation and disinformation, and which have focused on community engagement seem to achieve higher levels of vaccine uptake.

Organizing the roll-out of national vaccination campaigns

The development of vaccines for COVID-19 has been achieved at a record pace. This has required effective assimilation of the vaccines, which in Europe benefited from the operations of the EU Medicines Regulatory Network (EMRN) comprising the EMA, the medicines regulatory authorities of the EU Member States, and the European Commission. The use of fast-track procedures enabled the authorization of the first vaccine 9 months after the pandemic was declared (Cavaleri et al., 2021). The subsequent roll-out has also been achieved at fast pace in many countries (but not all). It has required a high level of organization and a trained workforce. The designs of immunization programmes and public health systems vary greatly across Europe so each country must find its own solution. However, the core elements of a vaccination programme are well established (Fig. 5.2).
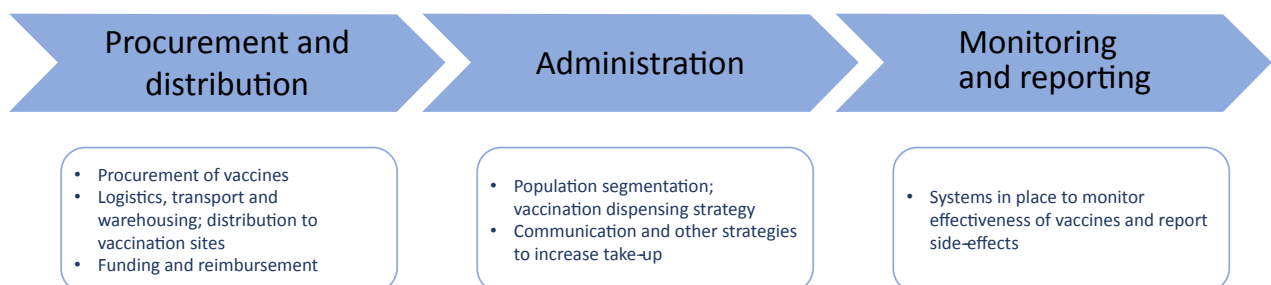
As the first step, countries needed to source vaccines in sufficient quantities and ensure they are both safe and effective, based on the approval procedures they use for new medicines which may operate at the national or, in the EU, European level. The EU COVID-19 vaccination scheme was designed to procure, gain regulatory approval and distribute vaccines (Box 5.2), but Member States have been free to determine which groups to prioritize for vaccination and how the vaccines are administered. This ensured that small Member States, that would otherwise be disadvantaged because of their low purchasing power, were able to get supplies. Other countries in Europe have negotiated bilateral contracts with manufacturers independently and used the global COVAX facility to obtain access to vaccine supplies (see Section 2.9). Those countries able to ensure plentiful supplies of vaccines were best placed to rapidly vaccinate their adult populations. For example, Israel traded access to the health data in return for sufficient supplies of the BioNTech–Pfizer vaccine to cover their whole population, effectively enabling a real-world efficacy study of the new vaccine (Rosen et al., 2021a). The United Kingdom negotiated contracts early and was prepared to pay a higher price.

There are many lessons to be learned from this experience. A high proportion of the cost of developing COVID-19 vaccines came from public sources, with substantial support from the United States (Moderna), United Kingdom (AstraZeneca) and EU (BioNTech–Pfizer) (Dyer, 2021b). Yet while the public sector bore much of the risk, it is not clear that it realized the benefits proportionately. As a consequence, the EU, and governments elsewhere, are reappraising the role of medical industrial strategies that can create a better balance between the needs of both parties. Looking beyond the high-income countries, there is a need to do much more to achieve global vaccine equity, with the ambition of COVAX limited to covering only 20% of the population in low-income countries.

Countries were able to manage the logistic and procurement challenges relatively well but even where systems for large-scale routine vaccination existed, these have been challenged by the unprecedented scale and speed of the COVID-19 vaccination process. Careful planning was required so that the various elements, including purchasing, distribution, dispensing (setting priority groups, ensuring convenient locations, but also material supplies, waste disposal and sufficient workforce to administer the vaccines), were well coordinated and worked seamlessly. Where available, real-time data, such as on the availability of equipment, helped ensure that the various elements of vaccination

Figure 5.2 *Successful mass vaccination programmes require careful planning*

Procurement and distribution	Administration	Monitoring and reporting
• Procurement of vaccines • Logistics, transport and warehousing; distribution to vaccination sites • Funding and reimbursement	• Population segmentation; vaccination dispensing strategy • Communication and other strategies to increase take-up	• Systems in place to monitor effectiveness of vaccines and report side-effects

Source: Authors, based on Agrawal et al. (2020).

Box 5.2   *EU's vaccination strategy for COVID-19*

The EU Vaccines Strategy, which negotiated vaccine purchases for the EU as a whole, was the first real test of the EU's ability to prioritize, negotiate and deliver. As part of the strategy, the European Commission agreed Advanced Purchase Agreements (partially financed via the Emergency Support Instrument) with vaccine producers on behalf of the 27 EU Member States and procured four COVID-19 vaccines approved by the EMA as safe and effective (see below). By mid-2021, these contracts amounted to 4.65 billion doses for an EU population of 446 million people. The European Commission has also reached agreements to purchase three other vaccines (Sanofi–GSK, CureVac and Novavax) if they are proven to be safe and effective and has concluded exploratory talks for further contracts (Valneva) (European Commission, 2021q).

There were all manner of recriminations in early 2021 with vaccines being delivered slowly, arguments about international trade in vaccines, questions raised about the safety of some vaccines, and arguments that the European Commission had negotiated poorly. Despite this, the EU did have enough vaccine advance purchases negotiated to be confident of an adequate supply of vaccines in every Member State in 2021. It is not clear whether the chosen approach was contrary to the will of European leaders and voters or if smaller EU Member States would have been able to procure vaccines on that schedule or at those prices themselves. Nevertheless, the EU took advantage of its market power to secure favourable conditions on pricing and liability, but several other factors including a low internal production capacity and the involvement of all 27 national authorities likely contributed to slowing down the process initially.

As of August 2021, the EMA had approved four vaccines (Comirnaty developed by BioNTech–Pfizer, Spikevax developed by Moderna,

Vaxzevria developed by AstraZeneca and COVID-19 Vaccine Janssen developed by Johnson & Johnson). However, neither the Chinese Sinopharm- and Sinovac-produced vaccines which have been approved by WHO for emergency use, nor the Russian Sputnik V which has already been administered in many European countries (EMA, 2021), have been submitted for a marketing authorization within the EU yet and are still being evaluated under rolling review.

Vaccines are made available to all countries in the scheme at the same time and are allotted according to the size of the country's populations, with each receiving a proportionate share of the EU total. Logistically, deliveries are made by manufacturers directly to hubs within Member States. The EU has little to no role in administering vaccines – turning vaccines into vaccinations – but there will be a cross-border dimension of access or hesitancy issues leading to low vaccination rates in some Member States.

The EU has established vaccination targets for the EU as a whole — 80% of over 80-year-olds and 80% of health and social care workers by the end of March and 70% of adults by the end of the summer 2021 — the prioritization of different groups and the roll-out of vaccination programmes is for Member States to decide. Due to logistic problems, only about 10% of the EU population had been vaccinated by the end of March. However, once these issues were resolved, vaccinations accelerated, and the 70% vaccination target was surpassed at the end of July.

In terms of international solidarity, EU Member States have mutually agreed to donate their own vaccines to WHO's COVAX, a partnership which pursues a global strategy of vaccine procurement and distribution (see Section 2.9).

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campaigns were seamlessly coordinated (see Box 6.1). Further, national monitoring systems have been set up to support vaccination roll-outs and monitor the progress of vaccination efforts. At the EU level, the ECDC set up a monitoring system to collect key vaccine roll-out indicators, which it displays on the ECDC website's COVID-19 Vaccine Tracker, a live dashboard.

The logistics of vaccine distribution were further complicated by the initial need to store the BioNTech–Pfizer vaccine at extremely low temperatures, maintaining cold chain monitoring throughout the distribution (European Observatory on Health Systems and Policies et al., 2021). This influences the delivery strategy, with vaccines requiring ultra-cold chain transport better suited for distribution via many smaller mobile delivery centres rather than fewer larger, fixed centres, and requiring appropriate training and education (e.g. storing, thawing, etc.) of those administering it. Since

existing vaccines do not typically require an ultra-cold chain, many countries needed to develop ultra-cold chain infrastructure to use such products.

In many countries, vaccination centres were set up in parallel with the existing health infrastructure. As vaccination has progressed, there have been changes in where vaccines are delivered and by whom. Vaccination sites have moved out of hospitals and dedicated health facilities into community settings, such as pharmacies and mobile units in shopping centres and sports grounds, among others in urban areas. Mobile units have also been used in remote and rural areas. As more vaccines became available and vaccination programmes were able to scale-up, there was also a need to identify sufficient health care workers to administer the vaccines. The overwhelming majority of countries are relying on personnel that normally perform vaccinations, primarily physicians and nurses (see Section 4.2).

However, some countries have explicitly expanded the workforce for their campaigns to include paramedics (e.g. Austria, Israel, Ukraine), medical students (e.g. Austria, Belgium, United Kingdom), pharmacists (e.g. Portugal, Switzerland, United Kingdom), doctors' assistants (e.g. Germany, Netherlands) and dentists (e.g. Ireland, United Kingdom). Some countries have also trained volunteer members of the public as "peer" and "non-health care" vaccinators to administer doses (e.g. Belgium, Ireland, United Kingdom). Many countries have also engaged volunteers to assist in all other operations of the vaccination process, including check-ins, helping vaccinators complete paperwork and staying with people in the recovery area following their inoculations.

Although the priority was to cover the whole adult (and in some countries the 12–18-year-old) population, most countries did prioritize certain groups. The highest risk groups were generally determined by age and occupation, with those aged over 80 years and health or social care workers considered the highest priority for vaccination. The next priority groups were progressively younger age groups and where they could be easily identified, people with certain medical conditions that put them at higher risk (e.g. diabetes) or certain people-facing occupations, such as teachers and police officers.

These approaches to prioritization must, however, be interpreted flexibly as otherwise there is a risk that doses will be wasted (Merkur & Waitzberg, 2021). In the United Kingdom and Belgium, for example, vaccination centres maintained reserve non-priority lists of people who wanted to be vaccinated and could attend at short notice. In Israel, vaccination sites with spare doses put messages out via social media so people could queue up without an appointment.

Inevitably, given the very rapid development of COVID-19 vaccines and use of emergency authorization there has been intense media interest in potential adverse reactions and vaccine efficacy. Many countries have drawn on existing monitoring systems. For instance, in the United Kingdom, the Yellow Card Scheme operated by the Medicines and Healthcare Products Regulatory Agency (MHRA) allows both health care professionals and patients to report side-effects through an online portal; data are summarized and reported regularly on the gov.uk website (European Observatory on Health Systems and Policies et al., 2021). In the Nordic countries cross-border registry studies are being used to monitor effectiveness and safety of vaccines.

Combating vaccine hesitancy

A combination of regulatory measures, communication strategies and actions to facilitate effective implementation, such as monitoring public attitudes, are needed to combat vaccine hesitancy, and no universal solution exists (Siciliani et al., 2020). Communication and education campaigns, including actively addressing the problem of the COVID-19 infodemic (Section 2.6), are critical for ensuring an effective vaccine roll-out. Addressing vaccine hesitancy has been highlighted as a key barrier to vaccine uptake that could threaten the successful roll-out of COVID-19 vaccination programmes. Although levels of vaccine hesitancy before the pandemic had been low overall in Europe, this was a problem in some countries (Eurobarometer, 2019). A Eurobarometer survey conducted in early 2021 revealed that just over half of Europeans (52%) were worried about safety of COVID-19 vaccines and two in three (67%) were worried about side-effects, but the majority (70%) of respondents agreed that a vaccine was the only way to end the pandemic (European Commission, 2021r). According to a Flash Eurobarometer from the end of May 2021, 75% of respondents agreed that COVID-19 vaccines are the only way to end the pandemic and vaccine acceptance was generally high, with 69% of respondents already vaccinated or keen to get vaccinated as soon as possible (Eurobarometer, 2021). But the degree of vaccine hesitancy can be high among some Member States, accounting for more than a quarter of respondents in Bulgaria (35%), Croatia (27%) and Slovakia (26%), compared with just 8% of respondents in Malta and 11% in both Germany and Hungary.

Inevitably there are small numbers of people who are actively opposed to vaccination, including individuals who have been attracted by various other conspiracy theories. The disinformation that feeds these views is often distributed widely on social media by those with a variety of motives, including taking advantage of the propensity of certain groups to share such material, thus making vaccines an attractive topic for those seeking to distribute malware or monetarize browsing (clickbait) (Wang et al., 2019), other conspiracy theorists, and state actors seeking to undermine trust in democratic institutions. This has necessitated carefully crafted information strategies, including actively addressing misinformation and disinformation (see Section 2.6)

Community engagement is also critical in building local vaccine acceptability and confidence, and in overcoming cultural, socioeconomic and political barriers that may lead to mistrust and hinder uptake of vaccines. This necessitates comprehensive approaches that give

communities a voice and engage diverse local voices to maximize vaccine uptake from the ground up. There is a large literature on co-creation that can be drawn on (Turk et al., 2021). Methods include engaging in local dialogue and supporting the development of community networks, leveraging and promoting existing local channels that influence decision-making, such as community and faith leaders, teachers, sports and youth clubs and online communities and networks. Using a bottom-up approach devolves the power of design and implementation of communication strategies to local actors, supported by evidence syntheses, enabling them to mobilize local expertise that can engage with and shift attitudes on vaccines and wider government handling of the COVID-19 pandemic (Burgess et al., 2021).

In general, the pandemic response by European governments has been mostly top-down and centralized (Rajan & Koch, 2020) (see Section 2.7). Where used more, community engagement has generally drawn on pre-existing collaborations with civil society groups. In Ireland, for example, an existing Red Cross peer health education programme in the country's prisons was expanded to include public health messaging around COVID-19 and the importance of vaccination, thereby reaching groups that have traditionally been very wary of government messaging.

5.3   Maintaining routine public health services (Strategy 18)

Key observations

Maintaining traditional public health services, such as screening and vaccination, suffered from the diversion of resources to tackle COVID, the closure of facilities and clinics and public reluctance to attend these facilities out of fear of infection or "trouble the health system" at a time of crisis.

- The pressures of sustaining routine services during a crisis are exacerbated when the system is already under-resourced or overstretched. Many countries struggled during COVID because there had been chronic under investment in public health.
- A strategic approach to priority-setting for non-emergency public health services is a way of rationalizing the use of the remaining health system capacity and of fostering efficiency and equitable access. Nevertheless, maintaining routine public health services has been challenging in many countries.
- The close relationship between public health and PHC creates opportunities to reassign roles and maintain services. Countries with multidisciplinary approaches to public health, and where there were existing links to mental health care and social care services, were best placed to sustain a comprehensive public health response.

