

HEALTH SYSTEMS AND POLICY ANALYSIS

POLICY BRIEF 36

# Strengthening health systems resilience

Key concepts and strategies

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A policy brief is a short publication specifically designed to provide policy makers with evidence on a policy question or priority. Policy briefs

- Bring together existing evidence and present it in an accessible format
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Each brief has a one page key messages section; a two page executive summary giving a succinct overview of the findings; and a 20 page review setting out the evidence. The idea is to provide instant access to key information and additional detail for those involved in drafting, informing or advising on the policy issue.

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## Acronyms

<b>DRG</b>	diagnosis-related group
<b>ECDC</b>	European Centre for Disease Prevention and Control
<b>EWRS</b>	Early Warning and Response System
<b>GDP</b>	gross domestic product
<b>GP</b>	general practitioner
<b>HSRM</b>	Health Systems Response Monitor
<b>IHR</b>	International Health Regulations
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>OOP</b>	out-of-pocket
<b>PHEIC</b>	Public Health Emergencies of International Concern
<b>PPE</b>	personal protective equipment
<b>SARS</b>	severe acute respiratory syndrome
<b>WHO</b>	World Health Organization

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## Key messages

- Health system resilience is key to coping with catastrophic events, such as the economic crisis and the coronavirus (COVID-19) pandemic, but there is much confusion about what resilience means, how to strengthen it and how to assess it.
- For operational and assessment purposes, and to foster a more consistent understanding and use of the key concepts, we adopt the following definitions of health system resilience and shock:
  - Health system **resilience is the ability to prepare for, manage (absorb, adapt and transform) and learn from shocks**.
  - **Shock is a sudden and extreme change which impacts on a health system**, and is thus different from the predictable and enduring health system stresses, such as population ageing. A shock cycle has four stages: Stage 1: Preparedness; Stage 2: Shock onset and alert; Stage 3: Shock impact and management; and Stage 4: Recovery and learning.
- Based on the existing literature and emerging evidence from the ongoing COVID-19 pandemic, we identify strategies for enhancing resilience and map them on to the key health systems functions:
  - **Governance**: effective and participatory leadership with strong vision and communication; coordination of activities across government and key stakeholders; an organizational learning culture that is responsive to crises; effective information systems and flows; and surveillance enabling timely detection of shocks and their impact.
  - **Financing**: ensuring sufficient monetary resources in the system and flexibility to reallocate and inject extra funds; ensuring stability of health system funding through countercyclical health financing mechanisms and reserves; purchasing flexibility and reallocation of funding to meet changing needs; and comprehensive health coverage.
  - **Resources**: appropriate level and distribution of human and physical resources; ability to increase capacity to cope with a sudden surge in demand; and motivated and well-supported workforce.
  - **Service delivery**: alternative and flexible approaches to deliver care.
- Assessing how each function is placed in terms of the strategies above can allow a country to identify the potential sources of vulnerability and plan for further action (to enhance resilience or the capacity to respond). Resilience can also be assessed after the crisis, providing an evaluation of the handling of the crisis.
- Assessment of health system resilience is crisis- and context-specific. It is important to employ a range of both quantitative and qualitative metrics that allow evaluation of particular aspects of health system resilience in order to provide a meaningful overall assessment.
- Analysing experiences of other countries provides useful lessons for policy-makers implementing resilience-enhancing strategies. It is particularly important to learn in the aftermath of the shock and make the link between recovering from the shock to preparedness for future shocks, which is an area often neglected once the health system returns to post-shock 'normality'.

## Executive summary

Health systems in Europe and beyond have recently been affected by a number of catastrophic events or shocks, such as the financial crisis or the Ebola outbreak. Some of these systems appeared to have been better prepared for and/or better able to cope with these events than others. In other words, some were more *resilient* to shocks and/or in their responses to shocks.

Most recently, the emergence and rapid spread of the novel coronavirus disease (COVID-19) since late 2019 is severely testing health systems around the world, threatening to damage the global economy and, as a consequence, leading to a human cost far beyond the impact of the disease itself. Understanding health system resilience has never been more essential.

Despite an increased interest in the concept of resilience and its practical applications among health systems analysts and policy-makers, there is still much confusion about what resilience means, how to strengthen it and how to assess it. In this brief we aim to address these gaps and thus support a more consistent understanding and use of the concept.

We define **resilience as the ability to prepare for, manage (absorb, adapt and transform) and learn from shocks**. The concept of resilience is thus closely related to the concept of a shock, defined as a sudden and extreme change which will impact on a health system. However, the experience of a shock is not a necessary precondition for a health system to be able to be judged as resilient: a resilient health system may be one that is *prepared* for the occurrence of a shock, but this shock may not necessarily happen. Shocks can affect predominantly the demand side of the health system (e.g. an epidemic will increase health care needs) and/or its supply side (e.g. an economic crisis will typically cause a reduction in available resources) and can be more (or less) severe.

The nature of the strategic response will be determined by the type and severity of the shock. It will be further affected by the stage in the shock cycle the health system is at. We distinguish four distinct stages:

- **Stage 1: Preparedness**, which is related to how vulnerable a system is to various disturbances;
- **Stage 2: Shock onset and alert**, where the focus is on timely identification of the onset and type of the shock;
- **Stage 3: Shock impact and management**, when 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**, which is when there is a return to some kind of normality but there may still be changes as a legacy of the shock.

A review of existing literature enabled us to distil a number of strategies for strengthening health system resilience or a resilient response to a shock. It is important to remember that these strategies often overlap across the various stages of the shock cycle, as well as across various health systems

functions. Which strategies should be followed depends on the specific country context, the stage of the shock cycle, and the type and severity of the shock. The strategies we have identified are:

- (1) **Effective and participatory leadership with a strong vision and communication**
- (2) **Coordination of activities across government and key stakeholders**
- (3) **Organizational learning culture that is responsive to crises**
- (4) **Effective information systems and flows**
- (5) **Surveillance enabling timely detection of shocks and their impact**
- (6) **Ensuring sufficient monetary resources in the system and flexibility to reallocate and inject extra funds**
- (7) **Ensuring stability of health system funding through countercyclical health financing mechanisms and reserves**
- (8) **Purchasing flexibility and reallocation of funding to meet changing needs**
- (9) **Comprehensive health coverage**
- (10) **Appropriate level and distribution of human and physical resources**
- (11) **Ability to increase capacity to cope with a sudden surge in demand**
- (12) **Motivated and well-supported workforce**
- (13) **Alternative and flexible approaches to deliver care**

We have also identified a wide range of assessment areas that have been applied to various aspects of health system resilience. Which indicators one should use depends on the purpose of the assessment and the contextual factors. For example, the more general metrics may be better suited for broader routine assessments of preparedness and vulnerability, in order to identify potential areas of weakness within the system. Crisis-specific indicators, on the other hand, can be used in all stages to prepare for, detect the onset and measure the impact of the specific shock.

Analysing experiences of other countries, as we do in this brief, may help sensitize those responsible for implementing resilience-strengthening strategies and those responding to actual shocks to the complex effects of shocks on the various elements of the health system and thus inform their strategic choices. Since shocks can cause a legacy of health system weakness or lead to another shock, learning from experiences of others may help alert decision-makers to the dynamic nature of health system shocks. Making the link from recovery and learning from a shock to preparedness is crucial although often neglected once the shock has passed and decision-makers focus again on dealing with day-to-day system stresses.



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## Policy brief

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### Introduction: why resilience?

Catastrophic events occurring over the last decade have highlighted the need to understand how to govern health systems in the face of extreme and largely unforeseen disturbances or shocks. In high income countries this has been triggered by the economic crisis and in low and middle income countries by the sudden outbreaks of infectious diseases, like Ebola, as well as civil conflicts, with catastrophic consequences (Barasa, Mbau & Gilson, 2018). Most recently, the emergence and rapid spread of the novel coronavirus disease (COVID-19) since late 2019 has been severely testing health systems around the world, converging or interacting with other crises, such as economic and migration crises (Bozorgmehr et al., 2020). National responses have varied greatly, with some countries being more successful than others in containing the transmission and preventing deaths. Nevertheless, health systems in many countries, such as Italy, have found themselves struggling to cope with the exponentially accelerating number of cases while health systems in other countries have also come, or are coming, under enormous pressure.

Analysts are thus trying to draw lessons from health systems that have proved more successful at dealing with the COVID-19 crisis and to offer evidence on best practice to health systems that are under strain. At the same time, questions are asked about what we can learn from the responses to COVID-19 and how to prepare for and cope with similar shocks in future (Legido-Quigley et al., 2020).

The concept of *resilience* promises to be useful in answering these questions (Barasa, Cloete & Gilson, 2017; Abimbola & Topp, 2018). However, the mushrooming literature on resilience remains confusing and there is no agreement on basic terms nor are they applied in consistent ways (Turenne et al., 2019). Indeed, the meaning of resilience has tended to evolve and broaden over time (Barasa, Cloete & Gilson, 2017) and there has been critique of the concept for being imprecise although strategically useful (Olsson et al., 2015). Such dissonance is inevitable and healthy, as a rich concept like resilience spills over into health systems thinking and health systems performance assessment. Nevertheless, it can create confusion for those seeking to utilize the concept for policy-making, in order to govern and monitor health systems performance better.

Given the considerations above, the purpose of this policy brief is to promote a more consistent and effective usage of the term 'resilience' in the health systems context. We start by acknowledging that the understanding of this term has broadened over the years and propose a narrower and more operationally useful definition that focuses on health systems' ability to *prepare, manage and learn from shocks*. We consider shocks to be *sudden and extreme disturbances*, such as epidemics, distinguishing them from more chronic health system strains, such as those caused by population ageing, and relate key aspects of resilience to the different stages of the shock cycle. Finally, drawing on the existing literature and the emerging experiences of dealing with COVID-19, we distil a list of strategies that appear to have

been successful at strengthening resilience, and of assessment areas for those strategies. Where relevant, we illustrate how strategies were used in a number of country examples. We conclude by summarizing the brief's key findings and pointing towards areas where further evidence is needed.

In a forthcoming, complementary policy brief, we will apply the conceptual resilience framework developed in this brief to analyse how well countries in the WHO European Region were prepared for and how well they responded to the COVID-19 pandemic. This work is part of European Observatory on Health Systems and Policies efforts to map and analyse health system responses to the pandemic across the Region. These efforts include a dedicated online platform ([www.covid19healthsystem.org](http://www.covid19healthsystem.org)), developed jointly with the WHO Regional Office for Europe and the European Commission and launched on 2 April 2020, where information on national responses to the COVID-19 pandemic is systematically collected, and a special (forthcoming) issue of *Eurohealth*, the Observatory's quarterly publication, which will be devoted exclusively to the analysis of the various aspects of policy responses that have emerged in the first wave of the pandemic.

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### What is health systems resilience?

Resilience is commonly understood to be the capacity to recover quickly from difficulties (toughness) or, in reference to materials, the ability of a substance or object to spring back into shape (elasticity). The application of the concept of resilience is far from new and relates to multiple areas, ranging from physics to human psychology. Over the past two decades, the concept has become relevant and more researched in relation to societal response to health emergencies and major societal shocks (Castleden et al., 2011).

### Definitions of health systems resilience

Most definitions of health systems resilience focus on the health system preparedness and response to a severe and acute shock, and how the system can absorb, adapt and transform to cope with such changes (Barasa, Cloete & Gilson, 2017). However, with the growing body of literature around health systems resilience, the focus of the definitions has broadened. Today, literature on resilience thus also extends to looking at minimizing exposure (risk and susceptibility) to shocks, which is usually termed as vulnerability (Adger, 2006), and to looking at the management of predictable and enduring system strains or stresses, such as population ageing or increasing incidence of multimorbidity, and even to what can be termed everyday resilience, i.e. resilience to stresses that are commonplace and chronic (Barasa, Cloete & Gilson, 2017).

This broader approach, introducing resilience as an objective of health systems, was first identified in 2014 by the European Commission (European Commission, 2014) and has then been adopted to assess European health systems in the biannual 'State of Health in the EU' profiles developed by the European Observatory on Health Systems and Policies

in collaboration with the Organisation for Economic Co-operation and Development (OECD) on behalf of the European Commission (Box 1). It is also used in the work on health systems strengthening by Kutzin and Sparkes (Kutzin & Sparkes, 2016), where it is defined 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, which is inherently linked with universal health coverage and individual health security (protection against risk) as other goals, and with health system strengthening as the means (policy instruments) to achieving these goals.

