

Future of health 8

Healthcare system resilience

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This year's *Future of health* study, the eighth in our series, examines healthcare system resilience: the ability of healthcare systems to anticipate pressure, respond effectively, maintain essential services, recover and adapt. To build a clear picture of healthcare system resilience in practice, we carried out an extensive analysis of acute shocks and chronic stressors affecting healthcare systems. We used established resilience concepts to structure the analysis and then applied a comparative country assessment to examine how selected countries are responding. This work was supported by an international survey of 486 experts across the healthcare value chain, in which respondents were asked how they rate the major stressors facing healthcare systems, how prepared they believe their systems are, which levers matter most and – significantly – what their own organizations are currently doing about it.

The conclusions are clear: healthcare systems recognize the need for resilience, but still struggle to turn that recognition into funded priorities and practical readiness. Overall, 81 percent of respondents say healthcare system resilience is becoming more important. Yet stakeholders remain divided on core strategic questions: how to balance resilience with affordability, whether responsibility should sit mainly with public institutions or private actors and how national self-sufficiency should be balanced with international cooperation.

The strategic implication is direct: healthcare system resilience cannot be treated as an emergency mode or an additional topic alongside day-to-day operations. Rather, it must be built into healthcare systems through clear accountability and sustainable financing. Preparing for every possible risk is neither realistic nor affordable, so healthcare systems must make explicit choices about where to build reserve capacity and where to rely on adaptability.

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The resilience imperative

Preparing healthcare systems for sustained pressure



Healthcare systems have always had to respond to change. What is different today is the scale of the pressures they face and the way those pressures interact. Acute shocks – sudden, high-intensity disruptions such as pandemics and geopolitical conflicts – increasingly coincide with chronic stressors, slower-moving pressures such as climate change and demographic shifts that reshape system foundations over years or decades. The question is no longer whether healthcare systems will be disrupted, but whether they are built to withstand it.

Resilient healthcare systems protect lives, sustain positive health outcomes during and after disruptions, and perform effectively in both crisis and routine conditions.¹ Yet resilience is not a fixed property that a system either has or does not have. Rather, it is an emergent feature of the healthcare system as a whole, shaped by context and requiring deliberate investment long before a crisis arrives.² During COVID-19, for example, all countries demonstrated some degree of resilience: the pandemic is behind us and most of the population survived. But the differences in how systems held up were significant.

Despite its growing prominence in global health policy, resilience remains a conceptually unsettled term. A 2024 scoping review of 34 peer-reviewed studies identifies 24 distinct conceptual frameworks and no validated set of assessment indicators.³ This shows that, even among experts, no single agreed definition or method exists. This fragmentation is not merely academic: without a shared framework, countries and organizations cannot systematically measure progress or identify gaps, nor can they hold each other accountable. It is precisely this gap that makes a clear, operationalizable understanding of resilience – such as that applied throughout this study – both necessary and timely.

To build a clear picture of what healthcare system resilience means in practice, we reviewed how leading international institutions define it. While the language differs, the message is consistent. Whether framed by the

Organisation for Economic Co-operation and Development (OECD), World Health Organization (WHO), World Bank, European Federation of Pharmaceutical Industries and Associations (EFPIA) or academic research, resilience comes down to the same five core competences.

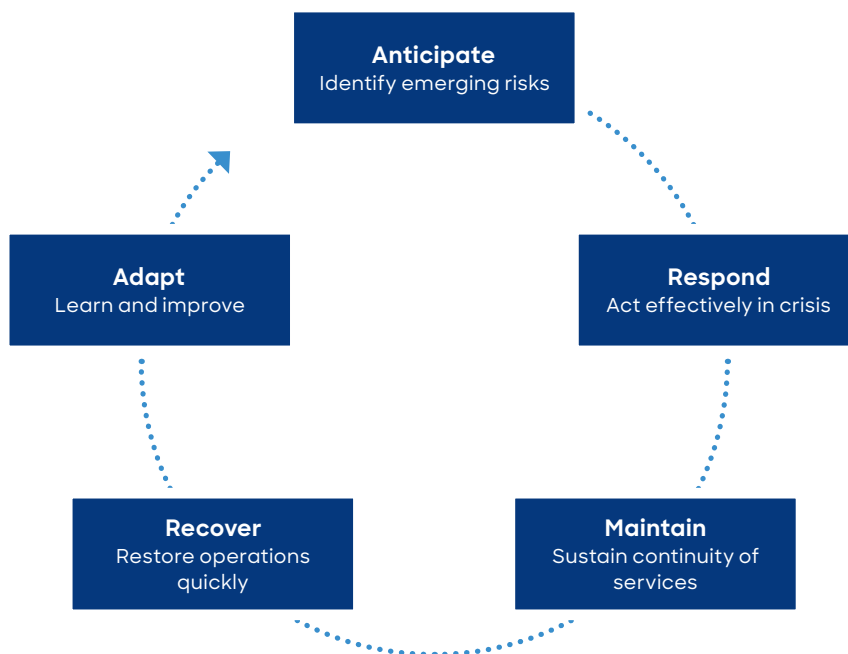
First, there is the ability to anticipate threats before they materialize. Resilient healthcare systems maintain an up-to-date picture of human, physical and informational assets, alongside surveillance networks capable of detecting emerging risks in real time.⁴ Critically, preparedness must be designed for multiple, concurrent threats rather than optimized for a single predefined scenario; systems that plan only for known risks are structurally exposed to novel or compounding disruptions.

Second, resilient systems must be able to respond effectively and rapidly when a crisis hits. This requires agility and flexibility in both operations and decision-making, plus the ability to rapidly reallocate resources and roles as necessary.

Third, resilience means being able to maintain continuity of essential services throughout the duration of a shock. Resilient healthcare systems not only respond to the acute threat; they simultaneously protect routine care, such as immunization, chronic disease management and emergency services.⁵ Indeed, one 2024 study identifies "maintain" as the single most frequently cited term across definitions of health system resilience in peer-reviewed literature, confirming it as a central and distinct competence rather than a sub-element of the ability to respond.⁶

The fourth competence associated with resilience is being able to recover efficiently once the shock passes. In other words, the healthcare system can restore normal operational capacity in a timely and efficient manner, without lasting damage to population health or system function. Studies recognize speed and efficiency of recovery as cardinal measures of resilience performance.

A Five core competences of resilient healthcare systems



Source: Roland Berger

Finally, there is the ability to adapt, transforming structures and strategies based on what is learned during and after a disruption. Adaptation is not incremental adjustment: it involves cross-sector integration (such as aligning healthcare, civil protection, supply chains and digital infrastructure) and redesigning governance and operational models, so that the system emerges from crisis better equipped for future pressure. ► **A**

These five competences are interconnected and must operate continuously as part of a resilient healthcare system. While each of the competences plays a distinct role, they reinforce one another over time. A system that can only recover but cannot anticipate will always be reactive; a system that plans but cannot maintain essential services under pressure will fail at the critical moment. Crucially, resilience is not a mode that healthcare systems switch into

during emergencies; it must be permanently built into how they are structured and run.

The distinction between acute shocks and chronic stressors matters because the same five competences are expressed differently under each type of pressure. Thus, for acute shocks, all five competences are compressed into a short timeframe: anticipating the signal, responding fast, maintaining services under surge pressure, recovering to baseline and adapting based on lessons learned. Speed and operational excellence are what matter.

By contrast, for chronic stressors, the same five competences stretch across years or decades. Anticipating demographic aging requires long-horizon modeling, not real-time surveillance. Responding means phased structural reform, not emergency activation. Maintaining continuity becomes about equity across a system in transition, not crisis triage. Recovering changes meaning, as there may be no pre-crisis baseline to return to. Adapting is no longer a post-crisis lesson; it becomes the central task of deliberately transforming workforce models, care architectures and financing structures.