Disruption of public health services

Despite the priority given, out of necessity, to the immediate COVID-19 response, the continuation of routine public health services, including cancer screening and routine immunizations, is essential. Yet, service disruptions have occurred in many countries and some programmes were temporarily postponed. In the WHO European Region, a survey found high levels of disruption (63%) in outreach services for routine immunizations (Jakab et al., 2020). There were also declines in actual immunizations in many countries, with a 30% reduction in measles–mumps–rubella vaccine coverage in Ukraine relative to that in 2018–2019, while the fall was 27% in Armenia. In Kyrgyzstan, routine vaccination services were temporarily suspended in March 2020, although the Ministry of Health has since used mobile immunization teams and mobile clinics to deliver catch-up immunizations. Lockdowns also decreased the availability of services such as reproductive health services, and the COVID-19 pandemic is expected to result in greatly increased maternal and child mortality in low- and middle-income countries.

Maintaining public health services via remote provision and collaboration with primary health care

There will always be challenges in maintaining routine public health services during a pandemic but this has been exacerbated because most countries have underinvested in this sector for many years. Low salaries, especially compared with clinical medicine, poor working conditions, and low status have combined, in many countries, to make public health an unattractive career. As the pandemic has shown, this was a false economy.

Some of the routine public health services were provided remotely (Section 6.2). PHC providers, mental health care providers and social care providers have also supported provision of public health activities. These included vaccinations, health checks, preventive screenings, prevention messaging as well as epidemiological surveillance, data collection and monitoring.

Transforming delivery of health services to address COVID-19 and other needs

Dual delivery of COVID-19 and non-COVID-19 services proved to be the core challenge of the service delivery response during the pandemic. Countries responded with a combination of strategies to manage a surge in demand for both health and social services due to COVID-19, while continuing to provide other necessary health care services.

The ability of health systems to respond to a surge in demand for services is a combination of several factors including the starting capacities, the ability to rapidly increase capacity and the presence of systems in place to monitor changes in available capacity as well as fluctuations in demand and access. This was conditioned on the ability of health systems to quickly increase financing, adapt coverage as well as purchasing and payment systems (Chapter 3) – in part to incentivize desired changes in service delivery (e.g. provision of teleconsultations) – and effectively deploy the health workforce (Chapter 4).

Before the pandemic, EU countries had a threefold variation in acute care bed capacity and a sevenfold variation in ICU bed capacity (Quentin et al., 2020) (Fig. 6.1). To prepare for or accommodate the sudden influx of patients due to COVID-19, countries in Europe have surged capacity especially in hospital settings; approaches to achieve this are described in Section 6.1. However, this focus on hospital care may have led to adverse consequences for ambulatory and community care settings (e.g. limiting the availability of PPE for these providers), and the underuse of these capacities. Further, it became quickly apparent that simply increasing the number of hospital beds, medical supplies and PPE for COVID-19 inpatient treatment was insufficient if it was not accompanied by ensuring sufficient numbers of adequately trained health professionals (Section 4.1). Finally, the ability to (re)distribute the capacity to various locations, such as localized outbreaks, depending on need and to various levels of care, proved particularly crucial in order to optimally use the available resources. As more became

Figure 6.1 *Intensive care unit bed capacity varied widely across the EU*
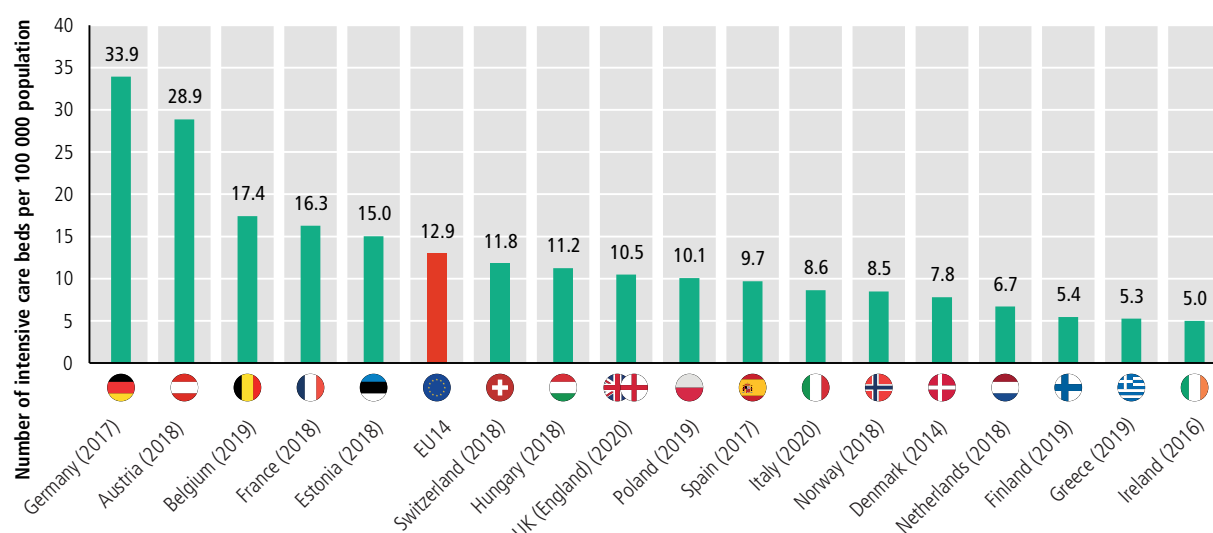
EU14: All countries in the figure except for Norway, Switzerland and the United Kingdom.

Source: OECD & European Union (2020).

known about the nature of COVID-19, care pathways for those patients as well as for those requiring other essential services evolved. Thus, Section 6.2 details the various strategies to adapt or transform patient care approaches, including the coordination of care across levels (e.g. acute versus outpatient) and settings (e.g. PHC versus long-term care).

Section	Strategy
6.1	Scaling-up, repurposing and (re)distributing existing capacity to cope with sudden surges in COVID-19 demand (Strategy 19)
6.2	Adapting or transforming service delivery by implementing alternative and flexible patient care pathways and interventions and recognizing the key role of primary health care (Strategy 20)

6.1 Scaling-up, repurposing and (re)distributing existing capacity to cope with sudden surges in COVID-19 demand (Strategy 19)

Key observations

The ability to respond to a surge in demand for services depends on the information flows in place; the ability to adapt the necessary financing, purchasing and payment mechanisms; and the management ability to coordinate all these elements. The initial capacity of health systems' service delivery was also important, but a large initial capacity could also result in suboptimal provision.

- Making more hospital beds available is critical at particular points (and places) in a pandemic. Some countries had spare bed capacity available while many repurposed existing beds for acute or transitional care (knowing this would have consequences). Other countries used hospital beds in the private sector and the military to scale-up hospital capacity relatively quickly while some created temporary hospitals or used spaces such as stadiums. Others transferred patients between facilities, regions and even countries to alleviate pressures.

- The focus on the availability of hospital beds can divert attention from PHC, skew treatment modalities and diminish efficiency. Some countries with spare bed capacity treated people as inpatients even where they could have been effectively managed in PHC or outpatient settings.

- Increasing infrastructure must happen in tandem with workforce capacity planning if new beds are to be useful. Not all countries managed to articulate plans and this resulted in excess beds without skilled staff to operate them.

- Strategies to increase material capacity are also critical to making beds operational. Countries with clear lines of responsibility for stocking and distributing material supplies between national/regional authorities and health care providers were best placed to cope including in identifying

and resolving supply chain bottlenecks. Countries had different degrees of success in creating and/or participating in appropriate financing mechanisms and procurement frameworks and these impacted on their ability to source the materials needed.

- The availability of real-time data on capacity and distribution enables better-informed decisions about resourcing needs, but this did not exist in most countries.

- International collaboration is an effective strategy for meeting peaks of national need efficiently. EU Member States could access equipment from a designated stockpile. Other countries brokered arrangements on a more ad hoc basis.

Creating, repurposing and redistributing hospital beds

While the starting point, for example the number of ICU beds, influences the ability to respond in a pandemic, countries can use several tools to increase capacity rapidly when needed. This was clearly demonstrated during the first wave of the COVID-19 pandemic. Countries rapidly increased their hospital bed capacity for acute and intensive care to accommodate an expected surge of COVID-19 cases. Germany increased its ICU capacity by 20% in the first wave, while Italy and Belgium increased theirs by 65% and 45%, respectively.

Initially, several countries, including Montenegro and Latvia, reported sufficient spare capacity to respond to the COVID-19 outbreak. Countries with a high density of hospital and ICU beds, including Austria, Germany and Switzerland, could use this capacity immediately to absorb increased demand for health services while having the time and flexibility to increase capacity. Often seen as a symptom of inefficient use of resources before the pandemic, spare bed capacity was viewed as an asset. At the same time, treating COVID-19 patients in hospitals regardless of disease severity, as was done initially in many countries, may also be viewed as inefficient. Many of these patients could have been treated at home with outpatient (remote) supervision. This would have put less strain on hospital capacities, and deferring (at least some) elective care for non-COVID-19 patients could have been avoided. Over time, the role of non-hospital settings in the pandemic response, especially PHC, has been strengthened in many countries (see Section 6.2).

Another strategy to increase bed capacity within the standard health care delivery system was the implementation of alternative approaches to using physical infrastructure. Countries quickly implemented or developed emergency hospital plans, most commonly adapting, reconfiguring and designating hospital wards

and spaces such as postoperative recovery rooms, acute and intermediate care units, to accommodate critically ill patients with COVID-19. This was possible due to postponing non-urgent and elective procedures. The novel use of physical space to separate patients and create transition areas allowed health care providers to most effectively care for the variety of patient needs (Section 6.2).

At least 18 countries in the WHO European Region created temporary hospitals designated for COVID-19 treatment or to accommodate mild COVID-19 cases or severe cases once discharged (Winkelmann et al., 2021). New physical capacities for the health sector included using existing physical spaces, such as conference venues, stadiums or fairgrounds, as well as newly constructed facilities. In addition, many countries repurposed non-health facilities such as hotels, dormitories and rehabilitation clinics which had been vacated due to lockdown measures into transition centres for quarantine purposes and to accommodate discharged patients requiring low intensity surveillance. In some countries, including areas of the Netherlands, the United Kingdom and the United States, newly created capacities, such as field hospitals, remained unused. This creation of excess capacities needs to be considered in conjunction with the high levels of uncertainty about how both the pandemic and the progression of COVID-19 would develop. Some countries did not have sufficient workforce to operate the new beds.

Tapping resources from other sectors, including the private sector

Available resources in sectors outside the statutory health system, including the private sector and the military, can provide a relatively quick way to scale-up extra capacity. In some countries partnerships between the public and private sectors were common before the pandemic, but volumes increased (e.g. Italy and Spain). At least 14 countries in the WHO European Region used private hospitals as part of the public system and overall COVID-19 response. Largely, countries with a strong private hospital sector and/or those strongly affected by the pandemic employed this approach. For example, Italy used private hospitals to ease pressures on public hospitals, and in the Lombardy region, private hospital beds made up 30% of ICU surge capacity. In Cyprus, during the first wave, patients who could not be treated in public hospitals, due to the closure of wards, could be treated by private providers with the costs reimbursed by the Ministry of Health (Waitzberg et al., 2021a). While private providers sold some services

to public payers before the pandemic, the range and volume of services was expanded during the pandemic.

The governments of several countries block booked private hospital capacity (e.g. England, Ireland, Italy, North Macedonia, Spain and the Russian Federation) to have flexible availability throughout the crisis. In countries less affected during the first wave of the pandemic, such as Denmark and Portugal, private hospital beds would be made available in case of need. In many countries, private hospitals provided equipment such as ventilators for treatment of COVID-19 patients.

Not all countries used the available private sector capacity to provide care to COVID-19 patients – others such as England used the private sector to support non-COVID-19 care, such as elective procedures and other activities. The Israeli Ministry of Health's Central Virology Laboratory partnered with the private company Kandu for surveillance and early warning of SARS-CoV-2 circulation through the monitoring of urban wastewater systems. This collaboration was initiated by Kandu, although in normal times it would have involved a public tender (Tille et al., 2021). Nevertheless, after the initial urgent need, PPPs should be reshaped to comply with good governance practices to avoid negative unintended consequences such as corruption, weakening public structures and market failures such as cream-skimming, duplication of services and access problems (see Section 2.6). Good practices include participation (involvement of stakeholders), decency (undertaking the partnership without harming third parties), transparency (taking and communicating decisions clearly), accountability (being responsible for actions and outcomes of partnership), fairness (applying rules equally to everyone) and efficiency (using human and financial resources without waste, delay or corruption) (United Nations Economic Commission for Europe, 2008).

In several countries, army hospitals were made available to treat the general population and relieve pressure from hospitals. In Belgium, for example, patients with major burns were transferred to military hospitals.

Critical role of the health workforce in surge capacity

Countries prioritized building up physical infrastructure and producing/procuring essential equipment and supplies. Increasing the health workforce capacity at a similar rate is extremely difficult but essential: increasing the number of hospital beds or ventilators is futile if there are not enough hospital staff to operate them. The numerous strategies to expand and retrain the

health workforce are discussed in Section 4.1. Some countries developed combined contingency plans that considered the capacity of infrastructure and workforce simultaneously, such as Greece or Romania (Winkelmann et al., 2021).

Redistributing patients

Several countries transferred patients between facilities, regions and even across borders to alleviate pressures in an outbreak area, including as part of the EU Civil Protection Mechanism (see Section 2.9). France deployed high-speed trains, helicopters, private planes and even a warship to move patients to other regions or neighbouring countries, such as Germany. Between 18 March and 19 April 2020, France moved 644 patients across the country. Spain placed trains on standby for transfers within the country that had the capacity to move 24 critical care patients at once. Cross-border transfers have also represented a strong show of European solidarity, with Germany receiving the highest number of patients from other countries during the first wave of the pandemic, likely due to its pre-existing high capacity. By 20 April 2020, Germany had received 229 seriously ill patients from other countries, including from France (130 patients), the Netherlands (55 patients) and Italy (44 patients). In these circumstances, the Commission issued the Guidelines on EU Emergency Assistance in Cross-Border Cooperation in Healthcare Related to the COVID-19 Crisis to inform Member States of the various EU instruments available to support each other and alleviate the pressure on European health systems. Solidarity mechanisms included the coordination of emergency patient and workforce transports through the EU Civil Protection Mechanism, as well as the management of requests for medical personnel and intensive care beds through the Health Security Committee and the Early Warning and Response System. The Guidelines further elucidated the financial and practical arrangements for the provision of health services across borders, while also encouraging Member States to make use of existing regional and local agreements to assist neighbouring regions (European Commission, 2020b).