#### Box 1: Resilience as a dynamic objective for health system strengthening in the State of Health in the EU profiles

The framework used in the State of Health in the EU country profiles adopts a broad definition of resilience that distinguishes the following three dimensions:

1. **Ensuring long-term stability of resources** refers to the capacity to protect or generate the necessary and adequate financial resources, as well as physical, human and information (knowledge) resources to address any upcoming major challenges, such as economic or fiscal crises, public health crises, demographic changes or new technologies.
2. **Responding efficiently** refers to the ability to manage the health system with limited resources, through achieving efficiencies, while not sacrificing key priorities, benefits, access or entitlements. The presence of sufficient resources is necessary, but a health system that is able to withstand shocks to supply or demand must be able to best use the resources it has available. That is, a resilient health system must be able to efficiently use its available resources.
3. **Strengthening governance** refers to the capacity to steer the system in order to adapt it quickly to new objectives and priorities, and to respond to major challenges through key governance tools: ability to formulate long-term health strategy; ensure accountability, transparency and stakeholder involvement; as well as use evidence for monitoring and performance evaluation.

Note: For a list of country profiles see: [https://ec.europa.eu/health/state/country\\_profiles\\_en](https://ec.europa.eu/health/state/country_profiles_en).

Source: European Observatory on Health Systems and Policies & OECD, 2019.

While acknowledging the breadth of the concept, for operational (and assessment) purposes we propose to use a narrower and clearer definition that focuses on shocks which we consider to be **sudden and extreme (severe) changes which will impact on a health system**.

Examples of shocks include the COVID-19 pandemic and other health emergencies, such as Ebola (Kruk et al., 2015) and Zika virus, natural disasters such as hurricanes (Borger et al., 2006), the Global Financial Crisis of 2008 (Thomas et al., 2013; Reeves et al., 2014), and political conflicts resulting in mass migrations, such as the war in Syria (Ammar et al., 2016). Strategies to strengthen health system resilience and responses to disturbances that are sudden and unknown (although they can, to some extent, be anticipated) will be

inherently different from responses to disturbances that are known and chronic, such as population ageing, or from responses to everyday management of health systems.

We therefore define **resilience as the ability to prepare for, manage (absorb, adapt and transform) and learn from shocks**.

While we refer to shocks as extreme events, it is important to note that there are also different degrees of severity of health system shocks. The severity of the shock will determine how much resilience is needed to deal with it, as well as the nature of the strategic response (Blanchet et al., 2017). Hence, the scale and duration of the shock will most likely have an impact on health system performance. While understanding of shock severity is often intuitive, there have been attempts, for some types of shock, to define and quantify it. For example, Keegan et al. propose a measure for economic recession as an indicator of shock severity and evaluate how it impacts on health system funding (Keegan et al., 2012). The proposed measure is an index which combines the annual gross domestic product (GDP) loss, fall in employment and increase in public debt, over threshold levels (of 70% and 90% of debt-to-GDP ratios), on top of the duration of the recession in years of GDP decline. Authors find that there is a strong negative relationship between total health expenditure growth and recession severity, and this seems to be particularly pronounced for those countries with the deepest recessions and their impact on public spending.

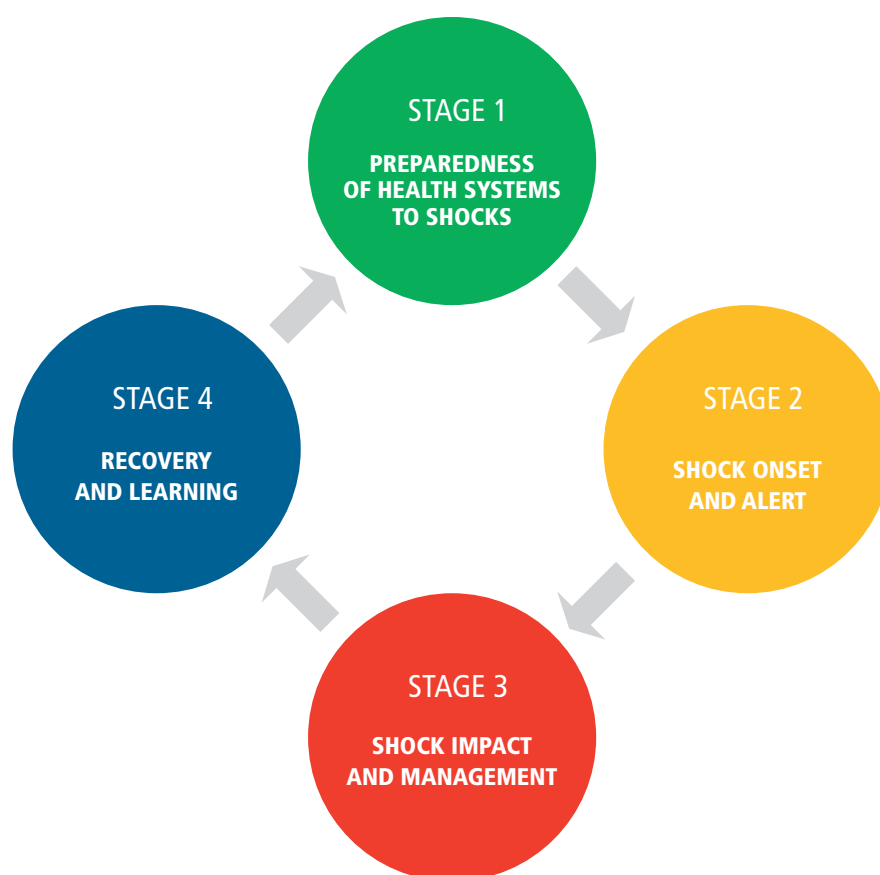
It is important to note that, while the concept of resilience involves a response to a shock, the experience of a shock is not a necessary precondition for a health system to be able to be judged as resilient: a resilient health system may be one that is *prepared* for the occurrence of a shock, but this shock may not necessarily happen.

There are debates in the literature on whether resilience is a good thing or not (particularly if the pre-shock system had many weaknesses) and whether bouncing back refers to a return to the original (pre-shock) state or is the transformation to a new, improved state (Olsson et al., 2015). Given the adaptive nature of health systems, the return to the pre-shock state is unlikely. As shocks typically involve changes to demand and supply, impacting communities, institutions and organizational culture, health systems will require at least some degree of adjustment. Such legacy issues may be both positive and negative (Burke et al., 2014). Hence, in terms of health systems performance, resilience is not only how a system absorbs a shock and adapts to it, but also **how it transforms and evolves – ideally into something better** (Thomas, 2013; Blanchet et al., 2017; Abimbola & Topp, 2018).

#### Resilience at different stages of the shock cycle

Looking at the stages of the shock cycle can help identify opportunities for enhancing resilience. Several stages can be distinguished within a shock cycle, which we summarize in Figure 1.

Figure 1: Stages of a shock cycle



Source: Authors' compilation.

### Stage 1: Preparedness of health systems to shocks

This stage is related to how open or vulnerable a system is to shocks (Kieny et al., 2014). It is the stage that offers the greatest scope for action and a time when much can be done to strengthen a health system as well as to consolidate existing resources. Overall, the better the performance of a health system, the more resilient it is. This, however, is not a necessity, as even health systems with varying degree of weakness can still be well prepared for a particular type of shock.

In this phase, the system needs to get ready for shocks before they happen and identify optimal responses. This requires some scanning of the horizon to anticipate what kinds of shock may be a realistic threat, as different threats may require different actions.

Learning from the Ebola outbreak, various preconditions have been specified as important for resilience (Kruk et al., 2015), including: collective responsibility across a network of actors; legalization and policy foundations which create accountability and mobilize all available resources (public and private); a strong and committed workforce

(empowered by good management and trust within the community). The problems of not being prepared and the potential ramifications for the health system are outlined in Box 2.

#### Box 2: Interaction of health system effects in reducing preparedness: Ebola and West Africa

Kentikelenis and colleagues argue that a number of factors weakened the health systems of three West African countries just prior to the Ebola outbreak, leaving them poorly prepared to deal with the shock. First, the introduction of economic reform programmes changed macro-economic governance in these countries. This had the effect of reducing the funds available to their health systems. Restricting health system financing was achieved by capping the public sector wage bill. This in turn impacted on the hiring and motivation of health workers and was associated with emigration of health personnel and reduced numbers of community health workers. Further, the governance reform emphasized decentralization, which may have undermined information flows and coordination. Consequently, the quality of health services delivery deteriorated in the years prior to the outbreak.

Source: Kentikelenis et al., 2015.

### Stage 2: Shock onset and alert

In this phase, the focus is on timely identification of the onset and type of the shock, which requires robust and comprehensive surveillance and early warning systems. Clearly, the earlier it is realized that a shock is occurring, the faster and more effective the response can be. For example, in the case of infectious diseases, early warning systems can detect sentinel disease cases or deviation from historical trends, triggering epidemiological investigations to determine whether an intervention is needed. The precondition for effective surveillance mechanisms is the ability to collect timely, complete, regular and good-quality information on a broad range of indicators. Such mechanisms can span beyond national borders, such as the Early Warning and Response System (EWRS) of the European Centre for Disease Prevention and Control (ECDC), which has played an important role in controlling serious cross-border threats to health, including the severe acute respiratory syndrome (SARS), Ebola, avian influenza, and, most recently, the spread of the novel coronavirus.

### Stage 3: Shock impact and management

As the shock impacts a health system and society at large, the response falls within the more traditional realm of resilience: absorption, adaptation and transformation. **Absorption** relates to incurring the system shock but protecting the health system from profound resource imbalance by making available additional resources, either from reserves or contingency planning. For example, countercyclicality of health financing is a mark of good governance and effective protection of health system funds from an economic shock (Keegan et al., 2012). **Adaptation** requires absorbing the additional demand or reduced supply, or both, by making the system more efficient (i.e. 'doing more with less' or by changing the allocation of resources). This may be a case of adapting delivery within the system (Thomas et al., 2013). When adaptation is not working or when all easy efficiencies have been made, the system may well need to change more fundamentally (**transform**) to cope with the impact of the shock. This may require a model radical rethinking of health system policy and the resourcing and delivery of care. This transformation process can sometimes compete with adaptation in relation to scarce governance capacity. The challenge of governance is managing the three aspects of absorption, adaptation and transformation, and the tensions between them, and knowing when to shift from one to another (see example in Box 3).

#### Box 3: Tensions between adaptation and transformation in Ireland during the economic crisis

There can often be difficulties in undertaking key reforms in times of austerity because of limited government capacity. A critical issue in Ireland emerged as to whether the government's headline reforms were getting the focus they required for full development and implementation.

A survey of government managers in Ireland showed that health service managers spent much of their time running the current system and on the immediate enactment of change-projects in the service of operational efficiency rather than on the implementation of the reform agenda. Over 25% of the managers' time was taken up with these two activities – living within budget and managing change. This imbalance occurred despite the managers themselves agreeing that such activities were of lower priority.

Source: Authors, based on Barry et al., 2017.

### Stage 4: Recovery and learning

This is the stage when the shock has disappeared and there is a return to some kind of normality. Despite the ending of the imbalance caused by the shock, there may still be significant changes to the system that are a legacy of the shock, so that the new normal is not like the old.

Typically, shocks involve changes in demand and supply, and there are frequently legacy issues for communities, institutions and culture as well as deliberate adaptation. Such legacy issues may be both positive and negative (Burke et al., 2014). For instance, staff may be demotivated or staffing capacity reduced. Households may also be in financial difficulties. These legacy aspects are quite different from the pre-shock situation despite the shock having ended. It is important to recognize what these system legacy components are and how they will continue to impact on the system and its performance. Not all legacy aspects are bad, as there may have been some efficiencies made in adapting to the shock. Hence, some legacy aspects should be encouraged to continue. Furthermore, the post-shock context may open up opportunities for effective change as balancing resources and need becomes easier (see Box 4 for an example from Greece). There may also be useful learning from the shock experience and its management, not only for improving the current system but also in relation to better handling of any future similar shock scenario.

#### Box 4: Recovery from the economic crisis and post-crisis reforms in Greece

Over the years following the economic crisis, Greece has been implementing an ambitious set of reforms aimed at strengthening its health system. It has addressed a number of key issues, such as fragmentation of benefits and coverage, excessive pharmaceutical spending and inefficient procurement. The post-crisis legislation ensured access to health care for the 2 million people who lost health coverage during the economic crisis and improved financial protection. Another notable area of weakness – the absence of effective primary care – has also come under scrutiny and is in the process of being addressed. The new primary care system introduced in 2017 is expected to result in better access to quality health care and a more rational and efficient use of existing services.

Source: OECD & European Observatory on Health Systems and Policies, 2019.