WHY RESILIENCE MATTERS NOW

Healthcare system resilience has become particularly urgent today because the pressures facing healthcare systems have changed fundamentally. The change lies not only in the number of pressures but also in how they overlap.⁷ To understand the nature of these stressors, we reviewed evidence from international organizations, regulatory bodies and peer-reviewed research. Across these sources, eight stressors consistently emerge as the most significant pressures on healthcare systems worldwide. They are grouped below into acute shocks and chronic stressors. ►B

ACUTE SHOCKS

Natural catastrophes

Natural catastrophes create acute physical shocks to healthcare systems, including geophysical events such as earthquakes and climate-amplified hazards such as floods, wildfires, hurricanes and heatwaves. Their immediate impact lies in damaged facilities, disrupted power and water supply, interrupted logistics and sudden surge demand for emergency care. Healthcare systems in disaster-prone regions therefore require climate-resilient infrastructure, decentralized supply chains and pre-positioned response capacity.^{8,9}

Health emergencies

Health emergencies encompass a broad range of acute events, including infectious disease outbreaks, biological or chemical hazards, food safety crises and radiological or nuclear events, which simultaneously strain hospital capacity, the workforce, supply chains and governance, often faster than healthcare systems can adapt.¹⁰ COVID-19 exposed structural shortages in hospital beds, intensive care unit (ICU) capacity and emergency preparedness across even well-resourced healthcare systems. Critically, WHO found that health emergencies disrupted essential services in 92 percent of countries surveyed, while global supply chains proved dangerously dependent on concentrated sourcing. Without adequate fiscal buffers and surge capacity planning, healthcare systems face severe trade-offs between emergency response and continuity of routine care.¹¹ Pandemics also strain the healthcare workforce through increased workload, infections, burnout, absenteeism and attrition. WHO estimated that between 80,000 and 180,000 health and care workers died globally during the COVID-19 pandemic between January 2020 and May 2021.¹²



Natural
catastrophes



Health
emergencies



Geopolitical
conflicts



Cyberattacks

Acute shocks



Resilience
in health



Workforce
shortages



Demographic
change



Climate change



Unhealthy
lifestyle



Chronic stressors

Geopolitical conflicts

Geopolitical conflicts affect resilience by disrupting care delivery, supply chains, workforce availability, financing and public trust. The sheer volume of wounded can overwhelm trauma care capacity within hours: current policy discussions in Germany, for example, center on whether the healthcare system could manage up to 1,000 seriously wounded soldiers per day in the event of a large-scale military conflict – a scenario that exposes critical gaps in trauma surgery capacity, blood supply, medical evacuation logistics and hospital surge readiness.¹³ WHO also notes that armed conflict can lead to the disruption of healthcare systems, the collapse of essential medical supply chains, the exodus of health workers, attacks on healthcare and upsurges in epidemics and starvation. Geopolitical risk should therefore be treated not only as an external shock but as a systemic stressor that can simultaneously reduce healthcare system capacity and increase population health needs.¹⁴

Cyberattacks

Cyberattacks have become a core resilience issue because digital healthcare systems, electronic records, connected devices, telemedicine and hospital operations are increasingly dependent on secure digital infrastructure. The European Union Agency for Cybersecurity (ENISA) found that healthcare providers and hospitals were particularly affected by cyberattacks, while the European Commission reported that 309 cybersecurity incidents affected the health sector in 2023 and that 54 percent of cyberattacks in the sector involved ransomware. Cyberattacks can disrupt clinical operations, delay care, compromise patient data, damage public trust and create patient safety risks, especially where digital downtime affects emergency, diagnostic or medication systems.^{15, 16, 81}

CHRONIC STRESSORS

Workforce shortages

Healthcare workforce shortages are not only a question of headcount but also of retention, skill mix and effective deployment. Europe faces a projected shortfall of 4.1 million healthcare workers by 2030, underscoring the need to expand and better support healthcare professionals of all types.⁶¹ Skills shortages further reduce effective capacity, particularly where healthcare systems lack specialists, digital capabilities, emergency-care skills or primary-care capacity needed to manage more complex demand.¹⁶ Burnout and absenteeism have become major workforce risks since COVID-19, while attrition has further reduced available capacity even where formal staffing numbers appear stable. Retention and better working conditions, including mental health support, are therefore central to resilience.^{17, 18, 19}

Demographic change

Demographic change and aging are slow-moving but structurally transformative stressors that increase demand for complex, continuous and long-term care. The old-age dependency ratio measures the number of people aged 65 and over relative to the working age population aged 20-64; in the OECD, it is projected to rise from 31 percent in 2023 to 52 percent by 2060.²⁰ Although longer lives do not necessarily translate into greater disease burden, it is operationally clear that life expectancy gains are increasingly spent living with multiple chronic conditions simultaneously – shifting demand toward age-related conditions such as cardiovascular disease, diabetes, dementia, cancer, frailty and multimorbidity.^{21, 22} This increases demand for coordinated primary care, specialist care, rehabilitation, home care and long-term care.²³

Climate change

Climate change should be framed as a long-term structural risk multiplier for healthcare systems rather than only as a sequence of disasters. It increases baseline health demand through heat stress, respiratory illness, vector-borne diseases, food and water insecurity and displacement, while also intensifying many acute hazards that can overwhelm healthcare infrastructure. WHO estimates that climate change could cause approximately 250,000 additional deaths per year between 2030 and 2050, mainly from undernutrition, malaria, diarrheal disease and heat stress.²⁴

Unhealthy lifestyles

Unhealthy lifestyles primarily refer to modifiable behavioral risk factors such as poor nutrition, physical inactivity, tobacco use and harmful alcohol consumption, particularly where healthier choices are realistically accessible and supported by the surrounding environment. These behaviors account for more than 43 million deaths annually, equivalent to around three-quarters of all deaths globally. This sustained demand for continuous care leaves healthcare systems with reduced spare capacity to absorb acute shocks. In low- and middle-income countries, fragile settings or populations without realistic access to healthy living conditions, poor health outcomes are often driven by structural determinants such as unsafe drinking water, poor sanitation, lack of food, malnutrition, air pollution and endemic infectious diseases such as malaria. These factors reflect environmental, socioeconomic and public health conditions rather than personal choice.

Importantly, not every country faces every stressor with the same intensity and not every country has the same resources to respond. But all countries are exposed to some combination of these pressures, and all of them need to find ways to become more resilient, whether through large-scale investment or more creative, low-cost approaches.

MEASURING HEALTHCARE SYSTEM RESILIENCE

Measuring the resilience of healthcare systems has historically been challenging, for two reasons: first, resilience is multidimensional, as we have seen; and second, no standardized internationally accepted framework exists for monitoring and measuring resilience.²⁵

In fact, approaches to measuring resilience vary as widely as definitions of the concept. The 2024 scoping review referred to earlier identifies three methodological traditions in the academic literature: **system mapping**,²⁶ which assesses core functions, outputs and outcomes of the health system; **capacity-based assessment**,²⁷ which evaluates system characteristics such as awareness, diversity, self-regulation, integration and adaptability; and **strategy-based assessment**,²⁸ which examines how absorptive, adaptive and transformative mechanisms unfold during a shock.²⁹ Each approach captures a different dimension of resilience and none is sufficient alone; a system may appear well resourced on paper while lacking the governance mechanisms needed to mobilize those resources under pressure.

Several studies have sought to assess and compare healthcare system resilience across countries, using similar healthcare system dimensions and focusing mostly on health emergencies as a stressor.^{30, 31, 32} A 2023 study by Zhao et al. evaluates 60 countries in terms of their responses to COVID-19.³³ It assesses countries across four dimensions: government governance and prevention; health financing; health service provision; and the healthcare workforce. The authors assign each country a healthcare system resilience score between zero and one, categorizing the countries into high, medium and low resilience groups. Switzerland ranks first, followed by Japan and Germany. They are followed by Australia, South Korea, Canada, New Zealand, Finland, the United States and the United Kingdom, completing the top ten. To address the lack of a universal measurement

and monitoring framework, in 2024 WHO developed the Health System Resilience Indicators Package. This provides a structured set of indicators for assessing resilience during routine operation as well as during shocks and crises. The framework supports systematic evaluation at the national and subnational levels as well as within individual facilities, while strengthening healthcare system performance and emergency preparedness.³⁴

The WHO framework organizes resilience measurement across six core domains: service delivery, health workforce, health information systems, access to essential medicines, financing and leadership/governance. Together, these domains represent the capacities healthcare systems need to anticipate threats, respond to disruption, maintain essential services, recover and adapt to changing conditions. ►C

**The threats differ, as do the
resources to tackle them.
But no health system can
afford to leave resilience to
chance.**