Scaling-up and redistributing essential equipment and supplies

While several countries had stockpiles of essential materials going into the COVID-19 pandemic, it became clear that scaling-up material capacity, including PPE (e.g. face masks, goggles and other protective clothing to protect the wearer from COVID-19 infection), testing materials (e.g. swabs, reagents),

medical equipment (e.g. ventilators) and medicines, presented a substantial challenge for the delivery of care during the first months of the pandemic. This pertained both to the effective delivery of necessary care to COVID-19 and non-COVID-19 patients and the safety of the health care workers who did so.

The combination of increased demand and disrupted global supply chains caused widespread shortages. Countries faced novel situations for paying for materials and determining the appropriate representative in these negotiations, and the EU facilitated several joint procurement initiatives (see Box 3.1). While countries used a number of transitory measures to increase the availability of essential materials, such as temporarily relaxing guidelines for use of PPE, repurposing factories or increasing output of essential materials, or accepting donations from other sectors, the unprecedented strain suggests that the reliance on exports should be reduced. Stockpiles and plans to rapidly increase production might enable countries to meet an unexpected surge in demand. By April 2020, the European Commission had designated €0.38 billion to create a stockpile of necessary equipment (including ventilators, PPE, therapeutics and laboratory supplies) via the RescEU reserve, which is part of the EU's Civil Protection Mechanism (UCPM) for preparing for and responding to disasters and emergencies. The stockpile is currently hosted by nine Member States, and has distributed large volumes of material to Member States in need. Within the scope of the Next Generation EU package, the Commission has assigned further 2 billion to RescEU for 2021–2027 to expand the reserves of equipment for health and other major emergencies (European Commission, 2020d). In addition, the Commission created the COVID-19 Clearing House for medical equipment, which operated for 6 months starting on 1 April 2020 (European Commission, 2021h). The Clearing House served as a platform for the monitoring of supply chains and shortages, as well as the exchange of information between various stakeholders, including national authorities, industry representatives and manufacturers, on the demands and supply arrangements of key medical equipment in Member States. This service permitted the anticipation of bottlenecks, while also helping Member States rapidly obtain medical supplies by matching them with companies producing and supplying equipment. Further, the European Commission has expressed plans to strengthen the EU's preparedness and response capacities by creating a new EU authority to deal specifically with cross-border health threats (see Section 2.9).

Box 6.1 *Using real-time data systems to ensure adequate distribution of resources*

The COVID-19 pandemic has underscored challenges in the availability of timely, credible, reliable, and actionable health and health care data (Azzopardi-Muscat et al., 2021). Such data often exist in separate silos and are not standardized in a way that makes them easy to combine or link, within or across countries. This often leads to critical delays in the availability of information necessary for policy decision-making (see Section 2.3).

A few countries and regions have established real-time data systems to help them monitor and plan pandemic response. Greece set up a Digital Registry that monitors the stock and use of PPE, and hospital and ICU bed capacity in real-time. Econometric modellers also use this data to forecast future needs.

In the Netherlands, all hospitals connect to a real-time computer system that shows bed availability. ICU units were requested to provide ICU bed capacity three times per day on a website to show an overview of availability in the country. Germany established the DIVI-Intensivregister, which provides information on free ventilation places, intensive care capacities and the COVID-19 cases treated in participating hospitals throughout Germany (European Observatory on Health Systems and Policies et al., 2021). Since early April 2020, hospitals have been required to report their intensive care capacity to the DIVI-Intensivregister on a daily basis, enabling the identification of regional shortages and allowing for real-time corrective actions, such as re-directing patients to hospitals with spare capacity. In Malta, the main hospital Mater Dei created a COVID-19 Emergency Operation Centre to simulate predicted demand and supply using real-time data on indicators such as current bed occupancy levels in different wards.

Outside of Europe, the state of Oregon in the United States has an automated tracking board with information about hospital beds and ventilator resources. The data is updated every 5 minutes and can be drilled down to the individual unit level. Real-time information also provides insight about material resources required by the public to prevent coronavirus transmission (Section 5.1).

In addition to increasing capacity, ensuring its appropriate distribution is key. Especially in the context of COVID-19, localized outbreaks have created an uneven situation across Europe and within countries. The availability of up-to-date information about capacity distribution and contingency plans to manage rapid reallocation of resources are critical for effective response, as is the ability to centralize decision-making to coordinate the redistribution of capacity across regions (Section 2.3). Countries with pre-existing monitoring systems fit for supporting an appropriate distribution of resources, such as ICU registries in Finland, the Netherlands, Norway, Sweden and the United Kingdom (England, Wales, Northern Ireland), were at an advantage (Winkelmann et al., 2021), but many countries managed to establish these systems rapidly during the course of the pandemic (Box 6.1).

6.2 Adapting or transforming service delivery by implementing alternative and flexible patient care pathways and interventions and recognizing the key role of primary health care (Strategy 20)

Key observations

Deciding how and where patients are treated is a key part both of dealing with a pandemic and maintaining essential care for non-COVID patients. This requires new and flexible approaches, including using tools such as digital health, new guidance and the capacity to adapt all these as the situation evolves, including taking into account the mental health burden and long COVID. PHC has played a crucial role in providing care to both COVID-19 and non-COVID-19 patients.

- Creating dual delivery care pathways for COVID-19 and non-COVID-19 patients is a way to protect patients and staff. Countries who were able to coordinate effectively across levels of care (primary, secondary, tertiary) and settings (inpatients versus long-term nursing care) were the most effective.
- PHC has played an instrumental role in the management of COVID-19 in the non-hospital setting and in providing essential care for non-COVID-19 patients and public health services.
- Providing clear guidelines and protocols for managing COVID-19 cases and having mechanisms in place both to update them and communicate them to clinicians is critical. Countries used a variety of approaches to determine best practice and share information, from monitoring and compliance systems, to the use of professional bodies, online training and feedback loops.
- Putting in place guidance on how to adjust the provision (and prioritization) of essential services in the light of the epidemiological situation is also crucial. Countries that suggested postponing non-urgent care and elective surgeries depending on the epidemiological situation and/ or disease severity built in the possibility of adapting to changing needs as disease severity fluctuated.
- Using digital health tools such as remote consultations and remote patient monitoring increases capacity to meet patient needs. Adaptations to legal and financial frameworks facilitated the use of digital services for both COVID-19 and non-COVID-19 patients.

- Mental health needs additional attention because of the hugely increased burden across populations. Countries are only beginning to put in place the monitoring needed and will have to adapt and gear up the delivery of mental health services even after the pandemic subsides.
- Support mechanisms are crucial for vulnerable groups such as residents in long-term care and in precarious settings. Most countries lacked these and this weakened responses.

Disruptions in provision of routine health care services

During the first wave of the pandemic, most countries cancelled or postponed non-urgent care, although decisions on which services to maintain and the duration of these restrictions varied widely. There were large reductions in cancer referrals in many countries (Morris et al., 2021), such as a 24% fall in new referrals in Norway. The number of cancer diagnoses also decreased, especially in the first months of the pandemic. In Catalonia, Spain, 34% fewer cancers were diagnosed than expected between March and September 2020 (Coma et al., 2021). In the Netherlands, non-skin cancer diagnoses dropped 26% while skin cancer diagnoses fell 60% between the end of February and mid-April 2020 (Dinmohamed et al., 2020). Providers in many countries adapted their prioritization of services in response. For example, most facilities treating cancer patients in Italy reorganized their waiting lists, cancelled routine follow-ups and set up teleconsultation services, but continued to prioritize first outpatient consultations (Jereczek-Fossa et al., 2020).

New care pathways to enable dual delivery

After the first wave, non-essential services have largely resumed, albeit often with novel patient pathways that reinforce a dual delivery approach for COVID and non-COVID care. Luxembourg changed its patient pathway so that first primary care contacts occur via teleconsultations; Spain developed a system that uses occupancy rates of COVID-19 patients as a basis for hospitals to determine when to start allowing more elective or non-urgent treatments (Arnal Velasco & Morales-Conde, 2020). Ireland introduced a surge plan to expand community care in winter 2020/21, including home care and rehabilitation services, for both COVID-19 and non-COVID-19 patients thus reducing pressures on hospitals and GPs (HSE, 2020). These tools have been adapted throughout the pandemic as health systems gained experience. In particular, the shift of COVID-19-related care from hospitals to outpatient settings has allowed for new adjustments (see below). Furthermore, some countries

have begun to recognize the implications of the longer-term impact of COVID-19 on patients (or long COVID) for service delivery; for example, in Denmark (Sundhedsstyrelsen, 2020). New care pathways for long COVID will require continuous evaluation, as the understanding on the diagnosis and management is still evolving. Multidisciplinary, multispecialty approaches to assessment and management will be required in close collaboration with patients and families (Rajan et al., 2021).

Key role of primary health care

Throughout the pandemic, PHC providers have delivered dual track care to both COVID-19 and other patients. PHC includes family doctors or general practitioners (GPs) who are the first level of professional health care, as well as public and community health providers. The role and models of PHC differ across Europe, but played a crucial role in the COVID-19 response.

At the beginning of the pandemic, many countries emphasized the role of the hospital in planning the response to COVID-19, implementing strategies to surge hospital capacity for treating COVID-19 patients (see Section 6.1). But as more became known about the characteristics of the disease and the number of cases increased dramatically, this approach shifted to managing mild cases at home and only hospitalizing more severe cases. This shift contributed to more appropriate, safer care for COVID-19 patients and, by reducing stress on hospital capacities, allowed elective care for non-COVID-19 patients to resume and expand.

PHC providers often coordinated with public health services in activities related to the COVID-19 public health response (see Chapter 5). Several countries built on pre-existing innovations in primary care in their COVID-19 response. France has over 1 600 multidisciplinary PHC centres that have existing partnerships with municipal community and public health services. This close partnership enabled a more rapid mobilization of the response and exchange of information, enabling a coordinated, holistic response to COVID-19 while maintaining other public health services (André et al., 2021) (Section 5.3). In Catalonia, Spain, existing primary care teams added COVID managers, social workers and administrative staff to manage the new tasks of testing and tracing on top of increased demand and communication of health results to patients (Martí et al., 2021). In Belarus, Greece, Iceland and Spain, testing and medical advice was provided at PHC centres. Slovenia referred all suspected COVID-19 cases to 18 so-called entry points

in PHC centres which conducted COVID-19 tests. In several countries, PHC providers provided support and monitored conditions of patients isolating at home. Several countries, including Armenia, Belgium, France and Germany, requested GPs to conduct home visits to perform tests or monitor COVID-19 patients, while most relied on teleconsultation services to monitor and support patients isolating at home. PHC providers also initiated transfers to more intensive care and determined when quarantine periods could end.

Despite the importance of PHC providers to the COVID-19 response, clinical and organizational guidelines about COVID-19 were not always available for PHC providers. In Italy, GPs reported a lack of communication, coordination and leadership related to the emergency response (Kurotschka et al., 2021), and, until May 2020, 44% of all deaths among doctors in Italy were GPs, despite only making up 15% of the total number of doctors (Modenese & Gobba, 2020). Their ability to safely provide the spectrum of care was challenged for a number of reasons, including uncertainty about the suitability of facilities in the light of infection control, the availability of PPE, financing and staff in the light of the focus on hospital care. In addition, patients may have changed their care seeking behaviour, and may not have pursued health services out of fear of becoming infected.

Targeted communication strategies to the public (Section 2.7) about the measures taken in health care settings, including safety and infection control measures, are needed to minimize disruptions and negative health outcomes, particularly as service delivery adapted once again to deliver COVID-19 vaccinations.

Guidelines for treatment and prioritization of care

Treatment guidelines and protocols for patients with COVID-19 changed rapidly over the course of the pandemic, as knowledge about the condition evolved. For example, the Robert Koch Institute, responsible for disease control and prevention in Germany and which has one of the largest inpatient care sectors in Europe, changed its guidance between February and March 2020 from hospitalizing all patients with COVID-19 to hospitalizing only those where treatment at home was not possible. A variety of mechanisms were used to deliver the latest information to workers on the ground, including online training, active feedback and monitoring/compliance systems. Many countries leveraged pre-existing professional bodies to share best practice across clinicians and health care providers.

International collaboration has been key in producing updated evidence on COVID-19 treatment options, as exemplified by the COVID-NMA process, which provides a living mapping of COVID-19 trials, and the LIVING project, an ongoing systematic review of randomized clinical trials comparing the effect of all COVID-19 treatments.

At the same time, providers of specialist services often used prioritization recommendations to manage the provision of non-COVID-19 care. In hospitals, essential services maintained throughout the pandemic often included urgent consultations, necessary treatments (e.g. chemotherapy, dialysis) and maternal services. The Netherlands created an "urgency list" of procedures to prioritize when scaling-up regular hospital care after the initial response to postpone; Spain adopted different criteria to prioritize surgery in five potential scenarios depending on the epidemiological situation, prioritizing first consultations over follow-ups; and the German Association for General and Visceral Surgery created a list of prioritized elective interventions. The Association prioritized surgeries of patients with rapidly progressing diseases and manageable comorbidities; however, treating physicians were still responsible for the final decision about postponing for all patients. Italy recommended suspending routine cancer screenings while treating patients with early and advanced cancer in the outpatient setting (Curigliano, 2020). If cancer patients required hospital treatment, they followed a dedicated diagnostic and therapeutic internal pathway to prevent potential SARS-CoV-2 infection. Given the situation, decision-making for all cancer patients was entrusted to multidisciplinary tumour boards, which balanced the risk and benefits of treatment for each specific patient (accounting for the patient's performance status and comorbidities as well as tumour biology and likely impact of treatment on outcome) in the context of the epidemiological situation.

Scaling-up the use of digital health in delivery of care

Various applications of digital technologies, including remote services, were leveraged during the COVID-19 pandemic to enable access to care and build capacity to respond to surges (European Observatory on Health Systems and Policies et al., 2021) (Table 6.1).

While available in most countries prior to the pandemic, remote consultations have been used at unprecedented scales to ensure delivery of care and monitoring for both COVID-19 and other patients across all care levels, but have been most widely employed in primary

Table 6.1 *Example uses of digital technologies to support delivery of care*

Area of application	Digital technology	Examples of countries
Remote management of COVID-19 cases	Videoconferencing; virtual care or telemedicine platforms; monitoring devices such as oximeters; cameras and digital recorders; mobile phone applications.	France, Iceland, Italy, Luxembourg, Malta, the Netherlands, Singapore, Taiwan, the People's Republic of China
Remote consultations	Videoconferencing; virtual care or telemedicine platforms; cameras and digital recorders; mobile phone applications.	Nearly all countries
Supporting management of hospital capacity	Digital whiteboards and apps; web-based toolkits and portals; artificial intelligence.	Canada, Estonia, Germany, Ireland, Malta, the Netherlands, United Kingdom

Source: Whitelaw et al. (2020); European Observatory on Health Systems and Policies et al. (2021).

care. In France, the number of doctors performing remote consultations increased from around 3 000 in February 2020 to 56 000 in April 2020, with GPs billing 80% of all teleconsultations (Richardson et al., 2020). In Lithuania, the National Health Insurance Fund reported conducting 758 000 PHC remote consultations in April 2020, nearly 70 times higher than in April 2019, when 11 000 teleconsultations were conducted (Webb et al., 2021).