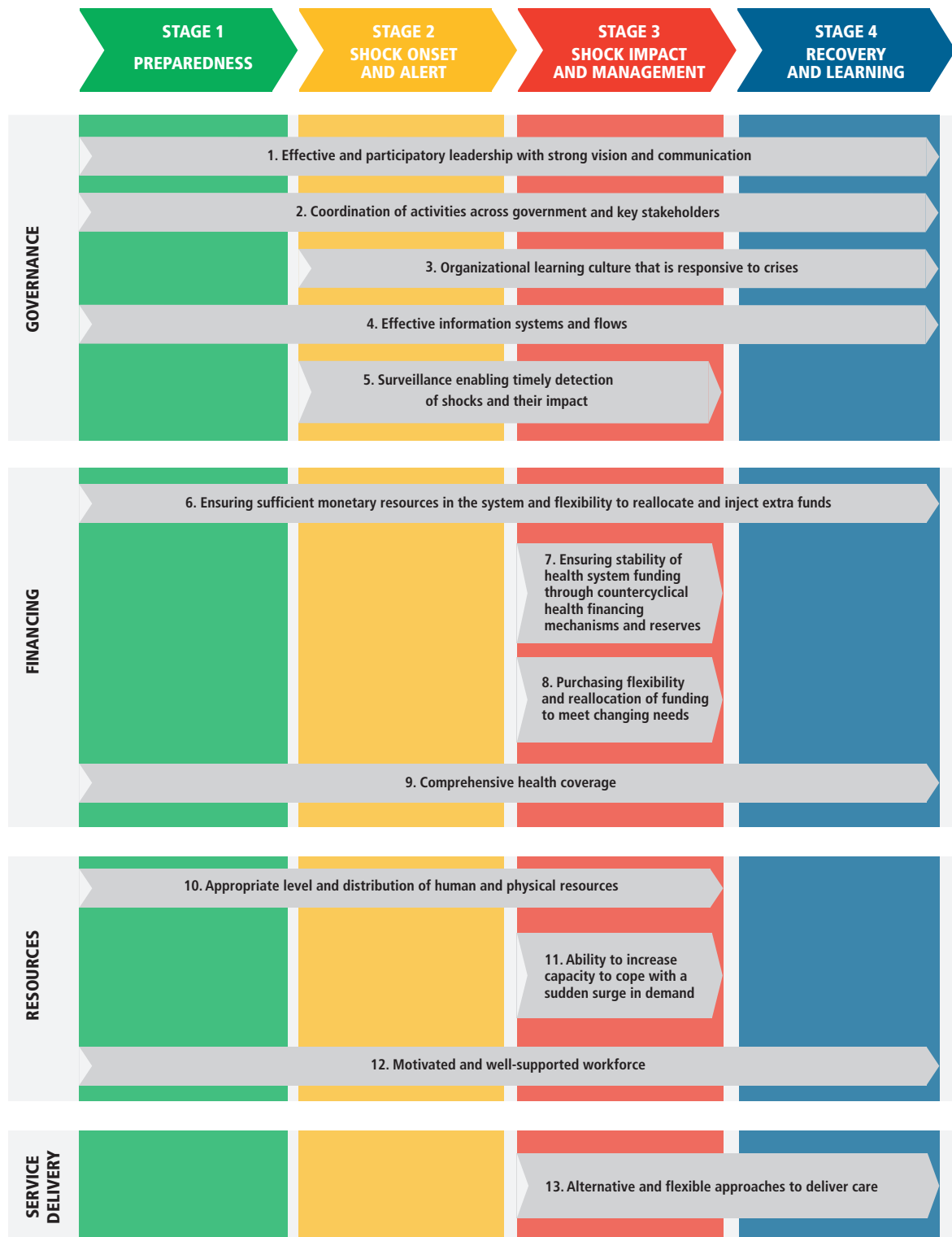
## What strategies make health systems more resilient?

Health systems are complex. Shocks thus create complex and sometimes unforeseen consequences on health systems. A whole system approach is therefore needed to understand

the ramifications of the shock in relation to the functioning of health systems and adopt the appropriate response (Olu, 2017).

In this section we explore a number of strategies for strengthening health systems resilience or for a resilient response to a shock, which we have distilled from the

Figure 2: Strategies to strengthen resilience by health system function and stage in the shock cycle



Source: Authors' compilation.

existing literature (see Annex 1) and emerging experiences of dealing with COVID-19. In Figure 2 we map them in relation to the key health systems functions and the stages in the shock cycle, although we recognize that such distinctions are almost never clear-cut and there are overlaps across stages as well as strategies. Indeed, in many instances these are desirable characteristics for a health system at any time. Here, however, we deliberately choose to attribute specific strategies to particular phases in the shock cycle in order to emphasize their increased relevance in these stages. Where relevant, we also provide examples of how these strategies have been used in real life, drawing on national experiences with the COVID-19 pandemic and other shocks.

### **(1) Effective and participatory leadership with strong vision and communication**

Effective leadership and decision-making underpin many of the other factors that determine resilience (Thomas et al., 2013; Greer et al., 2015; Barasa, Mbau & Gilson, 2018). For example, leadership is important for achieving effective coordination between various stakeholders (see Strategy (2) below). Effective leadership should be able to demonstrate that the health system plays a crucial role and is capable of preventing, detecting or effectively addressing a public health threat, with the greatest beneficiary being the whole of society, including the economy, transport, tourism and trade sectors. In addition, among the crucial features of effective leadership is the ability to demonstrate the benefits of health system strengthening for better resilience in a context where it can be difficult to convince decision-makers about the importance of prevention and preparedness. Leadership must show that investment in health systems is irreplaceable in the face of an imminent health emergency (Kluge et al., 2018), but also in its aftermath.

Communicating to the public transparently, creating trust and building support are also fundamental throughout all stages. This has been highlighted in the COVID-19 pandemic at a time when governments started to implement containment measures, such as physical distancing and lockdowns, where communication was crucial for the public to understand the need and importance of compliance with such measures as well as to maintain the motivation of the health workforce.

Ability to lead, however, often depends on a pre-existing legal mandate to do so. The International Health Regulations (IHR) provide a legal framework for their signatory countries to integrate capacity for the leadership role in case of health emergencies (Box 5).

#### **Box 5: International Health Regulations as a legal framework for strengthening global health security**

The International Health Regulations, or IHR (2005), represent an agreement between 196 State Parties, including all World Health Organization (WHO) Member States, to work together for global health security. Their aim is to prevent, protect against, control and respond to the international spread of disease while avoiding unnecessary interference with international traffic and trade. They

are also designed to reduce the risk of disease spread at international airports, ports and ground crossings. The IHR were first introduced in 1969 and initially covered only three infectious diseases: cholera, plague and yellow fever. In 2005, the scope was widened to include all events, including chemical and nuclear threats, that could lead to Public Health Emergencies of International Concern (PHEIC).

The responsibility for implementing the IHR rests upon all Member States that are bound by the Regulations and WHO. The Member States, including all of their sectors, ministries, levels, officials and personnel, are responsible for implementing the IHR at the national level. A minimum set of 'core capacities' is required from the signatories, including the ability to detect and assess events through surveillance systems and laboratories; notify and report events to WHO; and verify and respond immediately and appropriately to public health risks and emergencies. This requires the IHR to be embedded into national health systems, across all health system functions and in particular in the leadership and governance functions.

To date, WHO has declared five PHEICs: influenza A (H1N1) pandemic (2009); international spread of Polio (2014); Ebola epidemic in West Africa (2014); cluster of microcephaly and Guillain-Barré syndrome in the context of Zika epidemics (2016); and outbreak of 2019-nCoV on 30 January 2020.

Source: Based on Kluge et al., 2018.

### **(2) Coordination of activities across government and key stakeholders**

Once the shock strikes, there is often a strong need for coordinated action (Behague et al., 2009; Armstrong, 2010; Ager et al., 2015; Greer et al., 2015; Ammar et al., 2016; Barasa, Mbau & Gilson, 2018). This means ensuring effective collaboration across sectors, different levels of government, and between government and non-government stakeholders. This may further comprise establishing or intensifying cooperation channels with other governments and international institutions (Forman et al., 2020). For example, such channels were established among certain Asian countries during the SARS outbreak in 2003 and have been swiftly activated during the COVID-19 pandemic (Legido-Quigley et al., 2020). The IHR also place expectations on countries' capacity for coordination (multisectoral action, e.g., between health, transport, food, agriculture, the environment, etc.) in the event of a public health emergency (Kluge et al., 2018).

At the preparedness stage, specific preparations may relate to planning for particular shocks, resourcing those plans and practising responses or playing out specific scenarios to test the ability of the system to respond well to acute shocks, such as an epidemic or natural disaster. Emergency management plans for disease outbreaks (Achour & Andrew, 2010) and contingency plans for shortages of supplies (McManus et al., 2007) that include multilateral stakeholders may be very useful but must be followed and implemented fully. In further stages, piecemeal activity can result in delays in taking crucial actions. For example, as government does not always have population-wide reach in all health care services, effective collaboration with non-government actors is required in shock situations.

At the start of the COVID-19 pandemic, it became apparent that rapid implementation of public health measures and health system operations depend on effective coordination at all levels and between different sectors. In practice, achieving this often requires strong leadership and centralization of decision-making powers in order to align the priorities of bureaucracies across the whole of government. Initial evidence from the Health Systems Response Monitor (HSRM) platform has shown that many countries achieved this by using a declaration of a state of emergency and/or enacting emergency legislation (Greer et al., 2020).

### **(3) Organizational learning culture that is responsive to crises**

Having a culture in place to allow, and with experience of, learning and adaptation may also build resilience and facilitate timely use of evidence. This is vital for learning from successes and failures to ensure more effective responses during a shock and in the future (Naimoli & Saxena, 2018). Therefore, this is important not only in the last stage of the shock cycle, which involves dealing with the legacy issues and learning from the shock experience itself and how it was managed, but throughout the entire shock cycle.

It has been noted already that Asian countries that experienced SARS in 2003 had a rapid and more coordinated response to tackle the spread of COVID-19, which resulted in quicker and more effective containment, at least in the early stage of the shock (Legido-Quigley et al., 2020). Lessons learned from the economic crisis have shown that pre-existing health system weaknesses may exacerbate the negative impact of recessions on people (Hanefeld et al., 2018). This has been recognized in Greece, where the economic collapse has prompted a major health system transformation aimed at addressing some of the key weak points in the system (see Box 4).

### **(4) Effective information systems and flows**

Health information systems are at the core of the decision-making throughout any policy process. Systems of sharing critical information with stakeholders are vital and may well be part of the planning needed when policy response is being prepared. Kruk et al. highlight the importance of knowing a list of key decision-makers across sectors and having functional communication channels involving both hard infrastructure (phone, Wi-Fi, etc.) and soft infrastructure (free press, community committees, free speech, NGOs, unions) (Kruk et al., 2015). While surveillance is particularly important in the early stages of a shock onset and for its management (see Strategy (5) on surveillance below), it builds primarily on the existing effective information flows and knowledge generation that allow decision-makers and managers to react quickly to cope with problems and make effective decisions around the best response. Conversely, poor information systems and interrupted flows may well undermine any kind of effective preparation for and timely management of a shock (Armstrong 2010; Thomas et al., 2013; Kruk et al., 2017; Ling et al., 2017).

### **(5) Surveillance enabling timely detection of shocks and their impact**

Surveillance systems need to have the ability to detect, verify and track events in real time or as soon as possible. Moreover, they need to ensure that data reaches all relevant stakeholders and can be rapidly transformed into useful information for decision-making. As Kluge and colleagues note (Kluge et al., 2018), this implies a good integration of surveillance mechanisms, including alert mechanisms, clinical and laboratory services, survey results, data on resources, evidence synthesis and communication activities. In practice, this integration is often insufficient and sometimes absent altogether (Kluge et al., 2018), hindering the ability of countries to timely detect the onset of a shock and provide meaningful information for its management.

In relation to specific shocks, several authors talk about the importance of having surveillance systems in place to provide early warning (Hanefeld et al., 2018), whether in relation to an Ebola outbreak or other epidemic (Ling et al., 2017; Barasa, Mbau & Gilson, 2018) or large movements of refugees (Ammar et al., 2016). In the case of the financial crisis, while there were very sensitive (including real-time) alert systems in place to detect and monitor financial and economic indicators, there was a lag of a year or two until meaningful and comparable data on the impact on health and health systems became available.

### **(6) Ensuring sufficient monetary resources in the system and flexibility to reallocate and inject extra funds**

A key aspect of resilience is ensuring first and foremost that there is enough money available to the health system and that, in the event of a crisis, those monetary resources can be easily deployed and made available where needed. This goes beyond simply a consideration of historical health spending levels to include the ways budgets are formulated, approved, executed and evaluated (Gupta & Barroy, 2020). To be resilient in the face of crisis, it should be possible to direct money where it is needed and quickly. This may be facilitated in some countries by accumulating national reserves, whereas others may have rules in place that allow for money to be reprogrammed towards the health system when it is needed. The consequences of insufficient monetary resources during a crisis could mean that those who need services are unable to obtain them, or that costs may be shifted onto households through higher out-of-pocket (OOP) payments. Indeed, a resilient response may mean that government temporarily increases funding to health care and lowers user fees so patients can continue to access services (Thomas et al., 2013; Olu, 2017). This strategy applies to governance of financing at the state level, which is beyond the health system; sustainable financing within health systems is discussed in Strategy (7), and reallocation within the health system is discussed in Strategy (8).