C WHO framework for measuring healthcare system resilience

Health system building blocks					
Service delivery	Health workforce	Health information system	Access to essential medicines	Financing	Leadership/ governance
Collaboration between facility-based and community-based delivery	% subnational health workers trained in community engagement	Mechanism for multisectoral information sharing	National list of essential medicines	Mechanism to address financial barriers	System for conducting simulation exercises
% facilities conducting simulation exercises	Roster of rapid response teams available	Comprehensive surveillance and response system	Regulatory mechanisms for essential health products	Dedicated budget line for service continuity	All-hazards emergency preparedness and response plan defines role of health services
% facilities conducting after-/intra-action reviews	Emergency workforce surge capacity (rapid response teams)	Early warning system established	% facilities with prepositioned essential supplies	Contingency funds available	Health facility infrastructure standards for resilience
% facilities with Infection Prevention and Control Assessment Framework level/ score	% facilities with focal point for emergency management and service continuity	Vulnerability and risk mapping conducted	Availability of essential medicines	Public health services funded	Health system resilience as a function in emergency management structure
% facilities offering nationally defined service package	% facilities with staff trained in health system resilience	% facilities with risk profiles	% facilities experiencing water supply interruption	Resource mapping conducted	Designated entity or structure for health system resilience
% facilities using community voice to inform service planning	% facilities covered by occupational health services	Completeness of reporting by facilities	% facilities with basic WASH amenities	Contingency funds accessible to facilities	Health in All Policies approach being implemented
Health system resilience indicators					

The level at which data are generated and collected: ■ National/subnational ■ Facility

Selection of key indicators; full list is 64 indicators listed and detailed by WHO

Source: WHO: Health system resilience indicators (2024)

Aligned on urgency, divided over strategy

Stakeholder views on resilience priorities
and readiness



This year's survey captures the views of senior stakeholders across the healthcare value chain. In total, 486 respondents took part, covering all major participant groups: policymakers, payers, providers and producers. The methodology was designed to ensure both geographic and stakeholder diversity. We asked respondents which threats they regard as most significant, how confident they are in the resilience of their healthcare systems, which levers they consider most important, what challenges their organizations face and what actions they are taking.

Notably, in a follow-up question, only a small share of respondents report having a dedicated resilience budget. Without ring-fenced funding, resilience investments are likely to be among the first to be cut when financial pressure mounts. Agreement is particularly strong in Europe and the Middle East, although somewhat lower in the United States and Asia. Even so, the wider sense of strain is evident in the United States: in a 2026 Gallup survey, a record 23 percent of Americans described the healthcare system as "in crisis."³⁵

Among the three countries ranked highest for resilience in Chapter 1, Japan is the exception: only 60 percent of respondents expect healthcare system resilience to become more important. By contrast, the figure is 79 percent in Switzerland and 86 percent in Germany. Although all three countries are generally considered relatively risk-averse, their views on the future importance of resilience differ markedly.

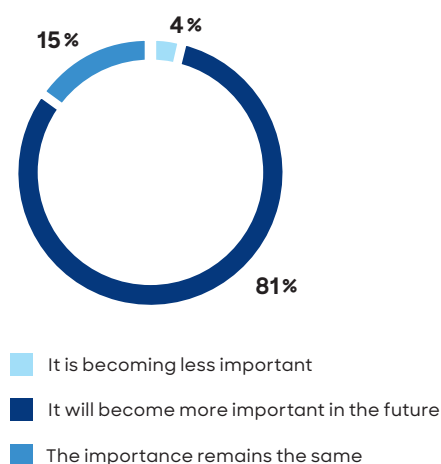
The results also reinforce the view that resilience is increasingly understood as a continuous system function rather than a crisis-response mode. The debate is no longer whether to invest in resilience, but how that investment should be made and who should bear the cost. ► **D**

This broad consensus on the growing importance of resilience raises a more practical question: where do healthcare systems remain most exposed? The survey reveals a clear mismatch: **respondents feel least prepared for the stressors they consider most important.** Demographic change emerges as the number one concern, followed by workforce shortages and geopolitical conflict.

Although the effects of demographic change have been foreseeable for decades, healthcare systems are still perceived as poorly prepared to manage them, particularly in Europe. Workforce shortages present a closely related challenge, and the two pressures reinforce each other where demographic aging is most advanced. Respondents

D Growing importance of healthcare system resilience

How do you think the importance of healthcare system resilience is developing?



Source: Roland Berger

in countries with large expatriate workforces, including Singapore, the United Arab Emirates and Switzerland, express considerably greater confidence. By contrast, respondents in Germany and Japan perceive their systems as less prepared, reflecting not only more constrained labor markets but also the acute demographic pressure that these countries face.

The preparedness gap is most pronounced for geopolitical conflict. Not a single respondent considered their healthcare system fully equipped to manage this risk, suggesting that structural readiness for geopolitically driven disruption remains limited. Saudi Arabia and the United Arab Emirates are notable exceptions, with respondents assessing their systems as comparatively well prepared.

Cyberattacks and health emergencies sit alongside unhealthy lifestyles in the upper-middle zone: respondents regard these stressors as moderately important but also feel comparatively well prepared to address them. Health

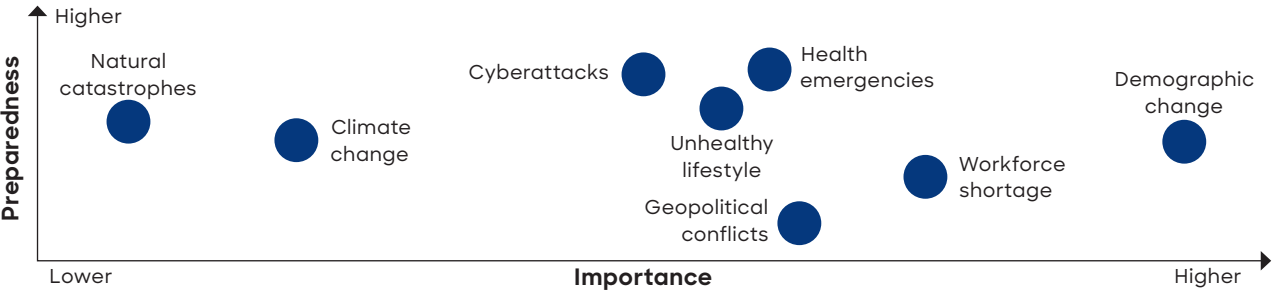
emergencies rank particularly high in Asia, which may reflect the lasting impact of COVID-19. Interestingly, respondents in the United States express especially strong confidence in their healthcare system's ability to address unhealthy lifestyles, despite obesity rates having more than doubled over the past three decades.³⁶

Natural catastrophes and climate change rank lower as sources of concern, particularly in Europe and the United States. This may indicate that respondents still tend to perceive them as occasional events rather than structural risks.

Regional differences sharpen this picture. European respondents generally feel less prepared to address the stressors identified, despite being among the most likely to believe that healthcare system resilience will become more important. By contrast, respondents in Asia, the Middle East and the United States are generally more confident in their systems' preparedness. ►E

E Perceived importance of and preparedness for resilience stressors

Which stressors do you believe pose the biggest challenge to your healthcare system's resilience, and how well do you feel your current healthcare system is equipped to tackle them?



Source: Roland Berger

FIVE STRATEGIC TRADE-OFFS

Recognizing that healthcare system resilience matters is only the starting point; the survey then explored five strategic trade-offs: prevention versus affordability, planning versus flexibility, public versus private responsibility, national self-sufficiency versus international cooperation and central versus local control. They reflect real decisions being made today on budget allocations, governance design, supply chain policy and crisis response architecture.

THE FIRST TRADE-OFF concerns whether **healthcare systems should invest more in prevention or contain costs and respond only when a crisis occurs.** Overall, 73 percent of respondents lean toward "resilience first." Support is strongest in the United States, at 84 percent, followed by Europe at 78 percent and Asia at 75 percent. The pattern is reversed in the Middle East countries surveyed, Saudi Arabia and the United Arab Emirates, where only 42 percent lean toward resilience first, while 58 percent favor "affordability first." This is notable given both countries' stated focus on healthcare resilience, but it also underlines the central tension of this trade-off: even where resilience is a policy priority, respondents remain sensitive to near-term budget constraints. ►F, G

The strong resilience-first preference is broadly shared by government and hospital respondents, as well as by respondents from pharmaceutical and medtech companies. Insurers and payer organizations are the clear exception: more than 40 percent lean toward affordability, reflecting the financial burden they would often be expected to carry.

The result provides support for preventive resilience investment, but it does not remove the underlying budget constraint. At the same time, health economists increasingly reject the false binary between resilience and affordability. A growing body of evidence suggests that investment during normal times can reduce the economic

cost of crises and support faster recovery – making resilience not just ethically preferable but economically rational.^{37, 38}

The OECD estimates that targeted annual investment equivalent to around 1.4 percent of gross domestic product (GDP) is needed to build resilient healthcare systems.³⁹ That figure is significant and, for many countries, sits in direct tension with fiscal constraints and competing budget priorities, including the immediate pressure of keeping existing services running. Some of this investment could be financed through efficiency gains and smarter reallocation of existing healthcare budgets rather than through new spending alone. That said, those same efficiency gains are already needed simply to keep routine care affordable, leaving little headroom for additional resilience investment. Ultimately, this is a political question: are societies willing to explicitly prioritize resilience over other competing demands?