Depending on previous infrastructure capacities, established ways of working and patient preference, remote consultations took place on different platforms. Suspected or non-severe COVID-19 cases often received consultations via phone or video link, as did patients requiring more routine care. Compared with the physical capacity requirements of providing care in-person settings, the solutions for remotely provided care are easier to scale. For example, many countries created COVID-19-specific telephone hotlines within weeks of the outbreak of the pandemic. Rapid scaling-up of remote consultations nevertheless required workforce adaptations (see Section 4.2) as well as policy changes to regulation (e.g. removing caps on the number of consultations allowed or enabling more health professionals such as nurses or physiotherapists to provide remote services), changes to reimbursement levels to compensate for lost income, investment in technical infrastructure and training for health professionals in most countries (see Section 3.2). It should also be acknowledged that remote consultations may not be appropriate for some patients and telehealth cannot fully replace in-person consultations.

Digital health tools for the remote management of COVID-19 patients with mild symptoms or those recuperating at home after hospital care went beyond teleconsultations, and included applications for self-monitoring of symptoms as well as remote monitoring using connected devices such as oximeters (European Observatory on Health Systems and Policies et al., 2021).

Beyond the options already discussed, a range of digital applications were leveraged during the pandemic to improve patient care and accelerate progress, providing tenable solutions for a resilient response. Artificial intelligence is being used to provide rapid identification of COVID-19 infections and potential treatments. For example, in initiatives supported by the European Commission, artificial intelligence software has been developed to speed up identification of COVID-19 infections through computed tomography scans, while super computers are being used to identify existing drugs that could potentially be repurposed to treat COVID-19 (European Observatory on Health Systems and Policies et al., 2021).

Provision of mental health services

The uncertainty linked to the COVID-19 pandemic as well as the consequences of measures to stop the spread of the virus affected mental health across multiple groups, including the health workforce (see Section 4.3), people who have or have had COVID-19, and the general population (Moreno et al., 2020). For example, the Italian Society of Psychiatry estimated that 300 000 patients were suffering from post-traumatic stress linked to losing loved ones, financial damage and uncertainty about the future. Provision of mental health services has also been affected. The Technical Advisory Group on the mental health impacts of COVID-19 in the WHO European Region identified three distinct levels of mental health impacts: the population, policy and service level, and individual level (WHO, 2021a), with recommendations for each area.

Efforts have been made to adapt the delivery of mental health care in response to the COVID-19 demands and pressures. Adaptation of services mostly focused on infection control, modifying access to diagnosis and treatment, ensuring continuity of care for mental health service users, and paying attention to new cases of mental ill health and populations at high risk of mental health problems, such as health workers and relatives of those who suffer or died from COVID-19 (see also

Section 4.3) (Moreno et al., 2020). Several countries, such as France, Malta and Portugal, established help lines for those in distress. The South West London and St George's Mental Health NHS Trust in England established a 24/7 mental health emergency department for patients of all ages with a dedicated phone line for admission; the goal was to support people who need urgent mental health care so they could avoid acute hospital emergency departments (CQC, 2021). Mental health care, including individual and group counselling sessions, also transitioned to remote access options to various degrees across countries to respond to existing and emerging needs.

Addressing the needs of vulnerable groups

The COVID-19 pandemic disproportionally affected vulnerable groups, not only in public health (Section 5.1) but also in the provision of care and outcomes (European Union, 2020). In particular, many countries initially underemphasized the need to protect residents in long-term care settings. Preventing infections and managing outbreaks in long-term care settings was a key weakness of many responses and nearly half of COVID-19 related deaths in the first wave in a selection of 26 countries occurred in long-term care facilities (Comas-Herrera et al., 2020).

In many countries, long-term care is organized separately from the health system, and suffers from lack of funding, workforce shortages and fragmentation (Langins et al., 2020). During the first wave of COVID-19, several countries established new governance structures, financing mechanisms and staffing approaches, while changes in care approaches were relatively less common. Some countries, including England, France, Italy, the Netherlands and Norway, explicitly discouraged transfers to hospitals.

"Solutions" to physically distance residents such as no-visitor policies have initial signs of undesired outcomes such as loneliness (O'Caoimh et al., 2020). The WHO Regional Office for Europe released guidelines, including 10 policy objectives, for preventing and managing COVID-19 in long-term care settings (Comas-Herrera et al., 2020; O'Caoimh et al., 2020; WHO, 2020f).

Issues around measuring health systems resilience during COVID-19

7.1 Assessing health systems resilience – why?

In this chapter, we review a number of existing initiatives used to monitor health systems resilience during the COVID-19 pandemic in an effort to understand the current state of the art and to identify scope for further improvements. Health systems resilience has become an increasingly relevant concept following high-profile shocks affecting health systems in recent years, including the 2009–2010 financial crisis, the migrant crisis and most recently the COVID-19 pandemic. As a result, the issue of how to measure health systems resilience has begun to receive considerable attention, both among policy-makers and researchers. Even as the COVID-19 pandemic began in 2020, the concept of resilience and its assessment was already being explored in detail, including in a policy brief published by the European Observatory on Health Systems and Policies (Thomas et al., 2020) and by the European Commission's Health System Performance Assessment Expert Group in their annual report (EU Expert Group on Health Systems Performance Assessment, 2020).

While resilience is clearly important for a health system to be able to maintain its overall performance in the context of a range of potential external shocks, the challenge of how to assess or measure it remains. This may be due at least in part to the fact that there is no uniform understanding of what the concept of health systems resilience is even referring to; for example, resilience could refer specifically to the ability to withstand external shocks (e.g. financial crisis, epidemics) or to endure ongoing or predictable longer-term health system strains. At the same time, the mechanisms within health systems (and other country contextual factors) that contribute to a resilient health system are poorly understood, making it difficult to know what to even measure and how to draw on metrics to learn policy lessons.

So why would it be important for policy-makers to be able to measure health systems resilience? Irrespective of how resilience is defined, having an idea about the degree to which the health system is able to perform well or even improve in the face of a shock can provide a starting point for improving preparedness and response planning for the future, for monitoring performance in general, or for simply learning from the past (see Chapter 1).

- Preparedness and response planning:
  - Knowing whether and to what extent day-to-day functioning of a health system is sufficient to withstand a sudden shock or crisis.
  - Identifying possible gaps and weaknesses that need to be addressed in order for a health system to surge and respond effectively to a sudden shock or crisis.
  - Having in mind mid- to longer-term challenges, assessing resilience can inform investment decisions.

- Performance:
  - Health system performance assessment (HSPA) increasingly features as a key process of evaluation of health system functioning and serves as a basis for policy-making. Assessing resilience is often considered part of the HSPA process either explicitly (EU Expert Group on Health Systems Performance Assessment, 2020) or implicitly (e.g. European Observatory on Health Systems and Policies' HSPA framework for universal health care (Papanicolas et al., 2021)).

- Learning:

  ○ Assessing resilience retrospectively presents opportunities for learning and improvement in the face of future challenges, feeding into preparedness.

This chapter discusses the different ways that have been used to assess health systems resilience during COVID-19. Multiple approaches already exist and provide various perspectives on what to measure, how to measure it and how to present key findings. The set of existing retrospective assessments from the European Observatory on Health Systems and Policies, the OECD and the European Commission, as well as tools aiming to provide methodology for prospective country-led assessments (by the EU's Expert Panel on Public Health and WHO), are outlined in Section 7.2. In Section 7.3 we focus on the resilience strategies outlined in this study, suggesting possible assessment areas that can then help to identify more specific indicators. Finally, in Section 7.4 we highlight the key considerations that need to be taken into account when assessing health systems resilience to COVID-19 in future endeavours, including upcoming collaborative work led by the European Commission, along with the European Observatory on Health Systems and Policies and the OECD to develop a framework and practical guide that can be used to support countries in their own assessments of health systems resilience.

7.2 Assessing health systems resilience to COVID-19: existing approaches

To date there have been a number of international initiatives that included efforts to assess health systems

resilience to COVID-19, either explicitly or implicitly. These initiatives were developed at different stages of the pandemic and with varying aims. Some of them seek to assess resilience or health system responses to COVID-19 (e.g. State of Health in the EU country profiles, Health at a Glance Europe, Health System Response Monitor), while others offer methodology to assess resilience and/or strengthen health systems in the context of COVID-19 (e.g. EXPH toolkit, WHO's strengthening population health surveillance tool).

State of Health in the EU country profiles 2021

The State of Health in the EU country profiles are a biennial series (latest releases in 2017 and 2019) which focus on key developments of health systems and policies in the EU Member States. They are produced using a harmonized template and a standard set of indicators with a broad aim to provide an overview and comparison of health outcomes and health systems. The 2021 series has been adapted to reflect how health systems in the EU Member States have coped with the pandemic.

This particular series of country profiles considers health systems resilience to COVID-19 by looking at the related concepts of preparedness, response capacity and governance. The preparedness discussion focuses on how well prepared countries thought they were before the crisis and whether this level of preparation was confirmed or not during the early stage of the pandemic. The former can be assessed through self-reported data reflecting compliance with the IHR reported to WHO (Fig. 7.1). While overall there is evidence that higher IHR scores lead to lower impacts of COVID-19 overall (Wong et al., 2021), the pandemic

Figure 7.1 *Example of indicators to assess preparedness to disease outbreaks (EU average IHR score in 2019)*

EU: European Union; IHR: International Health Regulations.

Source: (WHO, 2019).
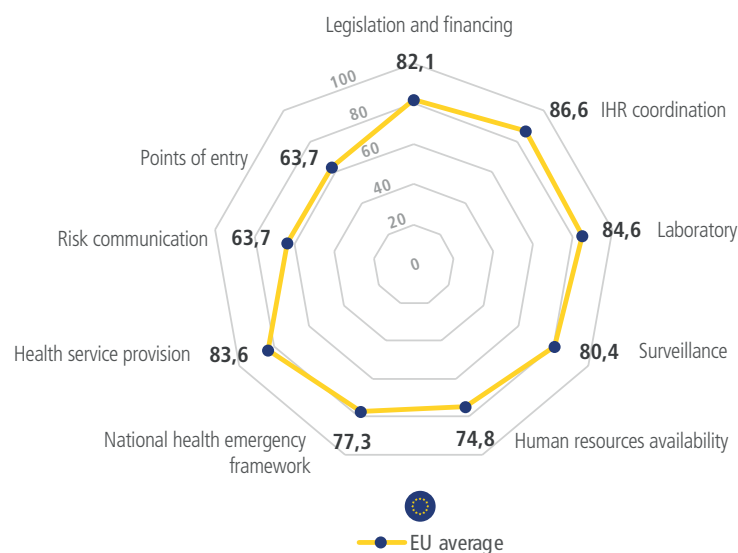
has highlighted that some of the metrics used are not entirely fit for purpose in individual countries, and tend to overestimate the state of preparedness for a major epidemiological shock. For example, in Italy, self-assessment on pandemic preparedness was rated at the highest level, despite absence of an up-to-date national pandemic preparedness plan (Giuffrida, 2021). Therefore, it is important to also look more closely at whether perceived preparedness translated into a more effective response in practice.

Response capacity is mainly assessed through the availability of human and physical resources, both before and during the pandemic, as well as the ability of the health system to meet needs for surge cases, testing and hospitalizations, including ICU capacity; sourcing PPE and medical supplies under proper accountability mechanisms; maintaining provision of essential non-COVID services; setting up effective test-trace-isolate-support systems; planning and carrying out effective vaccination programmes. For example, in countries with larger hospital and ICU bed capacities, the number of beds allocated for treating COVID-19 patients could be increased more flexibly by designating spare beds, or repurposing beds from other departments, as happened in Lithuania during the COVID-19 peak in December 2020. This, however, may lead to reduced capacity to deliver other types of care, especially when COVID-19 hospitalizations are peaking – something which should be evaluated in tandem.

Discussion of country governance mechanisms related to decision-making, communication and surveillance also supports the assessment of health systems' responses in the State of Health in the EU country profiles. This relates to the speed of introduction of COVID-19 containment measures (such as lockdowns, border closures, working from home, restrictions on movement, closure of services and public facilities). In terms of communication, this includes clarity and consistency of relaying decisions to the general public as well as to those responsible for implementation. Surveillance and health information flows have also been crucial in terms of monitoring the situation, assessing the impact and planning for the future.

When released in December 2021, this particular series of country profiles will be useful for decision-makers as a summary of health system response measures to COVID-19, and, to an extent, to assess the degree to which health systems were affected by COVID-19 and able to respond effectively, covering developments until September 2021. Nevertheless, it is important to note that the initial purpose of the profiles is to provide a brief overview of health systems and their recent major developments, rather than a detailed account of a specific issue such as COVID-19.

European Commission's Expert Panel on Effective Ways of Investing in Health (EXPH)

The European Commission's Expert Panel sought to operationalize health systems resilience testing, stressing the need for health system transformation to ensure optimal performance. It noted that "resilience is understood as an emergent property … that depends on the system's ability to absorb, adapt and transform after a shock or structural change impacts inputs, outputs, and/or outcomes" (European Union, 2020). It highlights that resilience testing is intended as a prospective exercise to prepare in advance of a shock, and need not necessarily be a component of retrospective HSPA or be used for country benchmarking.

Below, the traffic light scorecard toolkit summarizes key indicators relating to different health system components (such as infrastructure, workforce, financing, governance, service delivery, information systems). The health system is evaluated against different scenarios/conditions (e.g. a pandemic, financial crisis), summarized by the traffic light colour and expanded to more specific indicators adjusted for different scenarios in the radar plots (Fig. 7.2). The toolkit identifies potential areas of interest; however, specific scenarios and indicators need to be chosen by those carrying out the test, depending on a particular health system context.

The idea behind the use of the EXPH health systems resilience toolkit is to prompt policy actions based on results in order to pre-emptively address weaknesses identified in a system in case of specific scenarios. The test has flexibility and is intended to adapt to country and health system context, and the scorecard outputs summarize the results and allow one to identify gaps that health systems may face under specific conditions. The application of the toolkit, however, requires close cooperation between those carrying out the exercise and policy-makers, in order to obtain relevant information, assign appropriate indicators and assist with interpretation.