In the COVID-19 response, many countries have injected additional funds into their health systems (Cylus, 2020). For example, Lithuania managed to rapidly allocate a substantial amount of additional funds towards its health system by

drawing on government and state reserves, National Health Insurance Fund reserves and social insurance reserves to cover a wide range of purposes, including equipment, salaries, supplementary social security coverage for COVID-19 health workers and improvements in procurement. Other countries (e.g. Austria, Croatia, Estonia, Latvia, Poland and Serbia) were able to make additional funds available in the health system by channelling money through existing purchasing agencies, which meant there were comparatively fewer administrative hurdles to actually spend the money since purchasing mechanisms were already in place.

### **(7) Ensuring stability of health system funding through countercyclical health financing mechanisms and reserves**

Health systems are funded predominantly through taxation and social contributions in most countries. Shocks will often have an impact on the sources of these funds, including on households who contribute through taxes and contributions from their labour and other income, on consumption patterns, and on businesses, among others. The key to ensuring a resilient health system is to create health financing mechanisms that are impervious to any effects of shocks (which can be quite challenging), to accumulate reserves within a health system, or to create automatic stabilizers that spring into action in the presence of a shock (Box 6 provides one such example from Lithuania). Indeed, while population ageing itself is not a shock, analysis of how population ageing affects the ability to generate revenues for health shows how even slow shifts in age-demographics can lead to instability for revenue generation as older people age out of the labour force (Cylus et al., 2019).

#### **Box 6: Countercyclical mechanisms to protect public budget for health in Lithuania during the 2008 economic crisis**

One of the countries most severely affected by the deep recession during the 2008 global economic crisis was Lithuania. In 2009, its GDP fell by 15% compared to the previous year, and unemployment increased from 4.3% in 2007 to 17.8% in 2010 (Eurostat, 2019). While the country's economy was very vulnerable, its health system financing – despite reliance mainly on employment contributions to the health insurance fund – remained fairly stable. This was as a result of two key features, implemented before the crisis, which helped to maintain the public budget. First, employment contributions were countercyclical, i.e. they were tied retrospectively to the level of salaries earned two years prior. Second, as about half the population is economically inactive and contributions for this group are made by the state, the level of state contributions was set to increase year-on-year despite the recession, due to a legislative initiative predating the crisis. Therefore, the public budget for health was largely insulated from the effects of rising unemployment and falling incomes.

Source: Kacevicius & Karanikolos, 2015.

### **(8) Purchasing flexibility and reallocation of funding to meet changing needs**

When a shock occurs, there may be a need for changes in purchasing to keep the system operational. This could be because of significant shifts in demand for certain types of care and a need to redirect resources, or it could also be that

certain provider behaviours need to be incentivized and purchasing is a useful mechanism to accomplish this. For example, a crisis may result in more purchasing from private providers who do not usually participate in a publicly funded health system. This has occurred in the COVID-19 crisis and some countries, such as Spain and Ireland, had to tap into private sector capacity to meet excessive demands on public sector providers. However, developing ways to purchase from these providers, who may not have had any historical relationship with the statutory health system, can be challenging unless there are mechanisms in place or the ability to overstep regulatory barriers. Other countries, including Belgium, have created new billing codes to reimburse and incentivize telemedicine, since in-person consultations are widely discouraged.

Another example of how purchasing mechanisms may need to be changed to respond to a shock also comes from the COVID-19 crisis, but relates to how there have been significant changes in use patterns, as countries have restricted non-urgent care to free up resources for COVID-19 patients. While this has been a necessary shift in the short term, it means that providers that rely on volume-based payments will suffer cash-flow issues. In response to this, some countries have made rapid changes to the way they purchase services. In Hungary, for example, hospitals are being paid based on global budgets instead of diagnosis-related groups (DRGs), since purchasing using the latter would result in significant disruptions to hospital revenues. This way, hospitals have a better chance of remaining solvent and weathering the crisis.

### **(9) Comprehensive health coverage**

It goes without saying that a comprehensive and evidence-based package of properly resourced, organized and distributed services gives the best chance for health care activities to be maintained in the presence of many shocks (Olu, 2017; Therrien, Normandin & Denis, 2017). Countries closer to attaining universal health coverage are therefore more resilient. In countries where services are not covered or where there are high OOP payments for services, people may face barriers to accessing services, and these exacerbate in a crisis (Thomson et al., 2015). This is especially concerning where vulnerable groups are already excluded from the statutory health system, as they are the most likely to be unable to use services and may be most severely affected by a crisis. Additionally, if there is not a sufficiently comprehensive set of services available ex ante, it will be challenging to rapidly deploy new necessary services and scale up to meet needs.

Lack of comprehensive coverage design became apparent during the economic crisis in Greece. With unemployment increasing to 27% by 2014, people unable to find jobs also became ineligible for health insurance coverage. This led to over 2 million people losing coverage, and to a third of households in the poorest income quintile declaring an unmet health care need (Karanikolos & Kentikelenis, 2016). Legislative measures adopted in 2016 provided health coverage for this and many other excluded groups, leading to a substantial decrease in unmet health care needs (Eurostat, 2020). Many countries decreased or removed user



charges during the economic crisis to increase access to health services (Thomson et al., 2015). Suspension of user charges, including co-payments for non-COVID-19 health services, has been used as one of the strategies to remove barriers to accessing health services during the COVID-19 pandemic. It has also been used to enable innovations in service delivery (Thomson, Habicht & Evetovits, 2020). Belgium, for example, initiated teleconsultations in primary care in order to ensure access to essential care while at the same time preventing the spread of the virus by avoiding direct contact between patients and health professionals. To support access to this new method of service delivery, user charges for teleconsultations have been removed.

### **(10) Appropriate level and distribution of human and physical resources**

General preparation for any shock may include ensuring that health system resources, both human and physical, are sufficient and adequately distributed. In terms of workforce, this means appropriate levels of staffing for doctors, nurses and other health care personnel. For infrastructure, this not only means that there are enough hospitals and hospital beds, but that infrastructure allows services (emergency, primary and specialist care) to be delivered in the appropriate setting. In case of a crisis, having sufficient and appropriately distributed resources can buy time to increase capacity (see Strategy (11)) and provide the necessary flexibility. In contrast, going into a shock with existing shortages of staff and resources, or routinely operating on maximum capacity, may exacerbate existing gaps in access to care and undermine the response (Thomas et al., 2013; Ager et al., 2015; Barasa, Mbau & Gilson, 2018).

### **(11) Ability to increase capacity to cope with a sudden surge in demand**

Experience of various crises, including the economic crisis and, more recently, the COVID-19 pandemic, shows that a degree of embedded excess or 'surge capacity' in the system allows an effective response to a rapid increase in demand (Therrien, Normandin & Denis, 2017). Nevertheless, there is also a view that building too much preparedness to avoid a specific disaster, called 'over-optimization', might increase system vulnerability to other unanticipated shocks and stresses if it does not result in overall health system strengthening from the outset (Abimbola & Topp, 2018).

Yet, it is clear that if the needed resources are in place or if there is a mechanism to deploy them quickly, the system is better equipped to cope with a sudden surge in demand. In case of large-scale crises, such as COVID-19, surges in demand for intensive care beds, medical equipment and personal protective equipment (PPE) have exceeded national stocks, and international collaborative mechanisms, such as in the area of procurement (e.g. the Joint Procurement Agreement in the EU) or cross-border medical treatment, were employed. Surge capacity may also be released by delivering services in new, innovative ways. The use of telemedicine for primary care consultations provides one example of such innovation (see strategies (9) and (13)).

During the COVID-19 pandemic, multiple strategies have been implemented ad hoc to expand the capacity of the

existing workforce in the short term (Maier, Scarpetti & Williams, 2020). These strategies have included asking health professionals to work extra hours, including moving from part-time to full-time work, modifying work schedules and cancelling leaves of absence. This has often been underpinned by emergency legislation. Further, most countries have called upon medical and nursing students to work in clinical practice. Some countries have also taken measures to bring retired, inactive or foreign-trained but unregistered health professionals into the workforce, have redeployed private sector workers into the public sector and asked volunteers to support the response.

More complex reforms, such as changing the skill-mix of health workers, may also be employed to boost capacity in the longer term (see Strategy (13)).

### **(12) Motivated and well-supported workforce**

In many ways, resilience depends on the actions of staff under duress (Borger et al., 2006; Ager et al., 2015; Barasa, Mbau & Gilson, 2018; Alameddine et al., 2019). As health workers may be at the front line of response to certain types of shock, they are also among the groups who are hit the hardest, particularly in the case of disease outbreaks. Moreover, a long duration of the shock may undermine motivation if there is not very careful management and support (Williams & Thomas, 2017; Hiam, McKee & Dorling, 2020).

Having a robust, flexible and well-motivated workforce seems to be a critical element of preparedness, which allows adaptability in response to any shock (Barasa, Mbau & Gilson, 2018). Well-motivated and supported staff, in terms of effective human resource management and conditions, are more likely to temporarily take on extra burdens to see the system through a transition. In cases where health care staff need to be redeployed to meet a surge in demand, training and existing long-term planning for health workforce development becomes crucial.

### **(13) Alternative and flexible approaches to deliver care**

With a shock, the balance between supply and demand gets disrupted, requiring better management of resources to meet the needs (see also Strategy (11) on coping with surge demand). This may require an efficiency-enhancing response, e.g. shifting of activity to lower-cost modes or settings, or changing the mix of health professionals to deliver care. Shocks may also change the efficiency of service delivery in some activities and it is important to have the flexibility to respond (Thomas et al., 2013; Ager et al., 2015; Barasa, Mbau & Gilson, 2018).

While care delivery pathways are important for service coordination and continuity, and therefore need to be well-defined, there may be a need to have alternative, accessible pathways in case there are disruptions to standard pathways.

The initial strategy of multiple countries during the COVID-19 pandemic was to temporarily postpone planned health care to differing extents, while countries developed and/or expanded alternative service delivery routes (Panteli, 2020). This, however, has led to a notable reduction in the use of both planned and emergency services at least in some countries (e.g. UK, US, Spain, Finland), with clinicians raising

concerns about the decrease in people accessing essential care and the potential adverse impact of this on health (Illman, 2020; Krumholz, 2020). The significant pent-up demand for non-pandemic related care is likely to burden country health systems once the spread of the virus has been contained.

Having extra flexibility of service provision may allow the system to temporarily cope with unexpected barriers and gives time to adjust whilst still maintaining provision and access to essential care (Therrien, Normandin & Denis, 2017; Barasa, Mbau & Gilson, 2018). As already mentioned (see Strategy (9)), during the COVID-19 pandemic, some countries implemented novel ways of service delivery, such as teleconsultations in primary care. Such innovations may work as short-term solutions in a crisis situation, but it should be carefully considered if they are worth continuing thereafter. A review of emerging evidence (Nolte, 2018) has found that alternatives to face-to-face consultations, such as via the telephone or online consultations, are unlikely to

reduce demand or save costs and may at times compromise patient safety through a tendency to overprescribe, particularly antibiotics and analgesics. The intended and unintended consequences of an innovation should be carefully assessed before it is introduced more permanently.

In a severe or prolonged crisis, once relatively simpler reforms have been implemented, policy-makers may have to resort to more complex changes, possibly requiring additional investment, in order to enhance efficiency, quality and access in the longer term (Thomson et al., 2015). Such reforms include moving care away from hospitals and greater use of health technology assessment to inform care delivery and changes, and numerous countries have implemented such reforms during the recent economic crisis. A small number of countries introduced skill-mix changes to shift primary care tasks to nurses. Slovenia, for example, shifted general practitioner (GP) preventive activities to registered nurses in order to reduce GP workload and referrals to secondary care.