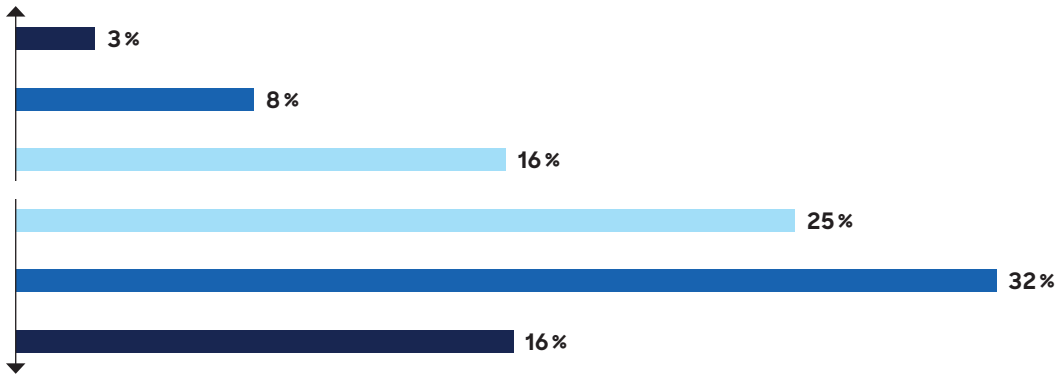
THE SECOND TRADE-OFF concerns the **balance between structured foresight and flexible response.** Here, respondents remain largely undecided: the results are almost evenly split, with no clear consensus on the right preparedness approach. This reflects a genuine unresolved strategic tension: some leaders place greater trust in sophisticated risk assessment and scenario planning, while others are wary of rigid plans that may fail under real-world conditions.

This pattern is consistent across the regions and industry players covered by the survey. Most regions are close to evenly divided, although respondents in the Middle East lean slightly more toward flexibility, while those in the United States show a modest preference for sophisticated risk assessment. No industry player leans more than 60 percent in either direction.

F Nearly three-quarters of respondents lean toward resilience first

Should healthcare systems invest more money in risk prevention ("resilience first") or try to contain costs and react only in a crisis ("affordability first")?

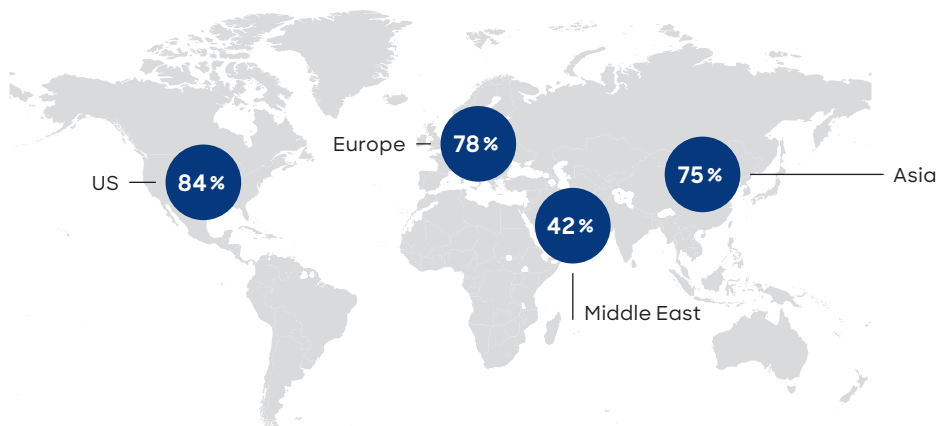
Fully agree with affordability first



Fully agree with resilience first

G Resilience-first sentiment is strongest in the United States

Share of respondents leaning toward resilience first by region



Source: Roland Berger

The implication is that preparedness frameworks need to combine both approaches through adaptive planning. Scenario planning – endorsed by the OECD and the European Union as a core resilience tool – must be complemented by organizational agility to be effective.^{40,41}

►H

THE THIRD TRADE-OFF concerns whether **responsibility for healthcare system resilience should sit primarily with private actors or public institutions**. A majority of 60 percent favor public accountability. This preference is particularly pronounced in countries where government plays a strong role in organizing the healthcare system. More than two-thirds of respondents in China, Saudi Arabia and the United Arab Emirates place responsibility on public actors, while the figure in Germany is almost two-thirds. In the United States, by contrast, a majority favor greater responsibility for private actors.

Despite the growing involvement of the private sector in healthcare, respondents firmly believe that public institutions carry the primary accountability for resilience. This is particularly evident in Europe, where emergency preparedness and stockpiling remain predominantly public functions, alongside surge capacity and pandemic coordination.⁴²

Primary public accountability does not, however, exclude a substantial role for private actors. Insurers, pharmaceutical companies and medtech firms play an increasingly important role through co-investment and innovation, including across supply chains. Regulatory frameworks are needed to align private incentives with public resilience goals, suggesting that private-sector contributions will often require public mandates or incentives rather than voluntary action alone. Public-private partnerships such as the Innovative Health Initiative (IHI) are also gaining traction in digital health infrastructure and data-driven health innovation.⁴³ ►I

THE FOURTH TRADE-OFF concerns the balance between national self-sufficiency and global cooperation. Respondents are deeply divided, with no clear overall preference. The strongest support for global solidarity comes from the Middle Eastern countries surveyed, where more than 80 percent lean in this direction. A majority of respondents in the United States also favor global solidarity, while Germany is almost evenly split between international cooperation and national self-sufficiency.

This division is consistent with real-world behavior during COVID-19, when export restrictions and vaccine nationalism exposed the limits of global solidarity. Despite the rhetoric of international cooperation, vaccine inequity showed that nations prioritized their own populations – a pattern widely expected to recur in future crises.⁴⁴ In fact, academic and policy consensus increasingly supports a model of "resilient interdependence," or maintaining critical domestic capabilities while preserving mechanisms for global collaboration.⁴⁵ ►J

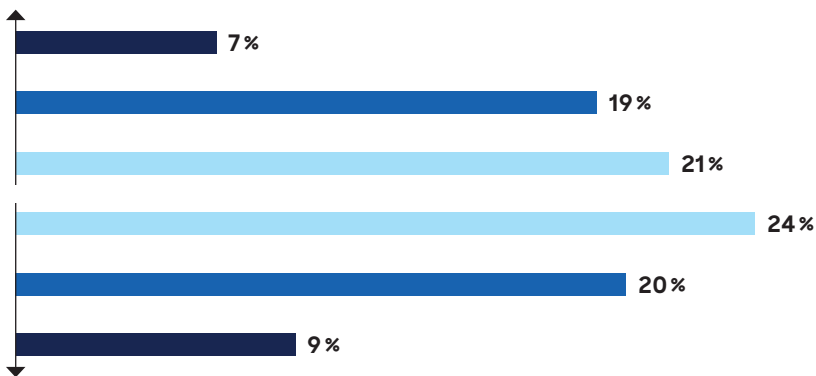
Finally, **THE FIFTH TRADE-OFF** concerns the **balance between central control and decentralized decision-making**. Respondents are almost perfectly split, with no dominant view. This reflects the genuine structural diversity of their national healthcare systems.

The country-level findings reveal similar diversity in practice. Even within a relatively small part of Europe, approaches differed during COVID-19: Austria and Switzerland adopted more centralized models, while Germany and France opted for decentralized decision-making. Looking more broadly, support for central control is strongest in centrally governed countries, with more than two-thirds of respondents in both China and Singapore favoring strong top-down coordination, for example. The underlying trade-off is clear: decentralized systems show faster local adaptation but weaker national coordination, while centralized systems deliver a more uniform response but offer less local flexibility. ►K

H Respondents are evenly split between planning and flexibility

Should healthcare systems focus more on sophisticated risk and scenario planning or prioritize flexible responsiveness and adapt primarily when a crisis occurs?