Health at a Glance: Europe 2020

The first chapter of the OECD's *Health at a Glance: Europe 2020* published November 2020, the most recent publication at the time of writing, considers how resilient European countries have been to the COVID-19 crisis (OECD and European Union, 2020). The report looks at the scale of the health impact

Figure 7.2 *Health systems resilience testing toolkit*

## Sample scorecard for a resilience test of a health system
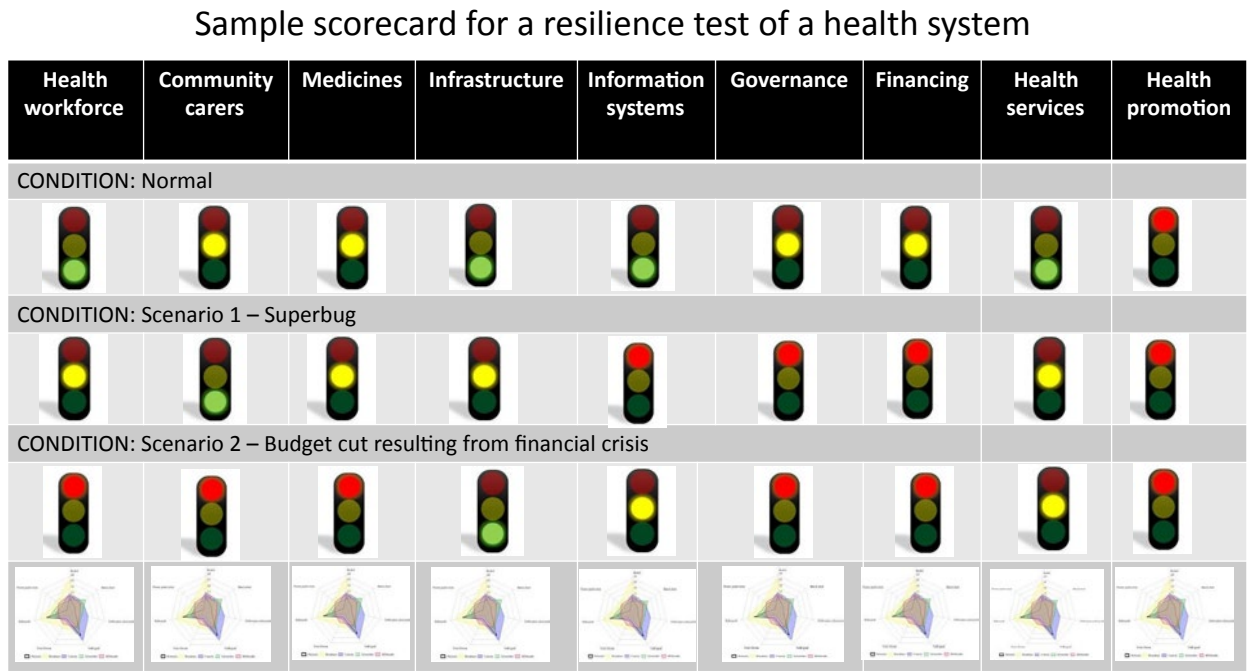
Source: Expert Panel on Effective Ways of Investing in Health (2020).

(COVID-19 deaths and excess deaths), economic impact (i.e. decline in GDP) and whether mitigation measures contributed to slowing disease transmission. In terms of health systems resilience more specifically, the focus is on initial pre-pandemic capacity (number of hospital beds, ICU beds, workforce availability), and strategies to provide adequate resources (infrastructure, staff, equipment, PPE) and cope with surges in COVID-19 hospitalizations. At the same time, the report looks at the use of non-COVID services in the first wave (Fig. 7.3), quantifying the reduction in primary care consultations during the first wave, which is among

the most telling indicators of resilience since it captures the ability of a health system to maintain access to care in the face of the pandemic and associated mitigation measures. The report concludes that COVID-19 is a challenge that not only goes beyond health systems, but also beyond countries' borders, and requires an adequate scale of response and international action.

Taking a birds eye view, the Health at a Glance report suggests that, in general, countries that were better prepared managed to contain the spread through scaling-up of testing, tracking and tracing strategies,

Figure 7.3 *Reduction in the volume of primary care consultations during the first wave of COVID-19*
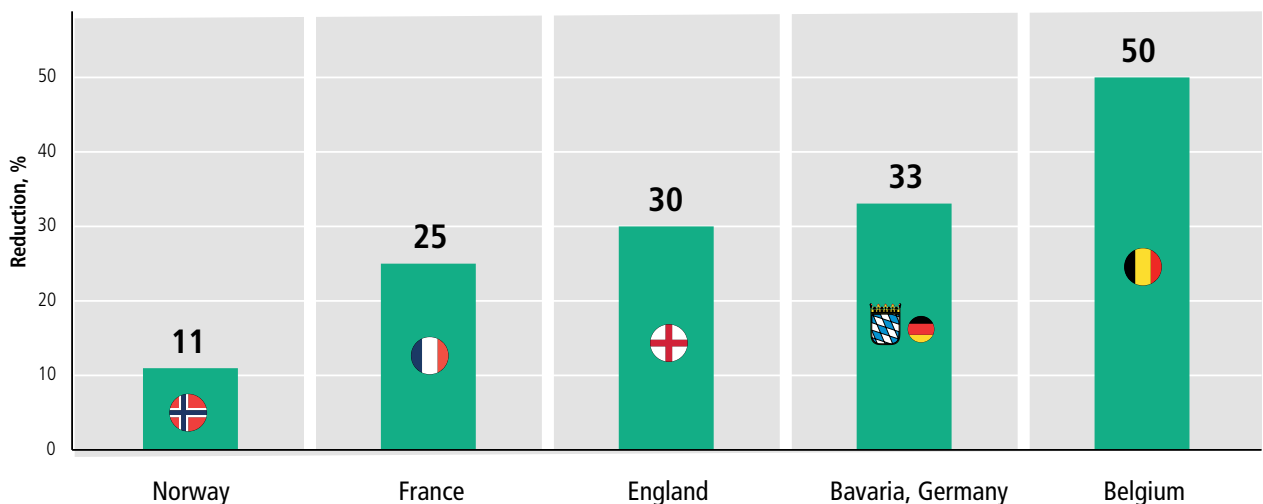
Source: OECD and European Union (2020).

which in some instances allowed countries to avoid very stringent and costly lockdowns. Boosting hospital capacity temporarily helped to cope with surges in demand for care of COVID-19 patients, although shortages among health workforces were much harder to mitigate. Broadly, these issues combined resulted in lack of access to care for non-COVID patients, highlighting the need for strong primary care and mental health support to provide alternative pathways to care.

The report is among the first publications on health systems resilience to COVID-19 in Europe and it illustrates a number of key indicators that reflect various aspects of health systems resilience. It uses multiple data sources and allows comparisons across countries on many areas impacted by COVID-19. It also describes data caveats to assist interpretation of many indicators, which is particularly important in the context of COVID-19. It assesses the impact of COVID-19 on essential health care, and on health of the vulnerable populations.

COVID-19 Health Systems Response Monitor (HSRM)

The European Observatory on Health Systems and Policies' HSRM platform has been designed to collect and organize up-to-date information on how countries are responding to the COVID-19 crisis (see Chapter 1). The focus of the HSRM is to document policy actions during the COVID-19 pandemic, many of which contribute to health systems resilience; therefore, it serves as a key source of information for preceding chapters of this study. The HSRM is organized roughly around the archetypal health system functions – health financing, governance, service delivery and resources (i.e. workforce and capital), adding, as well, information on both public health and actions outside the health system. Taking a functions-based approach to understand health system responses to COVID-19 is particularly useful because of its comprehensiveness, as it helps one to identify whether certain areas of the health system are neglected by policy action and most likely to be susceptible to the effects of the pandemic. It also facilitates cross-country comparisons; the information collected at the country level as well as cross-country analytical posts can provide useful insights into effective response measures.

The HSRM primarily collects health system responses and public health measures. Country-level information is also transformed into answers to relevant policy questions in cross-cutting analytical posts. Although not assessing resilience directly, some of the analytical posts address topics that are vital for coping with the pandemic, and provide cross-country insights often using qualitative information.

Fig. 7.4 is an example of how (and if) countries are improving COVID-19 vaccination coverage for hard-to-reach (HTR) groups. It shows that only a few countries in the EU actually have strategies for dealing with lower vaccination uptake despite broader recognition of the issue. Having pockets of low vaccination coverage in populations means that countries remain more vulnerable to further spread, especially with the emergence of the new and more transmissive variants. Countries that do have strategies recognize the need for decreasing barriers to vaccination information and distribution through methods such as providing information in multiple languages; providing non-technology reliant information; collaborating with community leaders and groups who already engage with hard-to-reach populations to facilitate trust; and creating more mobile and flexible options for vaccine delivery and administration (Siepmann et al., 2021). The HSRM provides qualitative descriptions of what countries are doing in detail.

WHO tool for selecting indicators to signal and monitor the wider effects of the COVID-19 pandemic
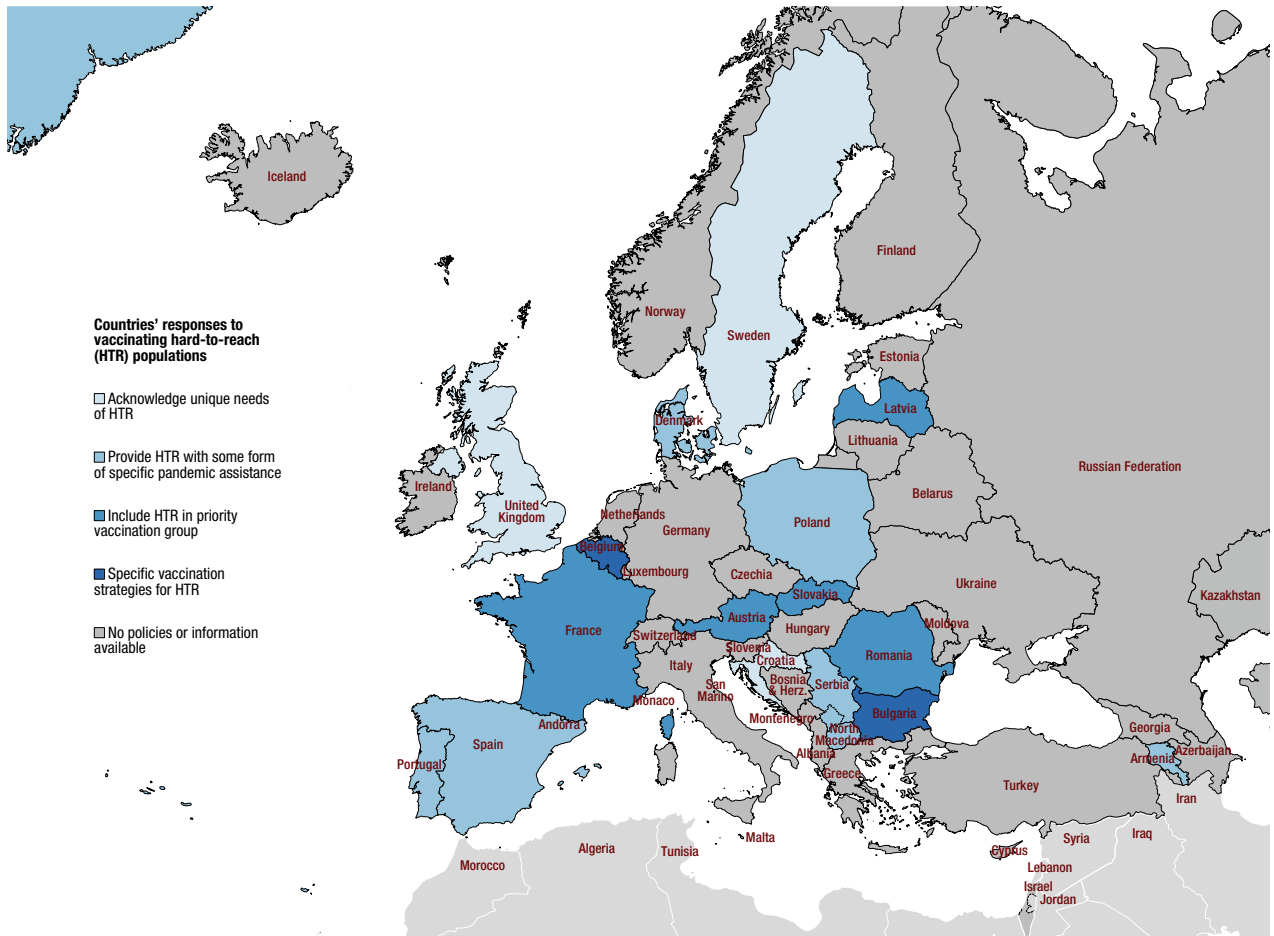
In early 2021, WHO released a tool for selecting indicators to monitor the effects of COVID-19 (WHO, 2021e). The tool offers a conceptual framework to identify pathways for the wide range of effects of the pandemic, some of which directly affect the key health system goals, such as population health outcomes, access, quality of care and financial protection.

The tool lists a broad range of COVID-19 pandemic pathways directly and indirectly affecting population health, and offers indicators that can be used to monitor changes. It also suggests the levels of disaggregation (age, socioeconomic status, location, morbidity, etc.), possible data sources and reporting frequency.

The tool provides a list of core indicators that can be used to monitor population health and certain health system indicators pre-, during and post-pandemic, accounting for a wide range of influences, but focuses on non-COVID health outcomes. It also explains briefly the basic mechanisms through which those outcomes may be affected. The most relevant pathway to assessing health systems resilience is impairment of health care for non-COVID conditions (affecting access, quality and financial protection).
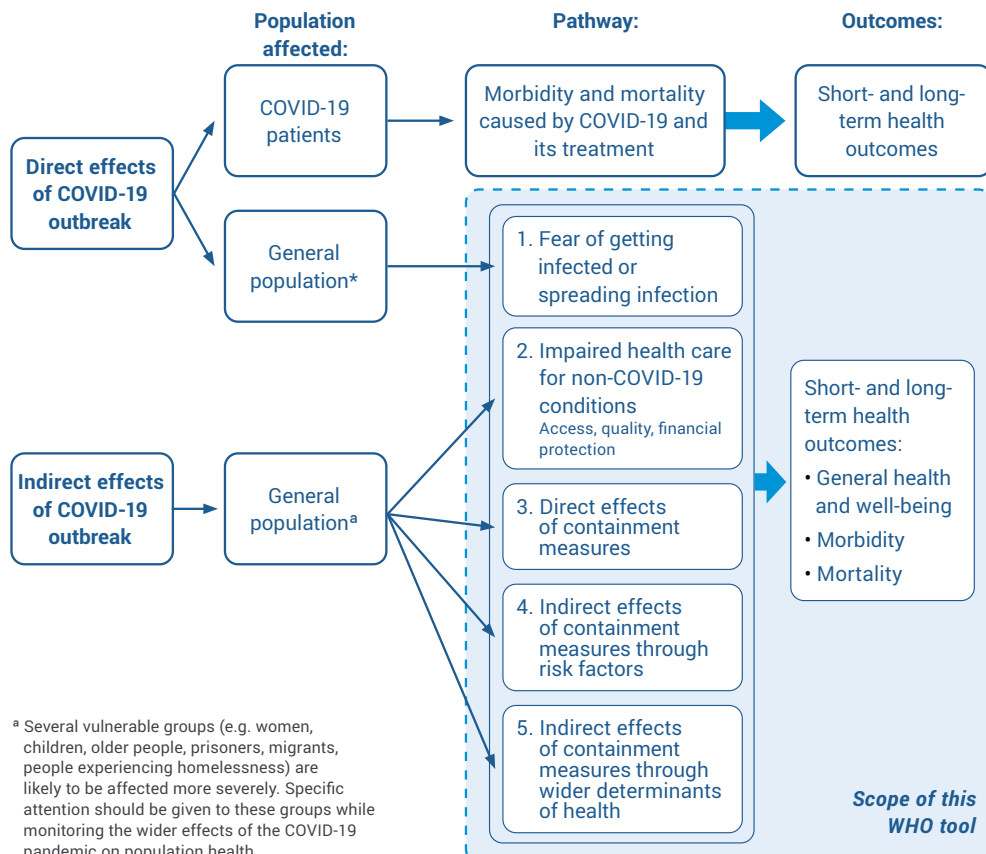
Figure 7.4 *Different strategies for increasing COVID-19 vaccination uptake*

Countries' responses to vaccinating hard-to-reach (HTR) populations

☐ Acknowledge unique needs of HTR

☐ Provide HTR with some form of specific pandemic assistance

☐ Include HTR in priority vaccination group

☐ Specific vaccination strategies for HTR

☐ No policies or information available

HTR: hard-to-reach.