**Table 1: Examples of assessment areas grouped by resilience-enhancing strategy**

Strategy	Examples of assessment areas
<b>Governance</b>	
<b>1. Effective and participatory leadership with strong vision and communication</b>	<ul style="list-style-type: none"> <li>• Set of contingency plans and protocols, emergency legislation</li> <li>• Functional management capacity for governance</li> <li>• Stakeholder participation and engagement</li> <li>• Leadership/steering and clear chain of command</li> <li>• Accountability of government agencies</li> <li>• Effective governance structures (transparency, accountability, stakeholder involvement)</li> <li>• Clear and feasible plan for response measures</li> <li>• Setting strategic direction</li> <li>• Established public trust in response agencies</li> <li>• Effective communication</li> </ul>
<b>2. Coordination of activities across government and key stakeholders</b>	<ul style="list-style-type: none"> <li>• Collaboration between sectors</li> <li>• Agreements with relevant actors (e.g. international agencies, non-state providers, NGOs)</li> </ul>
<b>3. Organizational learning culture that is responsive to crises</b>	<ul style="list-style-type: none"> <li>• Innovative organizational culture, culture of learning</li> <li>• Use of feedback and analysis in informing decision-making</li> <li>• Mechanisms to assess, audit and learn from response to shock and implement change</li> </ul>
<b>4. Effective information systems and flows</b>	<ul style="list-style-type: none"> <li>• Flow of information between stakeholders, data-sharing mechanisms</li> <li>• Flow of data, information and analysis into decision-making and evaluation</li> <li>• Mechanisms of timely dissemination of guidelines and protocols</li> <li>• Communication infrastructure (hard: phone, Wi-Fi; soft: press, community, NGOs)</li> <li>• Existence of data collection and linkage systems</li> </ul>
<b>5. Surveillance enabling timely detection of shocks and their impact</b>	<ul style="list-style-type: none"> <li>• Epidemiological surveillance and early warning systems</li> <li>• Existence of mechanisms to identify change in need and access to services</li> </ul>

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Strategy	Examples of assessment areas
<b>Financing</b>	
<b>6. Ensuring sufficient monetary resources in the system and flexibility to reallocate and inject extra funds</b>	<ul style="list-style-type: none"> <li>• Levels of spending on health (total, public, and as a share of government spending)</li> <li>• Equitable geographical distribution of health expenditure</li> <li>• Information on public financial management</li> </ul>
<b>7. Ensuring stability of health system funding through countercyclical health financing mechanisms and reserves</b>	<ul style="list-style-type: none"> <li>• Countercyclical financing mechanisms in place to cushion financial impact of shocks</li> <li>• Protected funding for health care, e.g. earmarked funds for health care</li> <li>• Financial reserves available for deployment in health shocks</li> <li>• Change in health spending vs change in government deficit and GDP</li> </ul>
<b>8. Purchasing flexibility and reallocation of funding to meet changing needs</b>	<ul style="list-style-type: none"> <li>• Development of alternative procurement channels</li> <li>• Ability to make rapid changes to purchasing mechanisms</li> <li>• Reallocation of funding to different providers or activities</li> </ul>
<b>9. Comprehensive health coverage</b>	<ul style="list-style-type: none"> <li>• Universal/effective health coverage (including vulnerable groups)</li> <li>• Public knowledge of entitlements</li> <li>• Out-of-pocket payments as share of total health spending</li> <li>• Catastrophic/impoverishing health spending</li> <li>• Existence/broadening of exemptions from user fees</li> </ul>
<b>Resources</b>	
<b>10. Appropriate level and distribution of human and physical resources</b>	<ul style="list-style-type: none"> <li>• Capacity of diagnostics, primary and specialist care</li> <li>• Availability of pharmaceuticals and medical products, vaccines and equipment</li> <li>• Mapping of health service providers (location, type, opening hours, accessibility)</li> <li>• Numbers of doctors and nurses and their workload</li> <li>• Workforce mapping (location, availability, competencies)</li> </ul>
<b>11. Ability to increase capacity to cope with a sudden surge in demand</b>	<ul style="list-style-type: none"> <li>• Ability to increase capacity of services (e.g. existence of waiting lists, occupancy rates)</li> <li>• Ability to increase number of health professionals and their workload, workforce reserves</li> <li>• Existence of an agency responsible for emergency supplies</li> </ul>
<b>12. Motivated and well-supported workforce</b>	<ul style="list-style-type: none"> <li>• Health workers job satisfaction</li> <li>• Health worker absenteeism</li> <li>• Staff support mechanisms, helplines</li> <li>• Ensuring safety of health workers</li> </ul>
<b>Service delivery</b>	
<b>13. Alternative and flexible approaches to deliver care</b>	<ul style="list-style-type: none"> <li>• Crisis preparedness training, cross-training for additional skills</li> <li>• Training of health workers to treat specific or at-risk population groups</li> <li>• Ensuring provision of services for at-risk population groups</li> <li>• Maintenance of quality and safety standards across all services</li> </ul>

Source: Authors' compilation.

## Assessing health systems resilience

Identifying measures of resilience is helpful to understand: how well a country responds to crises affecting its health system; establishing potential sources of vulnerability; and planning for further action. This can be done regularly and methodologies for such evaluations have been suggested by the OECD (OECD, 2014) and the OECD with European Observatory on Health Systems and Policies (European Observatory on Health Systems and Policies & OECD, 2019) for the overall health system (the latter adopts a broader definition of resilience compared to the one used in this brief; see Box 1), or for specific risks, e.g. refugee crises (WHO, 2016). The challenge with more regular reviews is to anticipate the nature of the shock and cover the range of metrics and strategies that are most appropriate. Resilience can also be assessed after the crisis, providing an evaluation of the handling of the crisis.

However, despite recent interest in measuring resilience, there is recognition that the concept of resilience remains poorly operationalized (Ager, Annan & Panter-Brick, 2013; Global Symposium on Health System Research, 2016). In this section we thus focus on identifying assessment areas for resilience in relation to the strategies identified above. These assessment areas, which we list in Table 1, are drawn from two sources. First, we conducted a rapid review of indicators used in assessing resilience across a variety of different country contexts. These findings are summarized in Table A.3 in the Annex. Nevertheless, it is important to keep in mind that not all metrics are always appropriate, as their selection depends on the purpose of the assessment, and their interpretation depends on multiple contextual factors, for example a country's potential exposure to shocks, or the phase in the shock cycle. Still, those assessment areas can be a useful starting point and encourage policy-makers to think about metrics that are appropriate in a particular country context. Second, we complemented the list of examples of assessment areas with those that may also be relevant to resilience but may have been used in a broader context of health system strengthening.

## Conclusions

The risk and frequency of shocks would appear to be increasing globally whether from global warming, new epidemics, or economic uncertainty and changing geopolitics. It is essential in a new volatile era for national leaders and policy-makers to be able to prepare for, steer and manage their health systems through various shocks. This is currently being demonstrated by the emergence and rapid spread of COVID-19 that is putting to the test not only health care preparedness and infection control mechanisms across the world, but also robustness of supply chains and markets, threatening to damage the global economy and, as a consequence, having a human cost far beyond the impact of the disease itself (Gulland, 2020). Understanding health system resilience has never been more essential. This policy brief and the subsequent one focusing specifically on health

systems resilience in the context of the COVID-19 pandemic have been devised to help fill this important gap in evidence.

In this policy brief we highlight the key features of resilience and provide examples of important strategies to strengthen resilience, including their real-life applications and suggestions on how to assess them.

The essence of a resilient health system response is absorption, adaptation and transformation where necessary. Nevertheless, preparing for shocks, prompt identification of their onset and features, and learning from them in the aftermath are also important needs for a resilient health system. In particular, a neglected area of focus has been learning from the management of shocks and dealing with their legacy to build better health system performance. How one shock can lead to another or can cause a legacy of health system weakness may also be important to consider. For instance, health professional emigration after a health system shock may mean not only that a health system performs less well but that it is also less able to respond to future shocks to the health system.

A key finding from much of the literature is that well-functioning, adequately resourced, managed and organized health systems are more resilient. As a minimum, a comprehensive package of services provided by a well-motivated cadre of health professionals in appropriate settings, along with effective partnerships and information systems, plus access to reserves or a degree of stability in funding mechanisms form a strong basis from which to handle a shock. Still, preparedness by itself is not a guarantee of resilience when a shock happens and therefore shock management strategies are also critical. This requires effective leadership to mobilize and coordinate all available resources, including motivating a stretched workforce, deploying financial reserves and maintaining and in some cases expanding financial disbursements, as well as adapting service delivery and purchasing mechanisms to help ensure health system capacity, along with providing good information flows to decision-makers.

Given the wide range of contexts to which resilience can be applied, a list of examples of assessment areas has been compiled to offer broad guidance to those assessing resilience. Ultimately, the choice of the assessment areas will be informed by the type and severity of the shock, stage in the shock cycle and the particular country context.

It is important for policy-makers to review their health systems to regularly assess their resilience and address any weaknesses (Forman et al., 2020). In addition, identifying possible risks relevant to their health systems will be a useful next step alongside highlighting which parts of the system are most susceptible to impact. Understanding the pathways of different shocks helps policy-makers prepare for problems but also manage them better when they occur. General health system strengthening will do much to better prepare for and withstand shocks. Nevertheless, specific targeting of identified weak areas may not only help resilience but also the overall health system performance.

## References

- Abimbola S, Topp SM (2018). Adaptation with robustness: The case for clarity on the use of 'resilience' in health systems and global health. *BMJ Global Health*, 3(1):e000758.
- Achour N, Andrew DFP (2010). Resilience strategies of healthcare facilities: Present and future. *International Journal of Disaster Resilience in the Built Environment*, 1(3):264–276.
- Adger WN (2006). Vulnerability. *Global Environmental Change*, 16(3):268–281.
- Ager A, Annan J, Panter-Brick C (2013). *Resilience: From conceptualization to effective intervention*. Policy Brief for Humanitarian and Development Agencies. New York, International Rescue Committee.
- Ager A et al. (2015). Health service resilience in Yobe state, Nigeria in the context of the Boko Haram insurgency: A systems dynamics analysis using group model building. *Conflict and Health*, 9(1):30.
- Alameddine M et al. (2019). Resilience capacities of health systems: Accommodating the needs of Palestinian refugees from Syria. *Social Science & Medicine*, 220:22–30.
- Ammar W et al. (2016). Health system resilience: Lebanon and the Syrian refugee crisis. *Journal of Global Health*, 6(2):020704.
- Armstrong J (2010). Risk equalisation and voluntary health insurance markets: The case of Ireland. *Health Policy*, 98(1):15–26.
- Barasa EW, Cloete K, Gilson L (2017). From bouncing back, to nurturing emergence: Reframing the concept of resilience in health systems strengthening. *Health Policy and Planning*, 32(suppl 3):iii91–iii94.
- Barasa E, Mbau R, Gilson L (2018). What is resilience and how can it be nurtured? A systematic review of empirical literature on organizational resilience. *International Journal of Health Policy and Management*, 7(6):491–503.
- Barry S et al. (2017). 'Is someone going to saw off the plank behind me?' – Healthcare managers priorities, challenges and expectations for service delivery and transformation during economic crisis. *Health Systems and Policy Research*, 4(1):1–7.
- Behague D et al. (2009). Evidence-based policy-making: The implications of globally-applicable research for context-specific problem-solving in developing countries. *Social Science and Medicine*, 69(10):1539–1546.
- Blanchet K et al. (2017). Governance and capacity to manage resilience of health systems: Towards a new conceptual framework. *International Journal of Health Policy and Management*, 6(8):431–435.
- Borger C et al. (2006). Health spending projections through 2015: Changes on the horizon. *Health Affairs (Millwood)*, 25(2):w61–w73.
- Bozorgmehr K et al. (2020). COVID and the convergence of three crises in Europe. *Lancet Public Health*, 5(5):e247–e248.
- Burke S et al. (2014). Indicators of health system coverage and activity in Ireland during the economic crisis 2008–2014 – from 'more with less' to 'less with less'. *Health Policy*, 117(3):275–278.
- Castleden M et al. (2011). Resilience thinking in health protection. *Journal of Public Health*, 33(3):369–377.
- Cylus J (2020). How much additional money are countries allocating to health from their domestic resources? COVID-19: *Health Systems Response Monitor – Cross-Country Analysis* (<https://analysis.covid19healthsystem.org/index.php/2020/05/07/how-much-additional-money-are-countries-putting-towards-health>, accessed 30 May 2020).
- Cylus J et al. (2019). Sustainable health financing with an ageing population: Implications of different revenue raising mechanisms and policy options. *Economics of Healthy and Active Ageing*. Copenhagen, WHO Regional Office for Europe.
- European Commission (2014). *Communication from the Commission: On effective, accessible and resilient health systems*. Brussels, European Commission (<https://eur-lex.europa.eu/legal-content/en/ALL/?uri=CELEX:52014DC0215>, accessed 30 May 2020).
- European Commission (2017). *State of Health in the EU: Country health profiles series*. Brussels, European Commission ([https://ec.europa.eu/health/state/country\\_profiles/2017\\_en](https://ec.europa.eu/health/state/country_profiles/2017_en), accessed 30 May 2020).
- European Commission (2019). *State of Health in the EU: Country health profiles series*. Brussels, European Commission ([https://ec.europa.eu/health/state/country\\_profiles\\_en](https://ec.europa.eu/health/state/country_profiles_en), accessed 30 May 2020).
- European Observatory on Health Systems and Policies, OECD (2019). *Template for the State of Health in the EU 2019*. EU country health profiles (Background Note). Brussels, European Commission.
- Eurostat (2019). *Economic indicators*. Luxembourg, European Commission (<https://ec.europa.eu/eurostat/cache/infographs/economy/desktop/index.html>, accessed 30 May 2020).
- Eurostat (2020). *Self-reported unmet needs for health care*. EU-SILC (<https://ec.europa.eu/eurostat/data/database>, accessed 30 May 2020).
- Forman R et al. (2020). 12 lessons learned from the management of the coronavirus pandemic. *Health Policy*, <https://doi.org/10.1016/j.healthpol.2020.05.008>.
- Global Symposium on Health System Research (2016). *Vancouver Statement for the Fourth Global Symposium on Health Systems Research* (<https://www.ddcf.org/globalassets/african-health-initiative/vancouver-statement-final.pdf>, accessed 30 May 2020).