Fully agree with flexible responsiveness

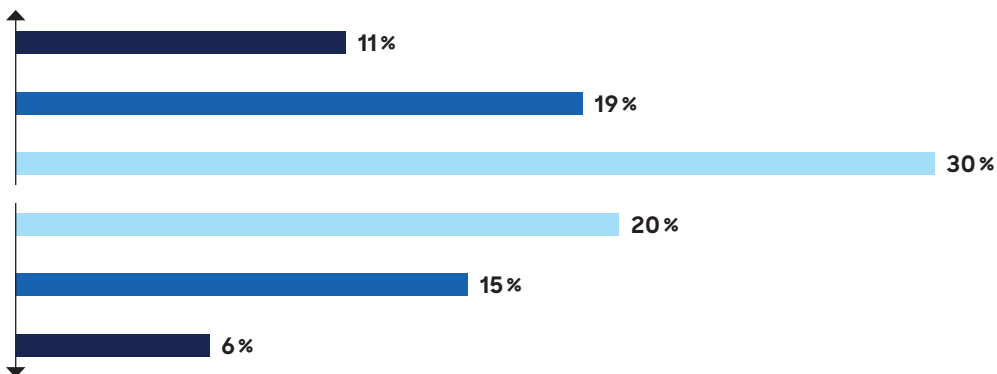


Fully agree with sophisticated risk planning

I Public institutions retain primary accountability for resilience

Should healthcare systems place more responsibility on private actors or public institutions?

Fully agree with public sector



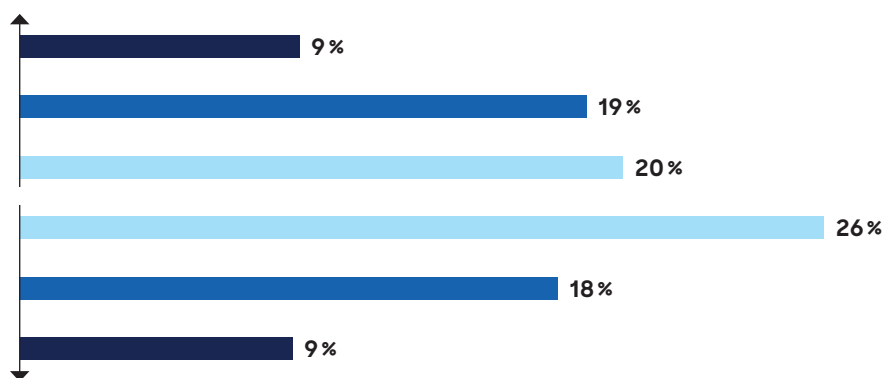
Fully agree with private sector

Source: Roland Berger

J Respondents are divided between self-sufficiency and global solidarity

Should healthcare systems primarily strive for national self-sufficiency or emphasize global solidarity and rely more on international cooperation and support?

Fully agree with global solidarity

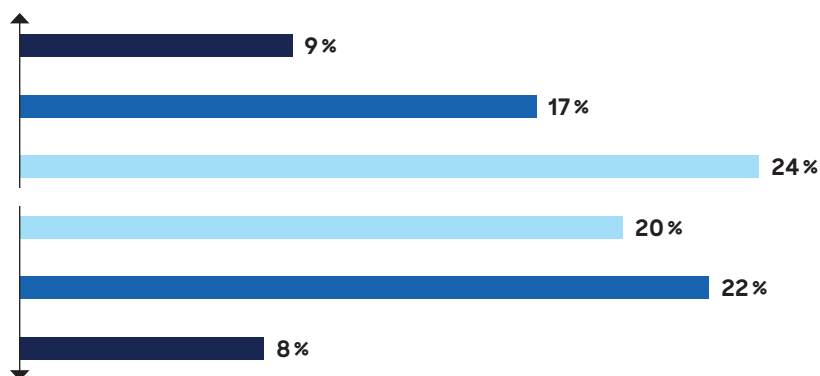


Fully agree with national autarky

K Respondents are evenly split between central and local control

Should healthcare systems rely more on central control with strong top-down coordination or on local control with decentralized decision-making?

Fully agree with local control



Fully agree with central control

Source: Roland Berger

STAKEHOLDER RESPONSIBILITY ACROSS THE VALUE CHAIN

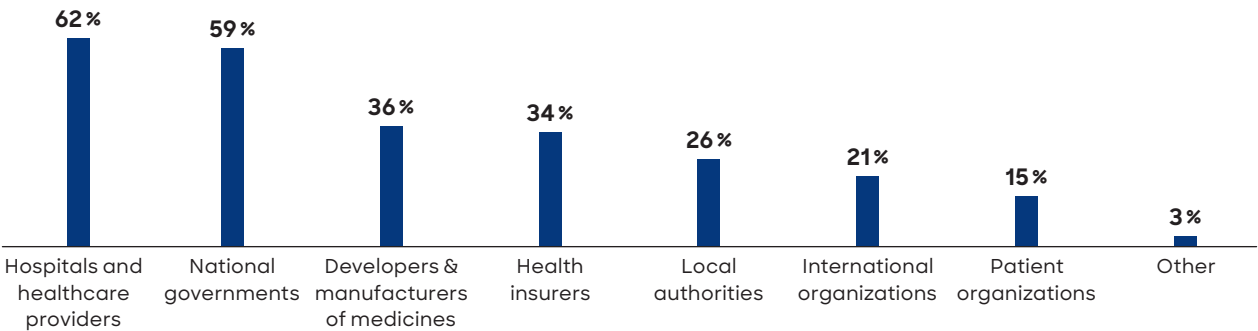
Respondents were then asked which stakeholders they see as most important for improving healthcare system resilience overall. Hospitals are seen as the primary actors, followed by national governments. Health insurers and pharmaceutical and medtech firms are considered secondary actors, while international organizations rank lowest, consistent with the national-first finding above. The regional pattern shows some variation, however: in Europe, most respondents believe that government should be responsible for improving healthcare system resilience, while in the Middle East, the United States and Asia, respondents attribute that responsibility primarily to hospitals.

The perception that hospitals and healthcare providers carry the primary operational burden of resilience creates a structural mismatch, as providers are funded per case or activity, not for maintaining resilience capacity. This is where national governments have a critical role: they are uniquely positioned to set mandatory preparedness standards, fund preventive capabilities and reserve capacity, coordinate cross-sectoral crisis response and ensure equitable access during shocks.

At the same time, health insurers are under-utilized as resilience actors. Their actuarial capabilities and financial mechanisms could be redirected toward risk pooling for resilience investment, but current incentive structures do not reward this. The key structural problem is that no single actor has both the authority and the incentives to drive system-level resilience. Deliberate multi-stakeholder governance design is therefore required. ▶L

L Hospitals and governments are seen as the leading resilience actors

Which stakeholders do you see as most important for improving healthcare system resilience overall?



Note: Multiple choice question. Totals exceed 100 %.
Source: Roland Berger

ORGANIZATIONAL REALITY: BARRIERS AND MEASURES

Leaving the systems perspective and turning to respondents' own organizations, the survey then asked about the main challenges they face regarding resilience. Budget constraints are the single most cited barrier to resilience investment across all surveyed organizations and are particularly pronounced for hospitals. Regulatory complexity also creates a compliance burden, consuming resources that could otherwise be directed toward resilience. This is especially true for hospitals, which must manage both clinical and operational compliance. Regulatory complexity is a particular concern for respondents in Europe and Asia, while lack of transparency is the main issue identified in the United States.

A lack of incentives points to a broader systemic design failure: healthcare systems reward output, such as procedures and patient throughput, but not resilience capacity, such as spare beds, stockpiles and trained surge workforces. The fact that decision-making is seen as insufficiently agile – the "agility gap" – reflects organizational hierarchies in healthcare that were designed for stability and standardization rather than rapid adaptation. ►M

Finally, we asked respondents which measures their own organizations have planned or implemented to strengthen resilience. Structured planning and risk assessment are the most widely adopted measures, although quality and depth vary considerably between organizations. Digitalization and artificial intelligence (AI) are increasingly seen as force multipliers for resilience: better data enables better anticipation, faster response and more efficient resource allocation.