Source: based on Siepmann et al. (2021)

Figure 7.5 *Conceptual framework of the main pathways for the wider effects of the COVID-19 pandemic*

Population affected: **Pathway:**   **Outcomes:**

Direct effects of COVID-19 outbreak

COVID-19 patients → Morbidity and mortality caused by COVID-19 and its treatment → Short- and long-term health outcomes

General population* →

1. Fear of getting infected or spreading infection

2. Impaired health care for non-COVID-19 conditions
Access, quality, financial protection

Indirect effects of COVID-19 outbreak → General population[a] →

3. Direct effects of containment measures

4. Indirect effects of containment measures through risk factors

5. Indirect effects of containment measures through wider determinants of health

Short- and long-term health outcomes:
• General health and well-being
• Morbidity
• Mortality

Scope of this WHO tool

[a] Several vulnerable groups (e.g. women, children, older people, prisoners, migrants, people experiencing homelessness) are likely to be affected more severely. Specific attention should be given to these groups while monitoring the wider effects of the COVID-19 pandemic on population health.

Source: WHO (2021e).

The way forward

This brief review of experiences measuring resilience during the COVID-19 pandemic reveals both the timeliness of the topic as well as the great advances made to monitor resilience in health systems and beyond. However, there remains considerable scope for further progress to better identify and develop resilience metrics that are actionable for policy-makers. To this end, the European Observatory on Health Systems and Policies and the OECD, led by the European Commission, are working to produce a resilience monitoring framework and practical guide that can be applied across Member States. An approach based around health system functions will not only enable consistent measurement across countries, but will also help to facilitate important discussions about the necessary preconditions and mechanisms for health systems to be able to sustain themselves during shocks, including those of a similar nature to COVID-19. Ultimately, the goal of measuring and monitoring resilience must be to link the data to policy actions. Doing so in a structured way enables cross-national as well as within-country learning to prepare health systems for future shocks.

7.3 Assessing resilience based on the 20 key strategies to enhance resilience identified in this study

This section further considers how one might assess health systems resilience in practice using the resilience strategies devised in the preceding sections of this study as a guiding framework. Each strategy can be linked to a number of assessment areas (Table 7.1), which are drawn from Thomas et al. (2020), as well as from the initiatives linked to assessing health systems resilience to COVID-19 mentioned in this section. It is important to note that assessment areas as shown below are broad and still require work to identify specific indicators to use in practice. Such indicators may have to be of a qualitative or descriptive nature due to the lack of data availability. Additionally, the attribution of assessment areas to specific strategies does not mean that those areas are exclusive to one particular strategy. The table can nevertheless serve policy-makers to identify strengths and weaknesses in COVID-19 response strategies in a particular country, and can be expanded or amended given the ever-changing nature of the responses needed to counteract the pandemic in addition to supporting the identification of indicators.

For example, Strategy 7 "Communicating clearly and transparently with the population and stakeholders" has been particularly important in COVID-19 as compliance with lockdown rules as well as demand for vaccination are contingent on good communication by decision-makers. As the table suggests, communicating with the population cannot be done on an ad hoc basis, but rather, there needs to be tailored approaches for different populations as well as a strategy and clear messaging. This is evident for example in vaccination outreach programmes, where certain groups that are particularly vaccine hesitant have been targeted in some countries through a myriad of campaigns. Such approaches have been successful, for example, in Israel (Rosen et al., 2021b), where targeted messaging and other efforts including incentives have been put in place to reach vaccine hesitant groups.

Table 7.1 *How to assess the resilience strategies?*

Strategy	What can be assessed? Examples of assessment areas
LEADING AND GOVERNING THE COVID-19 RESPONSE	
Strategy 1 Steering the response through effective political leadership	• Existence of dedicated COVID-19 cross-party committees or working groups that facilitate political consensus over the response strategy.
Strategy 2 Delivering a clear and timely COVID-19 response strategy	• Existence, clarity, feasibility and timeliness of COVID-19 response strategy. • Existence and comprehensiveness of contingency response plans and/or emergency legislation. • The facility to introduce and update pandemic response plans and/or emergency legislation.
Strategy 3 Strengthening monitoring, surveillance and early warning systems	• Existence of fit-for-purpose epidemiological surveillance and early warning systems. • Existence of data collection and data sharing mechanisms between stakeholders. • Use of digital tools to support monitoring and surveillance. • Mechanisms to identify change in need, access to services, at-risk populations.
Strategy 4 Transferring the best available evidence from research to policy	• Ability to generate (or access) and process scientific evidence. • Mechanisms to feed multidisciplinary scientific information into decision-making. • Mechanisms to rapidly assess, learn and implement change.
Strategy 5 Coordinating effectively within (horizontally) and across (vertically) levels of government	• Existence or introduction of mechanisms for collaboration between sectors. • Clarity of responsibilities and chain of command.

Table 7.1 *How to assess the resilience strategies? [continued]*

Strategy	What can be assessed? Examples of assessment areas
LEADING AND GOVERNING THE COVID-19 RESPONSE (continued)	
Strategy 6 Ensuring transparency, legitimacy and accountability	• Effective governance structures (transparency, accountability, stakeholder involvement, etc.). • Established and maintenance of public trust in response agencies.
Strategy 7 Communicating clearly and transparently with the population and stakeholders	• Existence and timeliness of communication strategy for COVID-19 response. • Effective communication means to address relevant audiences.
Strategy 8 Involving nongovernmental stakeholders including the health workforce, civil society and communities	• Mechanisms to involve all relevant stakeholders. • Stakeholder representation.
Strategy 9 Coordinating the COVID-19 response beyond national borders	• Agreements with relevant actors (e.g. international agencies, other countries' governments), regional and global collaborations.
FINANCING COVID-19 SERVICES	
Strategy 10 Ensuring sufficient and stable funds to meet needs	• Adequacy of baseline spending on health (total, public, and as a share of government spending). • Existence of countercyclical health financing mechanism to mitigate the impact of economic shock, arising from mitigation measures. • Protection funding for health care, e.g. earmarked funds for health care. • Ability to quickly reallocate general government funds. • Existence and adequacy of financial reserves for emergency use. • Ability to increase levels of public borrowing.
Strategy 11 Adapting purchasing, procurement and payment systems to meet changing needs and balance economic incentives	• Development of new and alternative procurement channels. • Ability to make rapid changes to purchasing mechanisms. • Ability to reallocate funding to different providers or activities.
Strategy 12 Supporting universal health coverage and reducing barriers to services	• Existing levels of coverage (population, services, user charges) and its gaps. • Public knowledge of entitlements and changes to coverage. • Inclusion of COVID-19-related health care services into health coverage. • Existence/broadening of exemptions from user charges.
MOBILIZING AND SUPPORTING THE HEALTH WORKFORCE	
Strategy 13 Ensuring an adequate health workforce by scaling-up existing capacity and recruiting additional health workers	• Adequacy of pre-pandemic availability of health workforce. • Subnational health workforce mapping (location, availability, competencies). • Ability to increase number of health workforce (e.g. private sector, students, retired health professionals). • Ability to temporarily increase workload of health workforce (e.g. through extending hours, cancelling leave). • Ability to draw on workers from other areas (e.g. volunteers, emergency services, military, etc.).
Strategy 14 Implementing flexible and effective approaches to using the workforce	• Crisis preparedness training, cross-training for additional skills. • Training of health workers to treat specific or at-risk population groups. • Ability to reassign health professionals to other areas / providers. • Ability to expand responsibilities of health professionals to deliver new types of services.
Strategy 15 Ensuring physical, mental health and financial support for health workers	• Monitoring of health workers job satisfaction. • Monitoring of health worker absenteeism. • Mechanisms to ensure safety of health workers. • Staff support mechanisms. • Provision of adequate compensation for increased workload, hazardous working conditions.
STRENGTHENING PUBLIC HEALTH INTERVENTIONS	
Strategy 16 Implementing appropriate nonpharmaceutical interventions and Find, Test, Trace, Isolate and Support (FTTIS) services to control or mitigate transmission	• Timeliness and degree of implementation of nonpharmaceutical interventions. • Ability to scale-up testing and lab capacity. • Ability to implement effective contact tracing. • Levels of adherence to isolation requirements. • Availability and level of economic and social support for people needing to isolate/shield. • Availability and level of economic support for businesses/individuals affected by restrictions. • Other measures of support.
Strategy 17 Implementing effective COVID-19 vaccination programmes	• Levels of pre-existing vaccine hesitancy (immunization coverage for national vaccination programme). • Roll-out of immunization programme (availability of vaccines, total coverage, coverage in priority and at-risk groups, etc.).
Strategy 18 Maintaining routine public health services	• Access to routine public health services such as early childhood and maternity services, screening programmes, etc.

Table 7.1 *How to assess the resilience strategies? [continued]*

Strategy	What can be assessed? Examples of assessment areas
TRANSFORMING THE DELIVERY OF HEALTH AND SOCIAL CARE SERVICES TO ADDRESS COVID-19 NEEDS	
Strategy 19 Scaling-up, repurposing and (re) distributing existing capacity to cope with sudden surges in COVID-19 demand	• Adequacy of pre-pandemic availability of physical and material resources. • Existence of an agency responsible for emergency supplies, and of emergency reserves. • Availability of physical resources (sufficient capacity of beds, ICU beds), equipment, medicines.
Strategy 20 Adapting or transforming service delivery by implementing alternative and flexible patient care pathways and interventions and recognizing the key role of primary health care	• Availability of non-COVID services (diagnostics, primary and specialist care, emergency care, mental health services, rehabilitation, etc.). • Monitoring of access to and change in utilization of services. • Maintaining quality standards across all services. • Mechanisms of timely dissemination of guidelines and protocols. • Ability to increase capacity to provide services (e.g. through tapping into private sector). • Ability to provide health services remotely.

Source: Authors.

7.4 Considerations when assessing health systems resilience to COVID-19

The initiatives above show that assessment of health systems resilience can be done in different ways and with different purposes. However, any assessment relies on information that feeds in, and, in case of COVID-19, there are a number of issues to consider, some of which we address below.

Defining resilience

Prior to developing an assessment framework, it is essential to define resilience in a consistent way across countries that can be both measurable and actionable, especially given the breadth of existing definitions. This issue links to understanding the spectrum of various health system challenges, from sudden shocks to more long-term and gradual strains. It is also important to clarify health system boundaries (e.g. through the use of health system functions), as well as intermediate and final goals, and how resilience impacts on links within a health system. For example, the European Observatory on Health Systems and Policies's work on HSPA Framework for UHC sees assessing resilience as crucial part of health system performance that allows the health system to maintain the achievement of the intermediate and final health system goals in the face of shocks (Papanicolas et al., 2021).

Quantifying the magnitude of the COVID-19 pandemic

Recording of COVID-19-related health outcomes is very dependent on testing availability. With tests being broadly accessible only by the summer 2020 in Europe, data on cases and deaths may not be reliable and is likely to underestimate the true impact of COVID-19. In later stages, COVID-19 incidence may still be underestimated due to reluctance of all symptomatic people to test in order to avoid isolation, particularly in countries with weak support mechanisms for those needing to isolate. Population surveys, carried out independently from the symptomatic and preventive testing, such as the Office for National Statistics (ONS) COVID-19 Infection Survey in England can help to verify COVID-19 prevalence across various population groups. In terms of deaths, using excess deaths is considered a better marker of the overall impact of COVID-19, as deaths in people who tested positive for COVID-19 (usually within certain time-limit, such as 28 days) also underestimate the impact. Excess deaths, however, would include non-COVID-19 mortality, reflecting disruptions to non-COVID health care services.

Obtaining timely data to inform policy-making

The COVID-19 pandemic has shifted dramatically the speed of health-related data collection and release in many European countries. Weekly and monthly updates on the total number of deaths across countries provided by Eurostat (going beyond the existing EuroMOMO initiative) (EuroMOMO, 2021) enabled researchers to quantify impact on population health much quicker. Data collection and publication in countries have also improved rapidly, with many more details released at the national level. However, apart from highlighting traditional lags in health sector data, COVID-19 posed a new level of challenge: with the speed of change happening in health systems in response to COVID-19, such as mobilization of health workforce, increase and resignation of beds, this information is needed to determine adequacy (or lack) of human and physical resources at a given stage of the epidemic. With health systems adapting rapidly, assessing and quantifying this adaptation can only be done through very robust data collection mechanisms.

Data exchange, linkage and use for assessing what works

As seen from the breadth of strategies identified in this study, infection control mechanisms, actions, decisions and responsibilities go far beyond health system boundaries. For example, many of the measures to prevent transmission – lockdowns, physical distancing, mask mandates, border closures – go beyond the mandate of the health system, yet how successful they are also depends on many of the governance strategies identified in Table 7.1. Whether these measures should be factored into an assessment of health systems resilience is an important question. But beyond these boundary issues, assessing these areas can be complex in its own right, and it is even more challenging to link the extent of these measures and their interaction to some of the outcomes, such as the number of cases. However, as this study shows, each strategy plays a part and contributes to the overall level of control over the pandemic.

Obtaining qualitative and contextual information

Many of the existing approaches to assessing resilience listed above build largely on quantitative data, yet they stress the importance of qualitative and contextual information. Such information is very time- and resource-intensive to obtain and systematize, but it is crucial for interpretation of how well countries are able to respond, what regulatory, governance and resource mobilization tools they have at their disposal, and how and if they are able to deploy them effectively. This is also reflected in the strategies described in preceding chapters, as well as in Table 7.1, which draws on these strategies and where many of the resilience assessment areas depend on availability of qualitative information.

Lessons for building back better

It is not yet possible to establish all the factors that determined successes and failures in the response to COVID-19. In *Anna Karenina*, Tolstoy writes "Happy families are all alike; every unhappy family is unhappy in its own way". In the same way, all countries that have succeeded in the pandemic share many of the same features. They have decisive leaders who understand science and are ready to base their actions on the evidence. They have access to high-quality evidence and intelligence on the trajectory of the pandemic. They have secured public trust. They can draw on strong public health institutions. They have well prepared and resourced health systems, and their populations are protected by strong and secure social safety nets. In contrast, there are many reasons to explain why others have struggled.