- Greer SL et al. (2015). Towards intersectoral governance: Lessons learned from health system governance. *Public Health Panorama*, 1(2):128–132.
- Greer S et al. (2020). How are countries centralizing governance and at what stage are they doing it? *COVID-19: Health Systems Response Monitor – Cross-Country Analysis* (<https://analysis.covid19healthsystem.org/index.php/2020/04/19/how-are-countries-centralizing-governance-and-at-what-stage-are-they-doing-it>, accessed 30 May 2020).
- Gulland A (2020). ‘The pandemic is not over’: WHO chief urges Europe to brace for second wave. *The Telegraph*. London, Telegraph Media Group Limited.
- Gupta S, Barroy H (2020). *The COVID-19 crisis and budgetary space for health in developing countries*. Center for Global Development (<https://www.cgdev.org/blog/covid-19-crisis-and-budgetary-space-health-developing-countries>, accessed 30 May 2020).
- Hanefeld J et al. (2018). Towards an understanding of resilience: Responding to health systems shocks. *Health Policy and Planning*, 33(3):355–367.
- Hiam L, McKee M, Dorling D (2020). The NHS has been run on the goodwill of its staff for too long. *BMJ Opinion* (<https://blogs.bmj.com/bmj/2020/04/07/the-nhs-has-been-run-on-the-goodwill-of-its-staff-for-too-long>, accessed 30 May 2020).
- Illman J (2020). Coronavirus response could create ‘very serious unintended consequences’. *HSJ: Policy and Regulation* (<https://www.hsj.co.uk/policy-and-regulation/coronavirus-response-could-create-very-serious-unintended-consequences/7027321.article>, accessed 30 May 2020).
- Kacevicius G, Karanikolos M (2015). The impact of the crisis on the health system and health in Lithuania. In: Maresso A et al., eds, *Economic crisis, health systems and health in Europe: Country experience*. Observatory Studies Series. Copenhagen, WHO Regional Office for Europe: 217–246.
- Kamal-Yanni M (2015). *Never again: Building resilient health systems and learning from the Ebola crisis*. Oxfam Briefing Paper ([https://www-cdn.oxfam.org/s3fs-public/file\\_attachments/bp-never-again-resilient-health-systems-ebola-160415-summ-en.pdf](https://www-cdn.oxfam.org/s3fs-public/file_attachments/bp-never-again-resilient-health-systems-ebola-160415-summ-en.pdf), accessed 30 May 2020).
- Karanikolos M, Kentikelenis A (2016). Health inequalities after austerity in Greece. *International Journal for Equity in Health*, 15:83.
- Keegan C et al. (2012). Measuring recession severity and its impact on healthcare expenditure. *International Journal of Health Care Finance and Economics*, 13(2):139–155.
- Kentikelenis A et al. (2015). The International Monetary Fund and the Ebola outbreak. *Lancet Global Health*, 3(2):e69–e70.
- Khan Y et al. (2018). Public health emergency preparedness: A framework to promote resilience. *BMC Public Health*, 18(1):1344.
- Kieny M-P, Dovlo D (2015). Beyond Ebola: A new agenda for resilient health systems. *Lancet*, 385(9963):91–92.
- Kieny M-P et al. (2014). Health-system resilience: Reflections on the Ebola crisis in western Africa. *Bulletin of the World Health Organization*, 92(12):850.
- Kluge H et al. (2018). Strengthening global health security by embedding the International Health Regulations requirements into national health systems. *BMJ Global Health*, 3(suppl 1):e000656.
- Kruk ME et al. (2015). What is a resilient health system? Lessons from Ebola. *Lancet*, 385(9980):1910–1912.
- Kruk ME et al. (2017). Building resilient health systems: A proposal for a resilience index. *BMJ (Clinical research ed)*, 357:j2323.
- Krumholz HM (2020). Where have all the heart attacks gone? *New York Times*. New York, The New York Times Company.
- Kutzin J, Sparkes SP (2016). Health systems strengthening, universal health coverage, health security and resilience. *Bulletin of the World Health Organization*, 94(1):2.
- Legido-Quigley H et al. (2020). Are high-performing health systems resilient against the COVID-19 epidemic? *Lancet*, 395(10227):848–850.
- Lewis M, Pettersson G (2009). *Governance in health care delivery: Raising performance*. Policy Research Working Paper 5074. Washington DC, The World Bank.
- Ling EJ et al. (2017). Beyond the crisis: Did the Ebola epidemic improve resilience of Liberia’s health system? *Health Policy and Planning*, 32(suppl 3):iii40–iii47.
- Maier CB, Scarpetti G, Williams GA (2020). What strategies are countries using to expand health workforce surge capacity to treat COVID-19 patients? *COVID-19: Health Systems Response Monitor – Cross-Country Analysis* (<https://analysis.covid19healthsystem.org/index.php/2020/04/23/what-strategies-are-countries-using-to-expand-health-workforce-surge-capacity-to-treat-covid-19-patients>, accessed 30 May 2020).
- Massuda A et al. (2018). The Brazilian health system at crossroads: Progress, crisis and resilience. *BMJ Global Health*, 3(4):e000829.
- McManus S et al. (2007). *Resilience management: A framework for assessing and improving the resilience of organisations*. Resilient Organisations Research Report 2007/01. New Zealand ([https://www.researchgate.net/publication/29489358\\_Resilience\\_Management\\_A\\_Framework\\_for\\_Assessing\\_and\\_Improving\\_the\\_Resilience\\_of\\_Organisations](https://www.researchgate.net/publication/29489358_Resilience_Management_A_Framework_for_Assessing_and_Improving_the_Resilience_of_Organisations), accessed 30 May 2020).
- Meheus F, McIntyre D (2017). Fiscal space for domestic funding of health and other social services. *Health Economics, Policy and Law*, 12(2):159–177.

- Meyer D et al. (2018). Lessons from the domestic Ebola response: Improving health care system resilience to high consequence infectious diseases. *American Journal of Infection Control*, 46(5):533–537.
- Naimoli JF, Saxena S (2018). Realizing their potential to become learning organizations to foster health system resilience: Opportunities and challenges for health ministries in low- and middle-income countries. *Health Policy and Planning*, 33(10):1083–1095.
- Nolte E (2018). How do we ensure that innovation in health service delivery and organization is implemented, sustained and spread? In: Kluge H, Figueras J, eds. *Health Systems for Prosperity and Solidarity*. Copenhagen, European Observatory on Health Systems and Policies.
- OECD (2014). *Guidelines for resilience systems analysis*. Paris, Organisation for Economic Co-operation and Development (<https://www.oecd.org/dac/Guidelines%20for%20Resilience%20Systems%20Analysis%20-%20Landscape%20Facilitation%20Guide.pdf>, accessed 30 May 2020).
- OECD (2018). *How resilient were OECD health care systems during the “refugee crisis”?* Paris, Organisation for Economic Co-operation and Development (<http://www.oecd.org/migration/Migration-Policy-Debates-Nov2018-How-resilient-were-OECD-health-care-systems-during-the-refugee-crisis.pdf>, accessed 30 May 2020).
- OECD, European Observatory on Health Systems and Policies (2019). *Greece: Country Health Profile 2019*. State of Health in the EU. Paris, OECD/Brussels, European Observatory on Health Systems and Policies.
- Olsson L et al. (2015). Why resilience is unappealing to social science: Theoretical and empirical investigations of the scientific use of resilience. *Science Advances*, 1(4): e1400217.
- Olu O (2017). Resilient health system as conceptual framework for strengthening public health disaster risk management: An African viewpoint. *Frontiers in Public Health*, 5(263).
- Panteli D (2020). How are countries reorganizing non-COVID-19 health care service delivery? *COVID-19: Health Systems Response Monitor – Cross-Country Analysis* (<https://analysis.covid19healthsystem.org/index.php/2020/05/06/how-are-countries-reorganizing-non-covid-19-health-care-service-delivery>, accessed 30 May 2020).
- Reeves A et al. (2014). The political economy of austerity and healthcare: Cross-national analysis of expenditure changes in 27 European nations 1995–2011. *Health Policy*, 115(1):1–8.
- Ridde V, Lechat L, Meda IB (2016). Terrorist attack of 15 January 2016 in Ouagadougou: How resilient was Burkina Faso’s health system? *BMJ Global Health*, 1(1):e000056.
- Sochas L, Channon AA, Nam S (2017). Counting indirect crisis-related deaths in the context of a low-resilience health system: The case of maternal and neonatal health during the Ebola epidemic in Sierra Leone. *Health Policy and Planning*, 32(suppl 3):iii32–iii39.
- Therrien M-C, Normandin J-M, Denis J-L (2017). Bridging complexity theory and resilience to develop surge capacity in health systems. *Journal of Health Organization and Management*, 31(1):96–109.
- Thomas S et al. (2013). A framework for assessing health system resilience in an economic crisis: Ireland as a test case. *BMC Health Services Research*, 13(1):450.
- Thomson S et al. (2015). *Economic crisis, health systems and health in Europe: Impact and implications for policy*. Policy Summary. Copenhagen, WHO Regional Office for Europe.
- Thomson S, Habicht T, Evetovits T (2020). How are countries removing financial barriers to accessing health services in the context of COVID-19? *COVID-19: Health Systems Response Monitor – Cross-Country Analysis* (<https://analysis.covid19healthsystem.org/index.php/2020/04/27/how-are-countries-removing-financial-barriers-to-accessing-health-services-in-the-context-of-covid-19>, accessed 30 May 2020).
- Turenne CP et al. (2019). Conceptual analysis of health systems resilience: A scoping review. *Social Science & Medicine*, 232:168–180.
- Williams D, Thomas S (2017). The impact of austerity on the health workforce and the achievement of human resources for health policies in Ireland (2008–2014). *Human Resources for Health*, 15(1):62.
- WHO (2007). *Everybody’s business: Strengthening health systems to improve health outcomes: WHO’s framework for action*. Geneva, World Health Organization ([https://www.who.int/healthsystems/strategy/everybodys\\_business.pdf?ua=1/](https://www.who.int/healthsystems/strategy/everybodys_business.pdf?ua=1/), accessed 30 May 2020).
- WHO (2008). *Health Systems Governance: Toolkit on monitoring health systems strengthening*. Health Systems Governance. Geneva, World Health Organization (<http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=5727F68059230F34E83824520ECA671F?doi=10.1.1.177.9191&rep=rep1&type=pdf>, accessed 30 May 2020).
- WHO (2016). *Toolkit for assessing health system capacity to manage large influxes of refugees, asylum-seekers and migrants in the initial phase*. Geneva: World Health Organization.
- WHO (2015). *Hospital safety index: Guide for evaluators*, 2nd edn. Safe Hospitals Initiative. Geneva: World Health Organization (<https://apps.who.int/iris/handle/10665/258966>, accessed 30 May 2020).

## Annex

Box A1 summarizes search strategies that were used in the rapid review of the literature to identify measures of resilience.

### Box A1: Summary of search strategies

- An initial search using Google and Google Scholar was conducted to find grey literature. The following search terms were used: 'Health system resilience' 'Health system resilience European Union' 'Health system resilience OECD' 'Health system resilience World Health Organization'. In total, 20 full-texts were examined and 15 were included for analysis.
- A search of PubMed was conducted using the following terms 'Health' and 'System' and 'Resilience', and also 'Measuring' and 'Health' and 'System' and 'Resilience'. There are no MeSH terms for Health System or Health System Resilience. The PubMed search returned 2255 results. Due to time constraints, 100 most relevant results were screened, of which 30 full-texts were examined and

16 were included for analysis. This end-point was chosen because after the first 40 results, papers were primarily related to health resilience at the individual level. Research in the area of resilience and health primarily looks at resilience at the individual level.

- Key known documents were also provided by experts in the field.
- References were searched in all of the reviewed grey and peer-reviewed literature for relevant research.