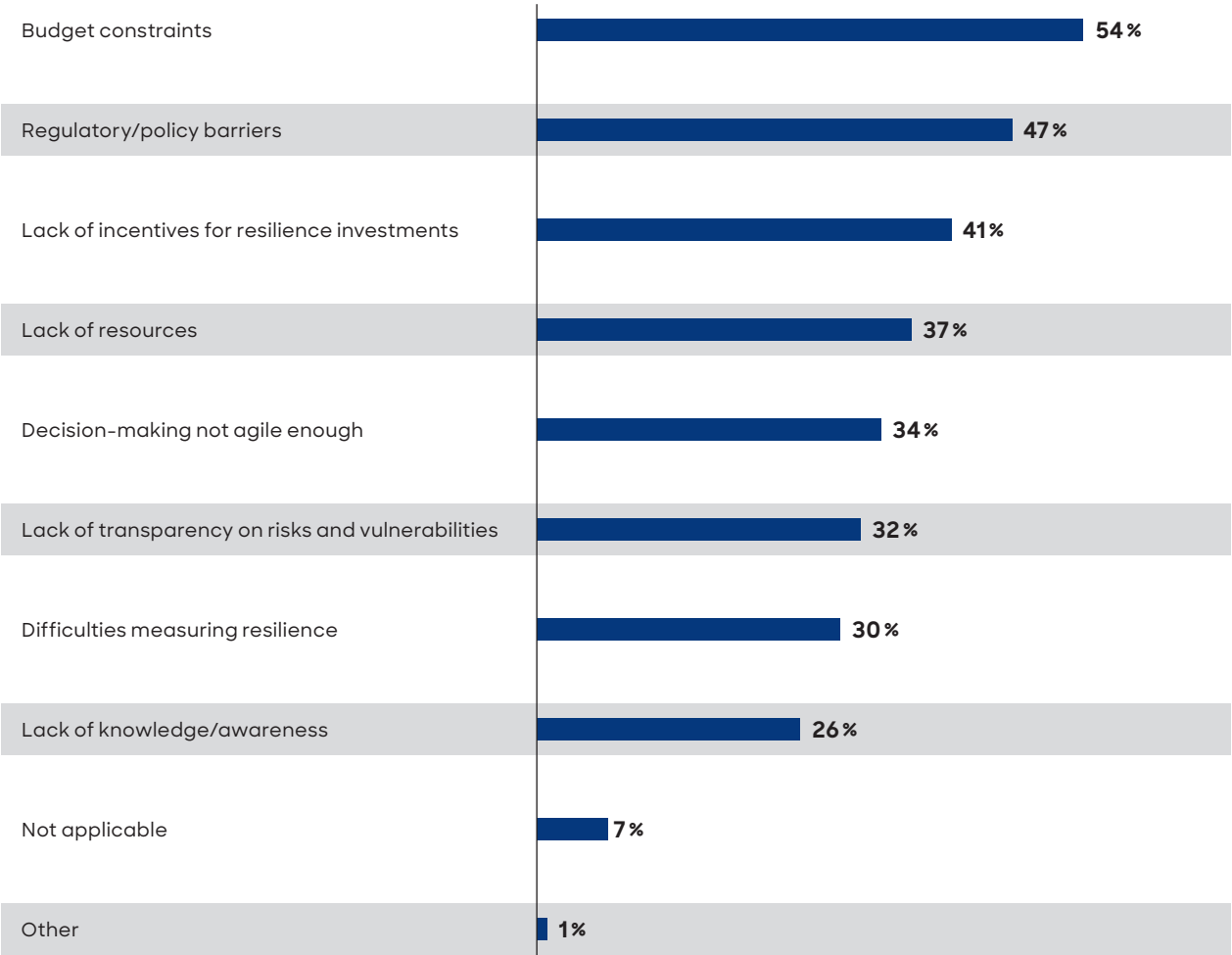
Significantly, only 22 percent of respondents say they have conducted peer benchmarking, even as 81 percent believe healthcare system resilience is becoming more important. Without a clear view of how they compare with

peers, companies will struggle to identify the most effective measures to strengthen resilience.

A closer look at regional and country-level results shows that organizations do not place the same emphasis on the same measures. In most surveyed Asian countries, "digitalization, automation and AI" are seen as the key measures for strengthening resilience, with Singapore as a clear frontrunner. In Europe, by contrast, "structured planning and risk assessment" is the key measure for strengthening organizational resilience. Still, AI and digitalization remain a close second both in Europe and globally, underlining that "AI in health" – the focus of our *Future of Health* study two years ago – remains very much at the forefront of the global health discourse. ►N

M Budget constraints are the leading organizational barrier

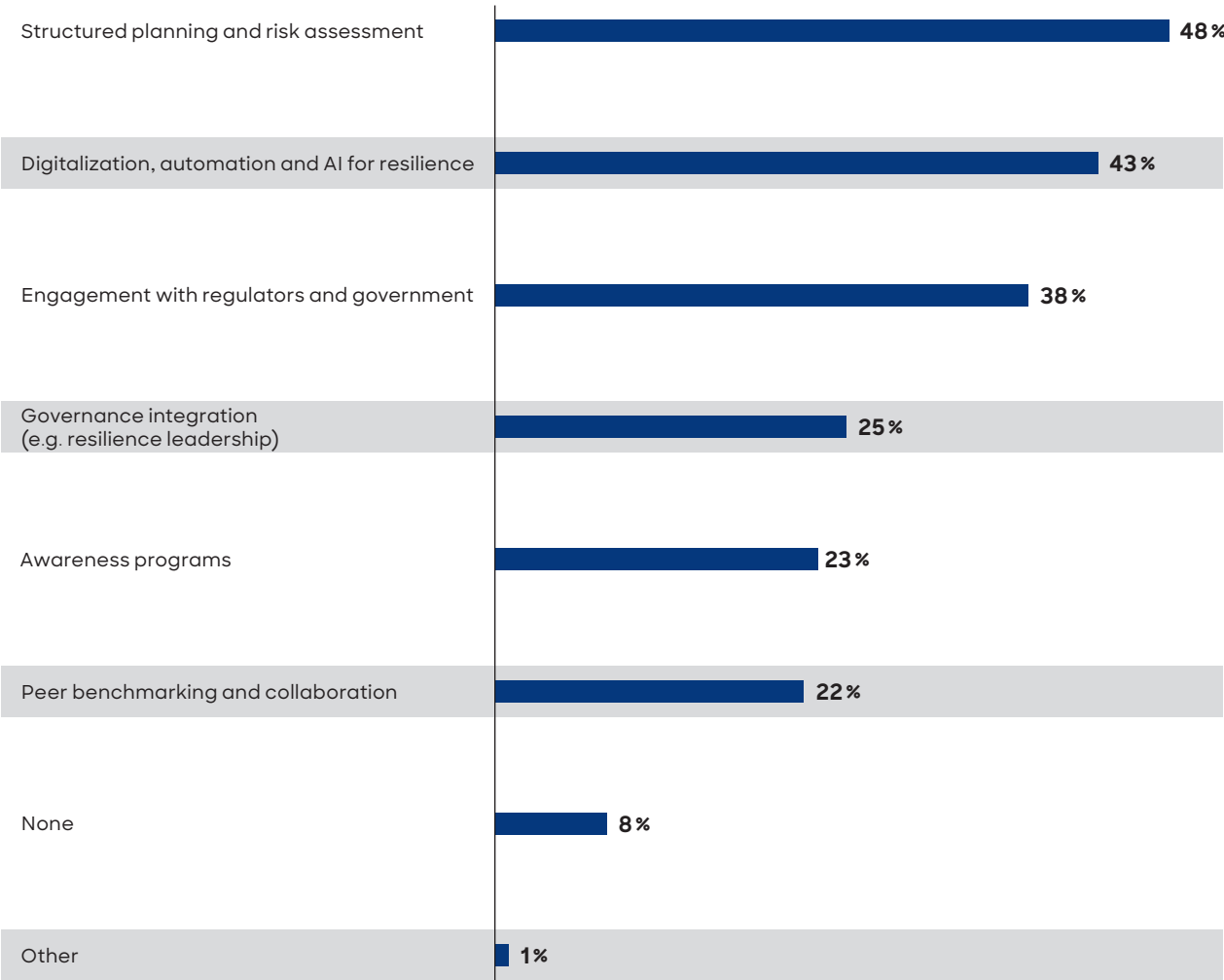
From the perspective of your own organization, what are the main challenges you face regarding resilience?



Note: Multiple choice question. Totals exceed 100 %.
Source: Roland Berger

N Planning and risk assessment are the most widely adopted resilience measures

Which measures has your organization planned or implemented to strengthen its resilience?



Note: Multiple choice question. Totals exceed 100 %.

Source: Roland Berger

Resilience in practice

How countries are responding



Awareness is no longer the challenge; action is. Countries worldwide are now translating the urgency around healthcare system resilience into concrete policies and investments. Their approaches differ: some respond to specific known threats, while others build broader systemic capabilities. This variation shows that perceived threats are not universal: each country has its own threat hierarchy and tends to focus resilience investment on the stressors it knows best. That selectivity is understandable, but it also means that even the most active countries leave gaps. With this in mind, we look below at what leading countries are doing and where even the best-prepared systems still fall short.