Many of the determinants of success lie outside the purview of health policy-makers. They must work with the leaders they have. They must do what they can with the resources that governments and others have provided them with. And, too often, they must pick up the pieces left when social support systems, weakened by long-term underinvestment, fail. This chapter draws on what we have learned in this book to help them in this task.

We start by restating the obvious. Health systems are complex. A shock to any complex adaptive system can create consequences that are unpredictable. However, by taking a whole system approach, encompassing all of the functions of the health system, the interactions among them and the wider environment, we can begin to understand what might happen and how one might respond (Thomas et al., 2020). The COVID-19 pandemic illustrates the challenges well.

So far, when the term "resilience" has been used in discourses on health systems it has typically drawn on ideas from material, rather than social, sciences.

Thus, resilience is seen as the ability to absorb, adapt and transform in the face of acute shocks. In terms of performance, a resilient health systems response to a shock can be understood as doing things that ensure continued operation of health system functions (governance, financing, resource generation and service delivery) while responding to the shock/threat, so that the ultimate goals, especially that of improving the health of the population, can be achieved. Thus, initial responses prioritized the money, people and equipment needed to treat the rising number of sick and dying people with COVID-19 and continue, as far as possible, to care for others. But health systems resilience can also be viewed as something that anticipates what the new context requires and transforms to go beyond what it was before, to create a new equilibrium. This recognizes that the pre-pandemic system may not have been perfect. Indeed, had it been, the impact of the pandemic would probably have been much less. So maybe a pandemic or other crisis should be seen as an opportunity to build back better (van Schalkwyk et al., 2021). The evidence reviewed in this book points to many things that could be done better. We now look at them in turn.

8.1 What have we learned about the governance of the COVID-19 response?

Political leaders

Political leadership is crucial at all times but especially in a crisis. However, the quality of political leaders varies enormously and those charged with developing and implementing policy must adapt their mode of working to the circumstances in which they find themselves. There are many things they must take into account when doing so. First, the ability of the political leaders to respond rapidly and decisively and mobilize resources

will vary, as will their ability and willingness to draw on an appropriate range of technical and policy expertise.

Second, power and authority within a political system can be focused or diffuse, and can be located in different places. Nominal and actual power can be quite different. Health ministers in central government are often heavily constrained in what they can do. Where power really lies depends on the constitutional settlement (e.g centralized or federal, parliamentary or presidential), the composition of the government (e.g. single party or coalition), and the power of actors outside the formal system of government (e.g. thinktanks, lobbyists, the media etc.).

Third, politicians differ in their desire and ability to develop political consensus and to secure and maintain public trust. In some cases a crisis and the responses to it can be used to gain advantage. Some politicians see a crisis as an opportunity to concentrate power in their own hands or to create divisions in society for political gain.

Fourth, there are many different mechanisms to ensure accountability of the executive. Some may be hard, with accountability to legislators (e.g. parliamentary committees) or the judiciary (e.g. judicial review). Others may be soft, such as by means of scrutiny by civil society organizations and the media. The effectiveness of legislative and judiciary oversight and the extent to which civil society and a free independent media exists are thus also important.

Effective governance structures and processes are crucial. The quality of governance can be assessed in terms of transparency, accountability, participation, integrity and capacity to develop and implement policy (Greer et al., 2016). A country that has effective systems of governance is more likely to be able to respond effectively in a crisis and thus to limit the damage to health and the economy.

Where was the plan?

The SARS-CoV-2 virus was new and much about it was unknown. Countries in East Asia were aware of this; they had experience with SARS in 2003. Many European countries did have plans for a viral pandemic. The problem was that it was the wrong virus (and, in at least one case, where planning had taken place for imported cases of coronavirus (MERS) infection, the planning was not acted on (Dyer, 2021)). There was a failure to realize the importance of pre-symptomatic airborne transmission, which had many consequences for the nature and timing of measures to interrupt

spread (Greenhalgh et al., 2021). It took time to realize that this was a virus that affected many different body systems. It was much more than another cause of viral pneumonia and the initial scramble to buy ventilators diverted efforts from other preparations. But above all, there was a failure to remember that SARS had been controlled by a policy of maximum suppression, and not by adopting the usual approach to influenza and allowing it to rip through populations. Even with the right plan, mounting an effective response would have been difficult. Without one it was almost impossible.

The problems were exacerbated by a natural hesitancy to act quickly in the absence of "firm" evidence. This is a problem that continued to delay effective decision-making with insufficient application of the precautionary principle, in spite of the concept of exponential growth being well known to public health professionals, and being intuitively understandable by finance ministers as the same calculations underpin compound interest, action was too often delayed. Even a few days hesitation at the onset of the pandemic could lead to enormous numbers of additional deaths. In part this reflected a perception of a trade-off between health and the economy. We now see that this was mistaken (McKee & Stuckler, 2020). But in an emergency, it can be difficult to take a long-term perspective.

Managing in real time

With cases doubling every few days, accurate and timely data on the course of the pandemic is essential. Yet too many countries had failed to invest in effective surveillance systems. Some had to set up systems from scratch, with limited infrastructure and expertise. Modelling capacity was in particularly short supply, especially as those with the requisite skills tended to have found employment in the much better paid financial sector, often in another country. As with all viruses, SARS-CoV-2 evolved as it spread. Yet few countries had the sequencing capacity to track this process. As a consequence, they were unprepared for the emergence of new, more transmissible variants, some with the ability to partially evade vaccines.

But there were many other weaknesses in surveillance systems. Over a year into the pandemic, many countries were unable to supply data in formats that allowed for easy international comparisons. Some countries used different definitions or collected data in different ways. Another problem was that most information was supplied in aggregate form. Many disadvantaged groups, such as ethnic minorities and homeless people, were invisible in it. As a consequence, the ability to

interrogate the data to find out what was happening and who was most affected and what was really driving disease transmission, was extremely limited, with the exception of a very few countries.

Getting research into policy

Evidence on COVID-19 has been generated at astounding speed and while only a few countries had the capacity to contribute to these efforts, all countries could benefit from open-access sources of information provided by international agencies and published in scientific journals and, especially, in preprints. However, given the pace with which this information has been generated and the vast amount of evidence, some of which later turned out to be incorrect, those in charge of crafting policy responses would require mechanisms to enable scientists to guide them. Some, but not all, were able to create these mechanisms, but all could draw on independent knowledge brokers, such as WHO or the European Observatory on Health Systems and Policies. In some countries, groups of scientists took on a role of conveying evidence to the public. Capacity to take decisions quickly under uncertainty is vital for any effective emergency response.

Coordination is key

The scale of the pandemic has required contributions by many different organizations, all of whom should be working in concert. Coordinating these efforts has been an enormously challenging task. In some cases, governments have resorted to the superficially easy solution of doing everything themselves, and centralizing power in the executive. While this may get things done, it does not guarantee that what is done is right. It is not easy to achieve either, with both horizontal (within the government) and vertical (across the levels of government) coordination efforts facing difficulties due to competition over leadership and power, differing political agendas and other reasons.

Countries vary enormously in their constitutional arrangements and thus the distribution of power and responsibility. Questions as to whether something should be centralized or decentralized are unhelpful; what matters is that decisions are taken at the level where they can be implemented and the rationale is communicated to all with a need to know.

In all cases, policies are more likely to work if they are developed in partnership with those who must implement them and who understand far better what is possible than anyone in a ministry can ever know. There

is a growing literature on co-production of evidence that can be drawn upon (Turk et al., 2021).

Lack of transparency can be dangerous

The speed with which decisions had to be made was not always conducive to legislative, media or public scrutiny. This is always problematic. A lack of transparency can too easily create the conditions for mistakes to be made or, worse, for corruption to thrive. Sadly, there were too many times when short-sighted decisions were made to benefit sectors, based on the false dichotomy of lives versus livelihoods, which had to be reversed later after having wreaked havoc.

Transparency about uncertainty is particularly important. Knowledge and circumstances change. An approach to communication with the public that accepts that policies will have to change as a result is to be welcomed (Hartwell & McKee, 2021).

Communication matters

The opportunities for those in authority to communicate with the public, in both directions, have increased enormously. This brings benefits and risks. The benefits include the ability to disseminate timely information on the development of the pandemic and advice on what to do. It also, as noted above, can encourage trust in the messages where those delivering them are respected by the public. However, when doing so, it is important to remember that the messages may not reach everyone, especially those who do not speak the official languages and the often surprisingly large number of those who are digitally excluded. Of course, it is not just public health authorities who can disseminate information. So can those whose intentions are less honourable. Consequently, the pandemic has provided an opportunity for some individuals and organizations to spread misinformation, or worse, disinformation designed to deceive (Gorski & Yamey, 2021), and it is essential to monitor this messaging and develop appropriate responses. This will require close monitoring of social media, including the use of tools such as sentiment analysis (Cheng et al., 2021) and network analysis. Investigative journalists can also play an important role.

Civil society plays a crucial role

Many, although not all, countries have vibrant civil society organizations, many of which have played important roles in the pandemic. While their most visible roles may be those involved in delivering

services to those who fall through the gaps in official programmes, they also can contribute as a source of information about how the pandemic is affecting ordinary people. In these ways they offer an invaluable resource that should not be overlooked.

Some civil society organizations can make more direct contributions; for example, where first aiders take on roles that have previously been reserved for health professionals, such as vaccinations (after appropriate training) or by providing support for those isolating or otherwise in need.

Viruses cross borders – so must responses

Even though governments have worked together in the fight against infectious disease for over a century, there are still many weaknesses in the international system. As the lead UN agency in the health sector, WHO did play an important role, although this role was limited by long-standing shortages of resources. The EU also played a role, after initial problems were overcome.

The International Panel on Pandemic Preparedness and Response (2021) and the Pan-European Commission on Health and Sustainable Development (2021) have both made a series of recommendations to strengthen international and global governance, including a new pandemic treaty; structures to support stronger preparedness; and mechanisms to promote access to vaccines.

Many lessons are being learned but it will be essential that they are followed through to achieve lasting change.

8.2 What have we learned about changes to financing of health services during the pandemic?

Finding the money

It costs a lot of money to mount a response to a pandemic. Governments have had to find it from somewhere. This was especially difficult for those that had failed to invest in their health systems in recent years as they had further to go to make them fit for purpose. Yet no government found it easy and hard decisions had to be made. Ultimately, the money was found, showing that what was often described as impossible could actually be done when there was no alternative.

Spending the money

It is easy to spend money badly, especially when one is in a hurry. There were several challenges during the

pandemic. One was to make sure that health providers, such as hospitals, had enough money to continue to operate when the normal payment systems were no longer working; for example, when the income linked to normal patient flows collapsed. Fortunately, many governments stepped in with imaginative solutions. Another was to buy the many things needed to manage a pandemic, such as PPE and ventilators. This was not so successful. Governments and health care providers fell victim to profiteering and fraud. In some cases, unscrupulous officials were complicit in wrongdoing. Existing rules for procurement include provisions for emergencies. These may need to be reviewed in the light of the pandemic. However, it is not justifiable to simply set them to one side.

Many lessons have been learned during the pandemic and more can be expected from the inevitable enquiries that will be held. It will be important to revisit existing procurement mechanisms, and especially the joint procurement systems that enable groups of countries to exert greater purchasing power but, potentially, at the expense of speed, in the light of these lessons.

Leave no one behind

Getting necessary care during the pandemic was not easy for many patients. Many health workers, especially those who normally support people with chronic conditions, were redeployed to support the needs of patients with COVID-19. Access to primary and secondary care was restricted, leading to much unmet need (Mansfield et al., 2021). Many non-urgent surgeries were cancelled, as were other important activities, such as cancer screening, and services such as mental health, palliative care and rehabilitation. Ironically, the demand for such types of services surged during the pandemic. Now that the pandemic is beginning to come under control, health systems must find ways to deal with an enormous backlog of care, including for many people whose conditions have progressed because of the delays they have experienced. Looking back, it is clear that many years of underinvestment in health systems in some countries have had consequences. It will be important not to forget the lessons learned.

8.3 What have we learned about mobilizing and supporting health workers?

We needed more health workers

Health workers have been the heroes of the pandemic. They have worked long hours, facing personal

discomfort wrapped in PPE and been subject to extreme psychological stress. In many countries they were too few in number, even before the pandemic. Many felt undervalued, especially when they compared their incomes with others who had comparable educational achievements. Many also struggled to bring up families while working antisocial hours. During the pandemic, even more was asked of them. They had to take on shifts, to care for their increasing numbers of patients and to fill the gaps left by those colleagues who had fallen ill. Many countries did find ways to boost their numbers. These included bringing health workers back from retirement or asking final year students to take on additional roles and responsibilities. It also included doing things differently through various skill-mix adaptations (see below). Health workers were often helped by volunteers from the community, not just in support roles, but in some countries undergoing training to take on clinical roles, such as administering vaccines. However, this came at a cost. Health workers faced high levels of burnout and moral injury – a feeling of guilt when one is unable to provide the care that one knows is necessary. Many things did not get done, including training. Looking ahead in health care as in some other sectors, people are reassessing their work-life balance. Do they really want to continue to work long hours with little reward? Tackling the growing shortages of health and social care workers will be a major challenge for health systems going forward.

The right person for the job

Looking across Europe, it is clear that health workers in different countries often do different things. Vaccination provides a good example. In some countries, vaccines are only given by doctors. In others, it is mainly carried out by nurses or, in a few, by pharmacists. Yet during the pandemic, some countries turned to people without clinical backgrounds to administer vaccines after they had received some basic training. There has been increasing discussion of what is referred to as task shifting in recent years. Several developments have contributed to this. They include changes in the balance of power among professional groups within health systems, new opportunities presented by technological innovations, and a move to patient empowerment. We now have evidence that challenges some widely held preconceptions. Contrary to what some expected, nurses actually get better results than doctors when running clinics for some chronic diseases. Pharmacists are experts in managing medication, and demonstrate this if they are allowed to do so. As we look into the post-pandemic future, now is a good time to reflect on

who does what and why, drawing on the growing body of evidence on what works in what circumstances (van Schalkwyk et al., 2020).

Health workers need support too

Many health and, especially, social care workers felt that they had been taken for granted during the pandemic. In the initial stages they faced shortages of many things, but particularly the equipment they needed to protect themselves from infection. They knew that if they became infected, they risked severe illness or death, not just for themselves but for their families. In some cases, they voluntarily stayed away from home to protect those who depended on them. They also struggled with all of the problems that everyone faced during the pandemic, such as the closure of childcare facilities and public transport. High proportions of health workers suffered from severe psychological stress and many of them struggled to obtain support. Many employers did what they could to support their staff but not all did. Those responsible for health systems have a duty of care to their staff. It is easy to assume that, because they have coped with so much in the past, they will continue to do so. Looking ahead, this is another area that offers many lessons. Health systems can only function if they can attract and retain high-quality staff.