Literature was excluded if it did not relate to health system resilience, if it did not involve the use of indicators or metrics of health system resilience, or if it exclusively examined everyday health system resilience.

The identified literature is shown in the following tables (Tables A1 and A2) both for the peer-reviewed material and the grey literature sources. The tables indicate the author, year, whether the metrics were just suggested or actually used, type of data required for metric and type of shock explored.

**Table A1: Peer-reviewed literature on resilience metrics**

Author, Year	Metrics used (MU), Metrics suggested (MS)	Type of metrics: Qualitative (Qual), Quantitative metrics (Quant) or Checklist (CL)	Type of shock
Ager et al., 2015	MU	Qual	Conflict
Alameddine et al., 2019	MU	Qual	Refugee crisis
Ammar et al., 2016	MU	Quant/Qual	Refugee crisis
Barasa, Mbau & Gilson, 2018	MS/MU	Qual	General resilience
Hanefeld et al., 2018	MS	Qual/CL	General resilience
Khan et al., 2018	MS	Qual/CL	General resilience
Kieny & Dovlo, 2015	MS	Qual/CL	Infectious disease (Ebola)
Kruk et al., 2017	MS	Quant/Qual/CL	General resilience/ Ebola
Ling et al., 2017	MU	Qual	Infectious disease (Ebola)
Massuda et al., 2018	MU	Quant	General resilience/ Economic crisis
Meyer et al., 2018	MS/MU	Qual/CL	Infectious disease (Ebola)
Naimoli & Saxena, 2018	MS	Qual/CL	General resilience
Ridde, Lechat & Meda, 2016	MU	Qual	Terrorist attack
Sochas, Channon & Nam, 2017	MU	Quant	Infectious disease (Ebola)
Therrien, Normandin & Denis, 2017	MS	Qual/CL	General resilience
Thomas et al., 2013	MU	Quant/Qual	Economic crisis



Table A2: Grey literature on resilience metrics

Author, Year	Metrics used (MU), Metrics suggested (MS)	Type of metrics: Qualitative (Qual), Quantitative metrics (Quant) or Checklist (CL)	Type of shock
European Commission (2014) <i>On effective, accessible and resilient health systems</i> (European Commission, 2014)	MS	CL	General resilience
European Commission (2017, 2019) <i>State of Health in the EU: Country health profiles series</i> (European Commission, 2017, 2019)	MU	Quant/CL	General resilience
OECD (2014) <i>Guidelines for resilience systems analysis</i> (OECD, 2014)	MS	CL	General resilience
OECD (2018) <i>How resilient were OECD health care systems during the "refugee crisis"?</i> (OECD, 2018)	MU	Quant/CL	Refugees
The World Bank (2009) <i>Governance in health care delivery: Raising performance</i> (Lewis & Pettersson, 2009)	MS	CL	General resilience
World Health Organization (2008) <i>Health Systems Governance: Toolkit on Monitoring Health Systems Strengthening</i> (WHO, 2008)	MS	CL	General resilience
World Health Organization (2012) <i>Toolkit for assessing health system capacity to manage large influxes of refugees, asylum seekers and migrants in the initial phase</i> (WHO, 2016)	MS	Quant/CL	Refugees
World Health Organization (2015) <i>Hospital safety index: Guide for evaluators</i> (WHO, 2015)	MS	Quant/Qual/CL	Geophysical crises
Oxfam (2015) <i>Never again: building resilient health systems and learning from the Ebola crisis</i> (Kamal-Yanni, 2015)	MU	Quant	Ebola

The results of the rapid review are categorized by the WHO Health System Functions in Table 3

Table A.3: Measures of health system resilience identified in the rapid review

Measurement area	Types of indicators identified in the review
<b>Routine governance</b>	<ul style="list-style-type: none"> <li>• Functional, accountable institutions and leadership (Barasa, Mbau &amp; Gilson, 2018; European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Ability to plan, non-linear planning (feedback and analysis) (Ammar et al., 2016; Therrien, Normandin &amp; Denis, 2017; Barasa, Mbau &amp; Gilson, 2018)</li> <li>• Clean and feasible plan for system change (Thomas et al., 2013)</li> <li>• Collaboration between sectors (Ling et al., 2017; Hanefeld et al., 2018; Alameddine et al., 2019)</li> <li>• Coordination between services (Barasa, Mbau &amp; Gilson, 2018)</li> <li>• Established public trust in response agencies (Ager et al., 2015; Kieny &amp; Dovlo, 2015; Kruk et al., 2015)</li> <li>• Stakeholder participation and engagement (Therrien, Normandin &amp; Denis, 2017; Barasa, Mbau &amp; Gilson, 2018; Alameddine et al., 2019)</li> <li>• Assessment of governance using TAPIC framework (Greer et al., 2015)</li> <li>• Existence of effective civil society (WHO, 2008)</li> <li>• Innovative organizational culture, culture of learning (Kacevičius &amp; Karanikolos, 2015; Barasa, Mbau &amp; Gilson, 2018)</li> </ul>
<b>Emergency planning</b>	<ul style="list-style-type: none"> <li>• Leadership/steering and clear chain of command (WHO, 2016; Ammar et al., 2016)</li> <li>• Set of plans, protocols, emergency legislation (WHO, 2016; Kieny &amp; Dovlo, 2015; Ridde, Lechat &amp; Meda, 2016; Barasa, Mbau &amp; Gibson, 2018; Meyer et al., 2018; Alameddine et al., 2019)</li> <li>• Agreements with relevant actors (e.g. international agencies, non-state providers, NGOs)(Kruk et al., 2015; Ridde, Lechat &amp; Meda, 2016)</li> <li>• National emergency coordination system (Kruk et al., 2015)</li> <li>• Preparedness of response teams (Ling et al., 2017)</li> <li>• Assignment of responsibilities (Kruk et al., 2015; Meyer et al., 2018)</li> <li>• Engagement of health care providers (Meyer et al., 2018)</li> <li>• Training for emergency response procedures (Meyer et al., 2018)</li> <li>• Emergency simulation/drills/identification of gaps (WHO, 2016; Kruk et al., 2015; Meyer et al., 2018)</li> <li>• List of key decision-makers across sectors (Kruk et al., 2015)</li> <li>• Research staff included in response team (Kruk et al., 2015, Meyer et al., 2018)</li> <li>• Existence of government policy on refugees (Ammar et al., 2016)</li> <li>• Decentralization of capacity, responsibilities, decision-making (OECD, 2014; Ager et al., 2015; Kieny &amp; Dovlo, 2015; Barasa, Mbau &amp; Gilson, 2018)</li> </ul>
<b>Infrastructure and IT systems</b>	<ul style="list-style-type: none"> <li>• Presence of electronic health record (Alameddine et al., 2019)</li> <li>• Availability of patient-level information for providers (European Commission, 2014)</li> <li>• Existence of data collection and linkage systems (European Observatory on Health Systems and Policies, 2019)</li> <li>• Active civil registration and vital statistics system (Kruk et al., 2015)</li> <li>• Epidemiological surveillance and early warning systems (OECD, 2014; Kieny &amp; Dovlo, 2015; Ammar et al., 2016; Ling et al., 2017; Barasa, Mbau &amp; Gilson, 2018; Hanefeld et al., 2018)</li> <li>• Existence of mechanisms, such as surveys, to measure access/need (WHO, 2008)</li> <li>• Standardized migrant immunization cards (WHO, 2016)</li> </ul>

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Measurement area	Types of indicators identified in the review
<b>Communication</b>	<ul style="list-style-type: none"> <li>• Functional communication channels, flow of information between stakeholders (Kruk et al., 2015; Barasa, Mbau &amp; Gilson, 2018; Meyer et al., 2018)</li> <li>• Flow of information between stakeholders, data-sharing mechanisms (Ager et al., 2015; Kruk et al., 2015; Ling et al., 2017; Barasa, Mbau &amp; Gilson, 2018; Meyer et al., 2018)</li> <li>• Providers prepared to distribute new guidelines among staff (Meyer et al., 2018)</li> <li>• Communication infrastructure (hard: phone, Wi-Fi; soft: press, community, NGOs) (Kruk et al., 2015; Ridde, Lechat &amp; Meda, 2016)</li> </ul>
<b>Revenue collection</b>	<ul style="list-style-type: none"> <li>• Overall spending on health (per capita and as share of GDP) (Thomas et al., 2013; European Commission, 2014; Ager et al., 2015; Ammar et al., 2016; Hanefeld et al., 2018; Massuda et al., 2018)</li> <li>• Public spending on health (as share of total health spending, and total government spending)(European Commission, 2014, 2017, 2019; Kruk et al., 2015; Hanefeld et al., 2018)</li> <li>• Out-of-pocket payments as share of total health spending (Ammar et al., 2016; Meheus &amp; McIntyre, 2017; Hanefeld et al., 2018)</li> <li>• Regional health expenditure (Massuda et al., 2018)</li> <li>• Countercyclical financing mechanisms, financial reserves (WHO, 2016; Thomas et al., 2013; European Commission, 2014; Ager et al., 2015)</li> <li>• Change in health spending vs change government deficit and GDP (Thomas et al., 2013)</li> <li>• Gap between public expenditure on health and funding need for universal primary care (Kamal-Yanni, 2015; Meheus &amp; McIntyre, 2017)</li> <li>• Levels of donor funding (Ammar et al., 2016)</li> <li>• Protected funding for health care (Ager et al., 2015)</li> </ul>
<b>Pooling</b>	<ul style="list-style-type: none"> <li>• Risk-adjustment (European Commission, 2014)</li> </ul>
<b>Purchasing</b>	<ul style="list-style-type: none"> <li>• Development of alternative procurement channels (Meyer et al., 2018; Alameddine et al., 2019)</li> <li>• Efficient resource allocation, use of health technology assessment (WHO, 2008; Ammar et al., 2016; European Commission, 2017, 2019)</li> </ul>
<b>Coverage and financial protection</b>	<ul style="list-style-type: none"> <li>• Universal/effective health coverage (WHO, 2016; Thomas et al., 2013; Kruk et al., 2015; Hanefeld et al., 2018; Alameddine et al., 2019)</li> <li>• Catastrophic/impoverishing health spending (European Commission, 2014; Kruk et al., 2015; Massuda et al., 2018)</li> <li>• Existence/broadening of exemptions from user fees (Ager et al., 2015; Ridde, Lechat &amp; Meda, 2016)</li> <li>• Public knowledge of entitlements (Ager et al., 2015; Hanefeld et al., 2018)</li> <li>• Entitlements for asylum seekers (Ammar et al., 2016; OECD, 2018)</li> </ul>

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Measurement area	Types of indicators identified in the review
<b>Capacity to deliver services</b>	<ul style="list-style-type: none"> <li>• Mapping of health service providers (location, type, opening hours, accessibility) (WHO, 2016; Ager et al., 2015; Ling et al., 2017)</li> <li>• Primary care capacity (European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Hospital capacity (number of beds)(Ager et al., 2015; Kamal-Yanni, 2015; European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Labs and diagnostic capacity (Ammar et al., 2016; European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Provision of services for hard-to-reach groups (Alameddine et al., 2019)</li> <li>• Ability to introduce/expand services (e.g. mental health, treatment clinics, blood bank, mortuary) (Ridde, Lechat &amp; Meda, 2016; Ling et al., 2017; Alameddine et al., 2019)</li> <li>• Security of staff/patients (in conflict) (Ager et al., 2015)</li> </ul>
<b>Service utilization</b>	<ul style="list-style-type: none"> <li>• Number of contacts in primary care (Ammar et al., 2016; Kruk et al., 2017)</li> <li>• Number of outpatient contacts (Kruk et al., 2017)</li> <li>• Number of hospitalizations (Ager et al., 2015; Ammar et al., 2016)</li> <li>• Share of admissions to private hospitals (Ammar et al., 2016)</li> </ul>
<b>Health service efficiency</b>	<ul style="list-style-type: none"> <li>• Average length of hospital stay (European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Bed occupancy (Kruk et al., 2017)</li> <li>• Health care activity relative to health spend (Thomas et al., 2013; European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Health gains relative to health spend (European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Supply of acute care versus non-acute care (European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Potentially avoidable admissions to emergency department (European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Share of day cases and day surgery (Thomas et al., 2013)</li> <li>• Number of health care professionals relative to outputs (Thomas et al., 2013)</li> </ul>
<b>Healthcare effectiveness/quality</b>	<ul style="list-style-type: none"> <li>• Vaccination coverage (Ammar et al., 2016)</li> <li>• Range of quality primary care services (Kruk et al., 2015)</li> <li>• High-quality care for sentinel conditions (Kruk et al., 2015)</li> </ul>