In terms of acute shocks, **NATURAL CATASTROPHES** have prompted countries exposed to earthquakes, tsunamis, hurricanes, wildfires, floods and extreme weather events to strengthen disaster preparedness and emergency response capacity. For example, Japan is highly exposed to earthquakes, tsunamis, typhoons and floods. Following the 1995 Great Hanshin-Awaji Earthquake and the 2011 Great East Japan Earthquake, which caused over 6,000 and over 20,000 deaths respectively, the country strengthened disaster preparedness through initiatives such as Disaster Medical Assistance Teams (DMATs) and more resilient healthcare infrastructure to ensure rapid response and continuity of care.^{46, 47} The United States faces frequent hurricanes, wildfires, floods and other extreme weather events. Since the establishment of the Hospital Preparedness Program (HPP) in 2002, it has strengthened healthcare emergency planning through regional healthcare coalitions, surge capacity planning and federal coordination mechanisms such as the Administration for Strategic Preparedness and Response (ASPR) and the Strategic National Stockpile.⁴⁸

HEALTH EMERGENCIES have driven a different set of institutional responses. The COVID-19 pandemic exposed

weaknesses in European cross-border preparedness and medical supply coordination. In response, the European Union established the European Health Union in 2020 and created the Health Emergency Preparedness and Response Authority (HERA) in 2021 to strengthen surveillance, joint procurement and rapid response capacity. The European Union also expanded emergency coordination through the EU Civil Protection Mechanism and rescEU stockpiles.^{49, 50} Likewise, the **Democratic Republic of the Congo** has faced repeated infectious disease emergencies, including 17 Ebola outbreaks since 1976 and the declaration of a 2024 mpox public health emergency. In response, the country strengthened outbreak preparedness through institutions such as the National Institute of Biomedical Research (INRB), expanded genomic surveillance and developed experience with rapid vaccination campaigns and community-based response models.^{51, 52, 53}

For healthcare systems exposed to **GEOPOLITICAL CONFLICTS**, resilience depends on maintaining services during recurring security threats and regional instability. In **Israel**, the National Emergency Management Authority (NEMA) coordinates preparedness with the Ministry of Health and Home Front Command to maintain healthcare continuity during crises. Around 30-40 percent of hospital beds in general hospitals are in protected spaces, including fully equipped bunker hospitals with intensive care units (ICUs), operating rooms and maternity wards capable of activation within hours. This supports uninterrupted service delivery during attacks, while Israel maintains one of the highest life expectancies in the OECD, at 84 years.^{54, 55, 56} **Saudi Arabia**, for its part, has approached geopolitical resilience through system transformation and supply security. As part of its Vision 2030 transformation agenda, it has prioritized healthcare system resilience by strengthening emergency preparedness and advancing digital health, as well as expanding domestic pharmaceutical manufacturing. These reforms,

implemented through the Health Sector Transformation Program, aim to improve healthcare security and reduce dependence on external supply chains.⁵⁷

In digitally advanced healthcare systems, **CYBERATTACKS** are becoming a core resilience issue. **Sweden** is among Europe's leading countries in digital health maturity, with widespread use of electronic health records, national e-prescriptions and interoperable digital health infrastructure. The country has launched Vision eHealth 2025, aiming to make Sweden a world leader in digital healthcare, while the Swedish eHealth Agency manages national digital health services such as the National Medication List, introduced in 2021. As digital dependency has increased, Sweden has integrated cyber resilience into its Total Defense strategy, reintroduced in 2015, to protect critical services including healthcare.⁵⁸ **Finland** has developed nationwide digital health infrastructure through systems such as the Kanta Services, launched in 2010, which provide electronic prescriptions, patient records and health data services across the country. With healthcare increasingly dependent on digital systems, Finland has strengthened cybersecurity through its Comprehensive Security Model, which coordinates public authorities and critical sectors to maintain essential services during cyber disruptions. Complementing this digital resilience, Finland also maintains physical preparedness through approximately 5,500 dual-use underground shelters in Helsinki alone, which can be converted from everyday leisure facilities into protected medical and civil protection spaces during crises.⁵⁹

Turning to chronic stressors, **WORKFORCE SHORTAGES** are already affecting healthcare systems across Europe. **Germany**, for example, is experiencing growing healthcare workforce shortages, particularly in nursing, driven by demographic aging and retirements. The country introduced the Nursing Staff Strengthening Act (PpSG) in

2019 and the Skilled Immigration Act in 2020 to increase staffing capacity. Germany is projected to face a shortage of hundreds of thousands of healthcare workers in the coming years, increasing the focus on recruitment and retention, backed up by digitalization.⁶⁰ **The European Union** more broadly is facing increasing healthcare workforce pressure due to aging populations and rising demand for care. WHO expects a shortage of 4.1 million healthcare workers in the European Union by 2030.⁶¹ In response, the European Commission launched a EUR 1.3 million EU4Health-funded initiative in 2025 to help Member States retain and attract nurses.

DEMOGRAPHIC CHANGE is a central chronic stressor on resilience. **Japan**, for example, is one of the world's most rapidly aging societies, with around 29 percent of the population aged 65 or over. To address rising demand for elderly care, Japan introduced the Long-Term Care Insurance System in 2000 and the Community-Based Integrated Care System in 2012, integrating healthcare, long-term care, prevention and social support. Japan has also invested in digital health and care technologies to maintain service capacity despite demographic pressures.^{62,63,64} **Germany** is also experiencing demographic aging, with around 23 percent of the population aged 65 or over and a shrinking working age population.⁶⁵ The country introduced the Long-Term Care Strengthening Acts from 2015 onward to expand elderly care support and has invested in healthcare modernization, including EUR 3 billion for hospital digitalization through its Recovery and Resilience Plan to improve efficiency and adapt care delivery. Germany nevertheless ranks third in the resilience assessment, despite the considerable pressure created by its aging population.⁶⁶

The effects of **CLIMATE CHANGE** are increasingly visible in healthcare systems through heatwaves, extreme weather events, changing disease patterns and pressure on

healthcare infrastructure. In response, the **European Union** launched the European Climate Law in 2021 and the EU Adaptation Strategy in 2021, which aim to strengthen climate resilience across sectors, including health. The European Union has also developed climate-health initiatives under EU4Health for 2021-2027 to improve preparedness for climate-related health threats. In Southeast Asia, **Singapore** is highly exposed to climate-related risks, particularly rising temperatures, flooding and sea-level rise. Through the Singapore Green Plan 2030 and the Centre for Climate Research Singapore, it has invested in climate adaptation and urban cooling, alongside developing climate-resilient infrastructure. The country has also implemented long-term measures to strengthen coastal protection, supported by a Coastal and Flood Protection Fund that now totals SGD 10 billion, to protect critical infrastructure from future climate impacts.^{67, 68}

Long-term prevention is especially important in addressing **UNHEALTHY LIFESTYLES**. The **United Kingdom** introduced the Soft Drinks Industry Levy, or "sugar tax," in 2018.⁶⁹ The levy successfully incentivized manufacturers to reformulate products and significantly reduce sugar content, and is being expanded to cover high-sugar, pre-packaged milk-based drinks. It has been associated with large reductions in the sugar content of soft drinks and is expected to contribute to long-term prevention of obesity, type 2 diabetes and other diet-related diseases. For its part, **Finland** is a leading example of how public health interventions can reduce lifestyle-related disease risks. Through the North Karelia Project from 1972 to 1997, it implemented population-wide measures targeting smoking, diet and cardiovascular risk factors, contributing to a major reduction in cardiovascular mortality.⁷⁰ The approach was later integrated into broader national health promotion strategies.

Deep dive: EU health resilience funding

The European Union supports health system resilience through a broad portfolio of funding mechanisms. Key instruments include EU4Health, the European Union's largest dedicated health program, with EUR 4.4 billion for 2021-27; Horizon Europe, with EUR 95.5 billion for research and innovation across sectors, including health; and investments in digital health, emergency preparedness and regional infrastructure through HERA, rescEU, the European Regional Development Fund (ERDF) and other cohesion funds. HERA, established in 2021, strengthens preparedness and response to serious cross-border health threats, with a particular focus on medical countermeasures.

Taken together, these examples show that progress is real and possible. But they also show that even the most active countries respond selectively, building resilience for the threats they know best. No system has closed all the gaps, and the distance between what is being done and what is needed remains significant in much of the world.