8.4 ### What have we learned about mobilizing public health?

Public health was challenged

The initial response to the pandemic involved two main elements, care for those who were ill and prevention to reduce their numbers. Designing, implementing and monitoring preventive interventions fell to the public health community. Yet in many countries, this community had suffered even more from underinvestment than other parts of the health system. As a consequence, policy-makers were often flying blind, lacking the data necessary to understand the threat that they faced and the scientific expertise to help them make sense of the often conflicting information. To take one example, the failure to understand the airborne nature of transmission meant that some things that had little effect were prioritized and others that would have been very effective, were overlooked (Greenhalgh et al., 2021). Once the vaccination programme began, more problems became apparent. Injecting a vaccine into someone's arm is the easy bit. Managing the logistics to make sure the vaccines are in the right place at the right time, understanding the reasons why some are

reluctant to be vaccinated, and tracking inequalities in vaccine uptake are all much more difficult. Public health expertise is essential to get these things right and to make sure that policies are not pursued that make things worse.

While many in public health were concentrating on the response to the pandemic, it was inevitable that other routine activity was set aside, such as cancer screening. This points to the need for continuity plans to be developed going forward to minimize the collateral damage in a future crisis.

Back to basics – finding, testing, tracing, isolating and supporting

Finding and testing people who may be infected, tracing their contacts and enabling them to isolate are basic public health activities. But just because they are basic does not mean that they are simple. As contact tracers working in sexual health clinics know all too well, obtaining a detailed picture of people's lives, necessary to understand where they became infected and who they may have passed it on to, is a highly skilled task.

Coordinating these activities is also extremely complicated and it is unwise to rely upon developing a new information system once a pandemic has begun. It is also essential to have well-developed and tested organizational structures, which are regularly tested as part of the exercises that are an essential part of pandemic preparedness.

The scale of the challenge during the pandemic was enormous and would have overwhelmed any system. Yet, in some countries, comprehensive track and trace systems did not exist before the pandemic and had to be created from scratch. And in many countries the complexity of these activities was simply not appreciated. Models based on call centres and repeated failures to develop apps diverted enormous resources from doing the job properly. One element, isolation, was rarely prioritized, even though it is an essential part of the entire process. There was too little understanding that those leading precarious lives would struggle to isolate and would need support.

Strong social safety nets are essential

The conditions in which people live and work are well recognized as determinants of their health. This is especially so during a pandemic. Those who lead precarious lives, uncertain if they will have a job, an income, a home, or even food for their family every week, will find it very difficult to adhere to public health

measures designed to reduce transmission of the virus. Everywhere it has been studied, there have been wide inequalities in risks of infection, severe illness and death, with the poor and those in disadvantaged communities, in particular minority ethnic populations, suffering most. Many countries did recognize this, even if there was relatively little that they could do to compensate for years of neglect. Support for people who would otherwise have lost jobs was provided and was extremely important in safeguarding their mental health. It also meant that they were more likely to be able to re-enter the workforce when restrictions eased. Looking ahead, it is clear that strong social safety nets are an essential part of pandemic preparedness.

8.5   What have we learned about reconfiguring health care delivery?

Coping with surging demand

You cannot run a health system at 95% capacity and expect it to cope whenever there is a surge in demand. Those countries that had tried to do so struggled in the face of the pandemic. Others, that recognize that flexibility was important, faced fewer problems. In most cases, hospitals did cope, albeit at the expense of non-COVID services, with non-urgent ones often postponed. They did so by redeploying staff, by converting existing wards into high dependency units, and using operating theatres as ICUs. A few countries tried other ideas. One was the creation of stand-alone hospital facilities; in effect, large numbers of hospital beds in conference centres and similar buildings. Yet, as they should have known, it is the health workers that are the critical factor, and if they do not exist, filling a large hall with beds will give little benefit. In the event, these facilities had very little use and, in at least one tragic case, unfamiliarity with equipment is believed to have led to avoidable patient deaths. One obvious lesson from this experience is the importance of building flexibility into hospital design.

New models of care

One of the lessons that countries in East Asia had learned in 2003 was the importance of segregating patients with SARS from others. As a consequence, they designed their hospitals and other health facilities to have parallel pathways. The failure to make such provision in Europe meant that, when the pandemic hit, much routine care had to be suspended. But things

have moved on since 2003 and these countries were much better prepared when COVID-19 emerged.

Health workers in many European countries rapidly adopted new models of care, often out of necessity as they were overwhelmed with demand for their services. Many of these involved much greater team working than in the past an it will be important to consider what elements should be maintained or built on going forward.

The growth of digital health

People are now much more digitally connected. There are new online platforms for conducting meetings and consultations between health workers and patients. Although there are challenges, it has become clear that there is often no need for a patient to spend hours getting to an appointment and waiting for it take place when it is over in 10 minutes. Obviously, there are some elements of the interaction that are impossible online, such as interpreting the many non-verbal clues involved in reaching a diagnosis. However, looking ahead, as more people have access to remote monitoring equipment, there are many more possibilities that will bring benefits to everyone. It will be important to harness these innovations and good practices and integrate them into health systems in post-pandemic era. This means more training for the workforce in digital health skills as well as for patients and other users. There is, however, one caveat. It will be important to take account of how, for the foreseeable future, there will still be many people who are in effect digitally excluded. The use of digital technologies also raises concerns about safeguarding privacy of individual data. These reservations have to be addressed in order to harness the full potential of such technologies (Regional Committee for Europe, 2021).

Recognizing the key role of public health and primary health care

Many countries have underinvested in public health and PHC services. One of the reasons for this lack of adequate investment is the fact that much of the returns are deferred into the future and benefit future generations, including future generations of policy-makers. The COVID-19 pandemic has clearly shown that having well-resourced public health and PHC services are irreplaceable assets in a pandemic, and both play an essential role in ensuring effective dual delivery of services to COVID-19 and other patients. However, they are assets that are not easily surged. While certain resources can be scaled-up relatively quickly, such as

material resources, specific on-the-ground knowledge of local communities and contexts and strong anchoring within these local communities and their structures that reinforce effective delivery of public health and PHC services, cannot be built overnight. While digital technologies can support delivery of public health and PHC services and their role is likely to grow in the future, the COVID-19 experience has shown that direct human contact and laborious public health and PHC services that are embedded in the local communities could not be completely replaced by technology, even in countries that have the necessary infrastructure and governance in place to support it.

8.6   Looking beyond the health system

Other systems

We have already noted that strong social safety nets are an essential part of pandemic preparedness. But many sectors have played a critical role during COVID-19, highlighting the need of intersectoral coordination in responding to modern health threats such as pandemics.

Over a decade ago, the 2009 WHO readiness framework for pandemic influenza noted that "a pandemic of any severity will have consequences for the whole of society" and called for integrated preparation across all sectors so that "all organizations, both private and public, plan for the potential disruption that a pandemic will cause, including the impact of staff absenteeism" with special emphasis on those organizations providing essential services (WHO, 2009). SDG 3 – Good Health and Well-Being – focuses on health but recognizes that it is connected to almost all other goals and is contingent upon reducing inequities in the social, commercial, cultural, economic, environmental and political determinants of health (United Nations, 2015). An intersectoral approach is not only critical for addressing health threats but also for preventing them. Since the 2003 SARS epidemic, the need for early warning surveillance at the human, animal and environmental interface – the One Health approach to preparedness – has been increasingly recognized for early detection of unusual pathogens (Aarestrup et al., 2021). Despite a broad acknowledgement of its importance, both in and out of the crisis, so far there has been little evidence on meaningful cross-sectoral engagement (Hussain et al., 2020; Jorwal et al., 2020). This has proved to be one of the main weak spots during the current pandemic.

Taking stock of the lessons from the COVID-19 pandemic and previous crises, the final report of the Pan-European Commission on Health and Sustainable Development (2021) acknowledged the importance of the various interlinkages between health and other sectors. The report reflects on the "many and diverse factors that influence health in its widest sense" and contends that a "Health in All Policies" approach will help protect the world from future health threats. A renewed call is being made to establish collaborative, multisectoral and cross-disciplinary work across health and other sectors as well as multinational initiatives across governments and international agencies. It is time that policy-makers finally take these calls seriously.

Political leadership and governance

Personal qualities of political leaders play an enormous role in novel, large-scale crises such as COVID-19, particularly in political systems where executive power is concentrated. Countries with a highly centralized leadership may be more likely to be paralysed in a crisis, for example, if the leader becomes sick, and their policies might suffer if the leader resists or otherwise delays taking necessary actions.

Poor political leadership during COVID-19 could be attributed to many things. Some leaders ignored or, in some extreme cases, even denied science. This may have been driven by ignorance, personal values and beliefs, or the values and beliefs of their political electorates. Information on case numbers and deaths – which have been available in almost real time – can help hold leaders to account; but this was complicated given that policy-makers were dealing with completely novel challenges and rapid change. Sometimes leaders did not have access to the necessary resources to do what was needed, such as providing tests or having the capacity to trace contacts. Finally, many leaders did not have well-functioning decision-making and other governance mechanisms to support them in a crisis. This volume showcases multiple examples of governance problems, starting with gaps in monitoring, surveillance and early warning systems, through inadequate communication and stakeholder participation, to problems with coordinating responses beyond national borders. Strong governance capacity is necessary to mobilize public health capacity and mount an effective response. It also determines the extent to what is possible for the politicians – it can thus provide a defence against particularly bad leaders. Commentators such as the members of the Pan-European Commission on Health and Sustainable Development are already advocating for strengthening pan-European and global health governance, but countries should also look closer to home and seek to address any deficiencies in their national health system governance structures and mechanisms. Well-performing and resilient health systems are those that are not only well-resourced but also well-governed.

State capacity

National governance capacity is crucially underpinned by state capacity. State capacity refers to a state's ability to make and effectively implement policy decisions in health and other sectors. This requires competent multifunctional local and/or regional governments and administrative and bureaucratic institutions, a professional civil service (e.g. to implement the necessary legislative and regulatory changes) and other specialized services, such as the police. During the pandemic, state capacity could often substitute for weak public health capacity, which could enable a response even in countries with limited public health capacity, but the reverse was not true (Greer et al., 2021).

The shrinking of the state under the dogma of new public management (NPM), which gained popularity in the 1980s and was characterized by deregulation, a focus on short-term efficiencies and fixing market failures, and government practices such as creation of arm's-length agencies and outsourcing, has led – in many countries – to an erosion of public-sector capacity and capabilities (Mazzucato & Kattel, 2020). COVID-19 has been particularly challenging for countries that have underinvested in state capacity. The pandemic may result in calls to rebuild it to enable governments to respond to health and other future crises and pressures. But these are not necessarily calling for "more state" but instead for a different type of state – one with the right capacities and capabilities (Mazzucato et al., 2021).

8.7   Conclusions: health systems for prosperity, solidarity and resilience

Every health system had a different starting point when the pandemic struck, with different capacities of the key health systems functions – governance, financing, resource generation and service delivery. As highlighted by the Independent Panel on Pandemic Preparedness and Response (2021), countries, governments, and health systems were insufficiently prepared for COVID-19. This reflected a legacy of reduced investment in resilient economies that left many health systems much weakened and with fewer resources to cope with the sudden surge in the demand for services. While many

health systems found ways to respond resiliently and maintain performance of the key health systems functions, those with stronger initial capacities have likely found it easier to manage the pandemic response. For example, while health sector financing could be increased relatively quickly, years of underinvestment in the health sector resulted in weakened health sector capacities that could not easily be overcome. This was particularly visible in public health and made implementation of effective FTTIS systems challenging (Chung et al., 2021). Despite massive investments, seemingly rapid solutions such as outsourcing of contact tracing to private call centres, or the use of digital apps could not replace the shoe-leather epidemiology conducted by experienced public health teams.

In 2008, in the Estonian capital Tallinn, 53 Member States from the WHO European Region agreed on an ambitious vision for the future of health systems, acknowledging that health systems, health and wealth are all interrelated, and committing to investing in strong health systems. The financial crisis struck in the same year causing many countries to retract their pledges, with many health systems subjected to austerity measures. Countries that made the biggest disinvestments in health and health care suffered the greatest declines in economic performance, proving the point made in Tallinn that there is no wealth without health (McKee & Kluge, 2018). In 2018, WHO Member States reconvened in the same location and reiterated the messages from a decade earlier, but with a renewed emphasis on inclusiveness and "leaving no one behind", recognizing that not everybody has benefited from gains in life expectancy and other health gains in the same way.

The COVID-19 pandemic made a clear case for addressing inequalities and protecting the poorest in society. It also proved again that there is no wealth without health and that the initial perception of a trade-off between health and the economy was misguided. We should renew our commitment to the pledges made in Tallinn and invest in building strong health systems for prosperity, solidarity, and resilience in the face of any future health threats acting on the lessons learned during this devastating pandemic.

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The COVID-19 pandemic represents a health system shock of unprecedented scale. Health systems resilience – defined as the ability to absorb, adapt and transform to cope with shocks – is needed to ensure sustained performance of the health system functions (governance, financing, resource generation and service delivery) so that the ultimate health system goals, especially that of improving the health of the population, can be achieved. As we have witnessed, few countries could achieve this goal and even fewer could do so in a sustained way – leaving all countries with important lessons to learn. The lessons derived in this study can inform both the ongoing efforts while countries are still grappling with the pandemic, as well as help ensure these efforts also incorporate a longer-term perspective, thus improving preparedness to any future health system shocks.

While there is no 'one-size-fits-all' response that all countries could replicate, the study identifies 20 key strategies, grouped according to the health system functions, that have been found as enhancing health systems resilience in the face of COVID-19. They have strong interlinkages and do not work in isolation, and this book also considers how the health system operates in the context of other systems, and broader political and governance structures.

The strategies describe how to secure and (re)allocate financing while leaving no one behind. They emphasize the need for more health workers who are fit for the job and are well supported. They demonstrate the importance of strong public health systems and safety nets. They show how providers surged capacity and adapted care pathways for both COVID-19 and non-COVID-19 patients. While the relative importance of the various strategies and their configurations will depend on the specific country contexts, governance emerges as the foundation and lever for health system functioning and resilience. It plays a crucial role in enabling all other functions to work in unison to ensure adequately financed and otherwise well-resourced health service delivery to promote improved health.

This study is targeted at policy-makers and has two aims. First, it provides national policy-makers with evidence from other countries to assess their own responses to COVID-19 and incorporate adjustments that are appropriate for their national contexts. To this end the study offers examples of assessment areas for each of the identified strategies that can be used as the first step in national assessments of health systems resilience. Second, the findings and lessons contained in the study enable us to draw experience from the COVID-19 pandemic to begin 'building back better' to improve the response to future health system shocks and hopefully even pre-empt them. This supports the transition from managing the crisis to achieving more resilient health systems and societies.

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