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Measurement area	Types of indicators identified in the review
<b>Medicines, medical products and technologies (availability and efficiency)</b>	<ul style="list-style-type: none"> <li>• Availability of medicines and medical supplies in public facilities (WHO, 2008; WHO, 2016; Ager et al., 2015; Ling et al., 2017; Therrien, Normandin &amp; Denis, 2017; Alameddine et al., 2019)</li> <li>• Stocks of essential medicines and medical supplies; reliability of supply chain (WHO, 2008; WHO, 2016; Ager et al., 2015; Alameddine et al., 2019)</li> <li>• Existing and back-up infrastructure (supply of water, electricity) (Therrien, Normandin &amp; Denis, 2017; Alameddine et al., 2019)</li> <li>• Number of drugs on essential medicines list (Massuda et al., 2018)</li> <li>• Share of counterfeit drugs (WHO, 2008)</li> <li>• Spending on pharmaceuticals (European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Appropriate prescribing (European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> <li>• Use of lower-priced generic medicines (Massuda et al., 2018; European Observatory on Health Systems and Policies &amp; OECD, 2019)</li> </ul>
<b>Workforce availability</b>	<ul style="list-style-type: none"> <li>• Workforce mapping (location, availability, competencies) (WHO, 2016; Barasa, Mbau &amp; Gilson, 2018; OECD, 2018)</li> <li>• Numbers of doctors and nurses and their workload (Ager et al., 2015; Ammar et al., 2016; Ling et al., 2017)</li> <li>• Appropriate skill-mix (Barasa, Mbau &amp; Gilson, 2018)</li> <li>• Informal task shifting (Ager et al., 2015)</li> <li>• Motivated and committed workforce (Ager et al., 2015; Barasa, Mbau &amp; Gilson, 2018)</li> <li>• Ability to increase number of health professionals and their workload, workforce reserves (Barasa, Mbau &amp; Gilson, 2018; Meyer et al., 2018; Alameddine et al., 2019)</li> <li>• Health worker absenteeism (WHO, 2008)</li> <li>• Redundancy of staff (Therrien, Normandin &amp; Denis, 2017)</li> <li>• Health care workforce emigration (Ager et al., 2015; Ling et al., 2017)</li> <li>• Gap between existing and WHO recommended levels of health professionals (Kamal-Yanni, 2015)</li> <li>• Availability of translators/cultural communicators (refugee crisis) (WHO, 2016; OECD, 2018)</li> <li>• Emergency transportation for staff (Ager et al., 2015; Ridde, Lechat &amp; Meda, 2016)</li> </ul>
<b>Workforce training/ preparedness</b>	<ul style="list-style-type: none"> <li>• Crisis preparedness training, cross-training for additional skills (WHO, 2008; Hanefeld et al., 2018; Meyer et al., 2018)</li> <li>• Staff support mechanisms, helplines (Ridde, Lechat &amp; Meda, 2016; Meyer et al., 2018)</li> <li>• All hospital staff trained in basic infection control measures (Meyer et al., 2018)</li> <li>• Training of health workers to treat refugees, cultural competencies (WHO, 2016; Alameddine et al., 2019)</li> </ul>

Source: Derived from the rapid review of literature outlined in the Annex.



### How do Policy Briefs bring the evidence together?

There is no one single way of collecting evidence to inform policy-making. Different approaches are appropriate for different policy issues, so the Observatory briefs draw on a mix of methodologies (see Figure A) and explain transparently the different methods used and how these have been combined. This allows users to understand the nature and limits of the evidence.

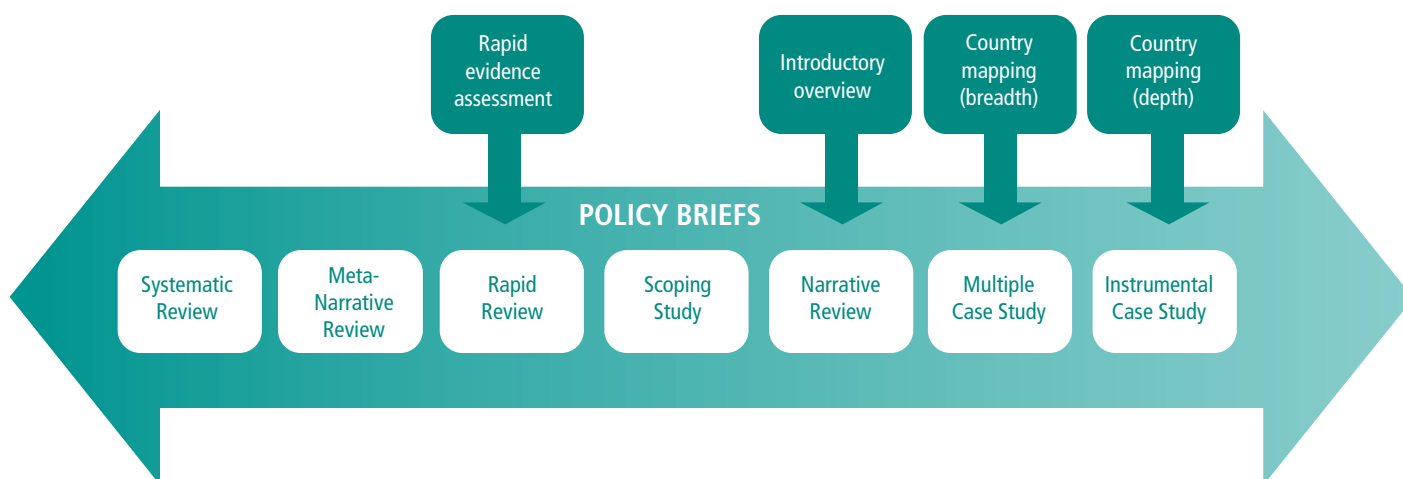
There are two main 'categories' of briefs that can be distinguished by method and further 'sub-sets' of briefs that can be mapped along a spectrum:

- **A rapid evidence assessment:** This is a targeted review of the available literature and requires authors to define key terms, set out explicit search strategies and be clear about what is excluded.

- **Comparative country mapping:** These use a case study approach and combine document reviews and consultation with appropriate technical and country experts. These fall into two groups depending on whether they prioritize depth or breadth.
- **Introductory overview:** These briefs have a different objective to the rapid evidence assessments but use a similar methodological approach. Literature is targeted and reviewed with the aim of explaining a subject to 'beginners'.

Most briefs, however, will draw upon a mix of methods and it is for this reason that a 'methods' box is included in the introduction to each brief, signalling transparently that methods are explicit, robust and replicable and showing how they are appropriate to the policy question.

Figure A: The policy brief spectrum



Source: Erica Richardson

## Joint Policy Briefs

1. How can European health systems support investment in and the implementation of population health strategies?  
*David McDaid, Michael Drummond, Marc Suhrcke*
2. How can the impact of health technology assessments be enhanced?  
*Corinna Sorenson, Michael Drummond, Finn Børlum Kristensen, Reinhard Busse*
3. Where are the patients in decision-making about their own care?  
*Angela Coulter, Suzanne Parsons, Janet Askham*
4. How can the settings used to provide care to older people be balanced?  
*Peter C. Coyte, Nick Goodwin, Audrey Laporte*
5. When do vertical (stand-alone) programmes have a place in health systems?  
*Rifat A. Atun, Sara Bennett, Antonio Duran*
6. How can chronic disease management programmes operate across care settings and providers?  
*Debbie Singh*
7. How can the migration of health service professionals be managed so as to reduce any negative effects on supply?  
*James Buchan*
8. How can optimal skill mix be effectively implemented and why?  
*Ivy Lynn Bourgeault, Ellen Kuhlmann, Elena Neiterman, Sirpa Wrede*
9. Do lifelong learning and revalidation ensure that physicians are fit to practise?  
*Sherry Merkur, Filipa Mladovsky, Elias Mossialos, Martin McKee*
10. How can health systems respond to population ageing?  
*Bernd Rechel, Yvonne Doyle, Emily Grundy, Martin McKee*
11. How can European states design efficient, equitable and sustainable funding systems for long-term care for older people?  
*José-Luis Fernández, Julien Forder, Birgit Trukeschitz, Martina Rokosová, David McDaid*
12. How can gender equity be addressed through health systems?  
*Sarah Payne*
13. How can telehealth help in the provision of integrated care?  
*Karl A. Stroetmann, Lutz Kubitschke, Simon Robinson, Veli Stroetmann, Kevin Cullen, David McDaid*
14. How to create conditions for adapting physicians' skills to new needs and lifelong learning  
*Tanya Horsley, Jeremy Grimshaw, Craig Campbell*
15. How to create an attractive and supportive working environment for health professionals  
*Christiane Wiskow, Tit Albrecht, Carlo de Pietro*
16. How can knowledge brokering be better supported across European health systems?  
*John N. Lavis, Govin Permanand, Cristina Catalo, BRIDGE Study Team*
17. How can knowledge brokering be advanced in a country's health system?  
*John N. Lavis, Govin Permanand, Cristina Catalo, BRIDGE Study Team*
18. How can countries address the efficiency and equity implications of health professional mobility in Europe? Adapting policies in the context of the WHO Code and EU freedom of movement  
*Irene A. Glinos, Matthias Wismar, James Buchan, Ivo Rakovac*
19. Investing in health literacy: What do we know about the co-benefits to the education sector of actions targeted at children and young people?  
*David McDaid*
20. How can structured cooperation between countries address health workforce challenges related to highly specialized health care? Improving access to services through voluntary cooperation in the EU.  
*Marieke Kroezen, James Buchan, Gilles Dussault, Irene Glinos, Matthias Wismar*
21. How can voluntary cross-border collaboration in public procurement improve access to health technologies in Europe?  
*Jaime Espín, Joan Rovira, Antoinette Calleja, Natasha Azzopardi-Muscat, Erica Richardson, Willy Palm, Dimitra Panteli*
22. How to strengthen patient-centredness in caring for people with multimorbidity in Europe?  
*Iris van der Heide, Sanne P Snoeijis, Wienke GW Boerma, François GW Schellevis, Mieke P Rijken. On behalf of the ICARE4EU consortium*
23. How to improve care for people with multimorbidity in Europe?  
*Mieke Rijken, Verena Struckmann, Iris van der Heide, Anneli Hujala, Francesco Barbabella, Ewout van Ginneken, François Schellevis. On behalf of the ICARE4EU consortium*
24. How to strengthen financing mechanisms to promote care for people with multimorbidity in Europe?  
*Verena Struckmann, Wilm Quentin, Reinhard Busse, Ewout van Ginneken. On behalf of the ICARE4EU consortium*
25. How can eHealth improve care for people with multimorbidity in Europe?  
*Francesco Barbabella, Maria Gabriella Melchiorre, Sabrina Quattrini, Roberta Papa, Giovanni Lamura. On behalf of the ICARE4EU consortium*
26. How to support integration to promote care for people with multimorbidity in Europe?  
*Anneli Hujala, Helena Taskinen, Sari Rissanen. On behalf of the ICARE4EU consortium*
27. How to make sense of health system efficiency comparisons?  
*Jonathan Cylus, Irene Papanicolas, Peter C Smith*
28. What is the experience of decentralized hospital governance in Europe?  
*Bernd Rechel, Antonio Duran, Richard Saltman*
29. Ensuring access to medicines: How to stimulate innovation to meet patients' needs?  
*Dimitra Panteli, Suzanne Edwards*
30. Ensuring access to medicines: How to redesign pricing, reimbursement and procurement?  
*Sabine Vogler, Valérie Paris, Dimitra Panteli*
31. Connecting food systems for co-benefits: How can food systems combine diet-related health with environmental and economic policy goals?  
*Kelly Parsons, Corinna Hawkes*
32. Averting the AMR crisis: What are the avenues for policy action for countries in Europe?  
*Michael Anderson, Charles Clift, Kai Schulze, Anna Sagan, Saskia Nahrgang, Driss Ait Ouakrim, Elias Mossialos*
33. It's the governance, stupid! TAPIC: a governance framework to strengthen decision making and implementation  
*Scott L. Greer, Nikolai Vasev, Holly Jarman, Matthias Wismar, Josep Figueras*
34. How to enhance the integration of primary care and public health? Approaches, facilitating factors and policy options  
*Bernd Rechel*
35. Screening. When is it appropriate and how can we get it right?  
*Anna Sagan, David McDaid, Selina Rajan, Jill Farrington, Martin McKee*

The European Observatory has an independent programme of policy briefs and summaries which are available here: <http://www.euro.who.int/en/about-us/partners/observatory/publications/policy-briefs-and-summaries>



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The **European Observatory on Health Systems and Policies** is a partnership that supports and promotes evidence-based health policy-making through comprehensive and rigorous analysis of health systems in the European Region. It brings together a wide range of policy-makers, academics and practitioners to analyse trends in health reform, drawing on experience from across Europe to illuminate policy issues. The Observatory's products are available on its web site (<http://www.healthobservatory.eu>).

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