Building the capabilities that matter

Strengthening system readiness



As we have seen, stakeholders agree that resilience must improve, yet remain divided on the strategic questions that would make it happen in practice: how to balance resilience with affordability, who should take the lead, how decisions should be made and how far national borders should constrain collective action. This strategic paralysis has a name: inertia, and it is itself one of the greatest risks to healthcare system resilience. The gaps are systemic, affecting all areas of the healthcare sector. Healthcare systems are structurally optimized for throughput, not preparedness, and every actor in the sector – from hospitals and insurers to pharmaceutical companies and policymakers – operates within incentive structures that reward activity rather than readiness.

The experts we interviewed confirmed this pattern. In their view, case-based hospital financing creates little economic logic for maintaining reserve capacity, while resilience is still often treated as an additional topic rather than an integrated part of the business. Outside crisis periods, preparedness is also difficult to justify commercially.

As established in Chapter 1, resilient healthcare systems need five core competences to operate continuously and reinforce one another over time: the ability to anticipate threats before they materialize, respond rapidly when a crisis hits, maintain essential services throughout a disruption, recover efficiently once the shock passes and adapt by transforming structures based on what is learned. The question is no longer whether these competences are necessary, but what is required to build and sustain them in practice. Below, we examine each in turn. ►○

●● When resilience is treated as an add-on, there is little business case for maintaining capacity that may only be needed in a crisis.

O Building healthcare system resilience



Anticipate

- Early warning systems
- Predictive intelligence
- Workforce visibility
- Supply chain transparency



Respond

- Central crisis governance
- Rapid coordination
- Workforce mobilization
- Digital care delivery



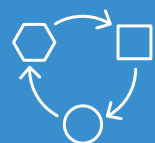
Maintain

- Service continuity
- Supply security
- Strategic reserves
- Surge capacity



Recover

- Capacity restoration
- Backlog management
- Care prioritization
- Resource reallocation



Adapt

- Governance reform
- Cross-sector coordination
- Updated incentives
- Continuous learning

ANTICIPATE

The ability to anticipate threats is the first core competence and requires more than general awareness of risk. It depends on real-time intelligence and connected systems that translate signals into decisions before pressure escalates.

Early warning systems are needed that not only detect risks but link warning signals to scenarios and thresholds. Infection trends, hospital capacity, medicine shortages, workforce gaps, supply chain disruptions and climate events should trigger predefined decisions and responsibilities, as well as appropriate funding. COVID-19 showed that early warning alone is insufficient if signals are not connected to authority and operational capacity. Many healthcare systems had plans but struggled with funding, stockpiles, testing, data sharing, communication and coordination once pressure increased. Building such systems requires sustained investment and cross-institutional data sharing agreements that many healthcare systems have yet to resolve.

Digital infrastructure forms part of the backbone of anticipation. AI, interoperable data systems, telemedicine and predictive analytics can give healthcare systems better visibility under pressure, supporting faster response and more efficient resource allocation.

Real-time shortage signals, such as those now available through the European Shortages Monitoring Platform, illustrate what is possible. The challenge is to make such tools systematic rather than selective. Healthcare systems should pursue digital sovereignty as an explicit resilience objective, reducing dependence on a small number of international hyperscalers through data residency requirements and diversified vendor strategies. Pursuing this path is not cost free. Diversified vendor strategies and data residency requirements can raise short-term costs and complexity, and should be weighed against the long-term resilience gains they provide.

Workforce visibility is equally part of anticipation. Healthcare systems need a clear view of available skills and how quickly they can be mobilized.⁷¹ Digital and AI-enabled workforce planning can provide real-time insight into available skills, vacancy trends, surge capacity gaps and time-to-mobilize by specialty. Middle management is critical in this respect, because it often sees operational workforce risks early.

In practice, however, most organizations in health still rely on legacy HR and scheduling systems that are not interoperable with planning or forecasting tools, which makes real-time workforce visibility more aspirational than operational for the majority of providers today. Building AI-enabled workforce planning requires standardized personnel data across departments and institutions – a prerequisite largely missing today and requiring years of investment, not a quick fix.

RESPOND

Responding effectively requires agility and speed, which depend on structures designed before a crisis arrives, not improvised under pressure. It is therefore not something healthcare systems can activate only in crisis mode; it must be built into the operating system in normal times.

Governance is the starting point. Resilience requires a central plan that societies and institutions can align behind. COVID-19 demonstrated that fragmented, heterogeneous decision-making slows response when speed is most critical. Countries that entered the pandemic with unified command structures and standardized stockpiling and surveillance protocols consistently responded more effectively than those relying on improvised, multi-actor negotiation under pressure.⁷² Central coordination does not mean central execution of everything. Operational response and workforce deployment often need to remain closer to providers and communities.

National governments are the only actors with the democratic mandate and authority to fill that role: setting preparedness and stockpiling standards, surge-capacity requirements, funding and independent audit. At the European level, regulation is equally needed for tasks no country can deliver alone: cross-border crisis coordination, strategic stockpiling, supply chain transparency and joint procurement.

The European Union has begun moving in this direction and strengthened selected preparedness functions after the COVID-19 pandemic through HERA, especially around medical countermeasures, joint procurement and emergency response capacity.⁷³ The United States illustrates a different, more hybrid model: federal structures support preparedness nationally, while the Hospital Preparedness Program works through regional healthcare coalitions.⁷⁴

Reactivation should also be planned before crises occur. Many people who leave clinical roles already have the training and professional experience the system needs. Rather than treating them as permanently lost, healthcare systems should maintain a clear pathway back through skills registries, regular contact, refresher training, fast-track onboarding and predefined emergency roles. The COVID-19 pandemic showed the relevance of this logic: several countries were able to bring back people with existing clinical training or near-clinical qualification.

Digital tools can also expand effective healthcare capacity. Telemedicine has demonstrated clear operational value in crisis settings but remains under-deployed at scale. In Germany, for instance, automated triage bots and remote consultation remain the exception rather than the norm. AI also holds substantial potential, from optimizing inventory allocation across suppliers to automating administrative tasks currently carried out by clinical staff.

On procurement, the principle should be simple: when shortages cross borders, pre-agreed EU solidarity mechanisms, coordinated by HERA, should determine how supplies are reallocated – not last-minute political

bargaining. Procurement rules should reward resilience as well as price, requiring diversified suppliers, buffer stocks and, where appropriate, domestic or nearshore sourcing. Manufacturers should bring final “fill and finish” back to Europe, while hospitals and procurement agencies should use AI-enabled forecasting to anticipate demand and manage inventories more proactively.

● The fastest capacity to
● mobilize may already be
outside the system: trained
professionals who could return
in a crisis.

MAINTAIN

Maintaining essential services throughout the duration of a shock is the most frequently cited competence in peer-reviewed definitions of healthcare system resilience, and the one most directly threatened by the structural optimizations of normal-time healthcare systems. Systems built for throughput have little reserve capacity to draw on when demand surges or supply fails.

Business continuity planning must be embedded at all levels of the workforce, not held only by senior leadership. Staff need to know in advance what their roles are during a crisis, which escalation protocols apply and how services will be maintained under disruption. Organizations that have exercised these scenarios systematically respond faster and with less improvisation when pressure arrives.⁷⁵

Critical medicines and vaccines are mainly sourced from a limited number of geographic production hubs, creating systemic supply dependencies. Procurement frameworks that prioritize lowest-cost tendering further constrain supply security. The survey results are consistent

Stockpiling requires binding rules: governments set the floor, industry holds the buffers and payers accept the cost of security. ● ●

with this: geopolitical conflict is the stressor for which respondents feel least equipped, and supply chain exposure is a central reason why.

Strategic stockpiling has advanced at EU level, including through rescEU medical stockpiles. Real-time shortage signals are now available through the European Shortages Monitoring Platform.⁷⁶ However, no standardized framework yet defines which products must be stockpiled, at what volume or by which actors across member states, and incentives are not consistently in place. Stockpiling needs such a binding framework, with clear responsibility shared between national governments and the European Commission. In practice, this means governments define the mandatory floor and enforce compliance, while pharmaceutical and medtech manufacturers are obligated to hold buffer stocks as a contractual condition of market access. Payers and procurement bodies must in turn accept that resilience-linked supply contracts will carry a cost premium over lowest-price alternatives: this is the price of security, not inefficiency.

The European Union's Critical Medicines Act (CMA), proposed in March 2025, points in this direction at European level.⁷⁷ It targets shortages of essential medicines, including antibiotics and insulin, by requiring member states to develop national supply security programs. It also enables collaborative procurement and supports EU manufacturing capacity for critical medicines and their ingredients. National frameworks are already operational: France's ANSM requires pharmaceutical laboratories marketing medicines of major therapeutic interest to maintain two- to four-month contingency stocks, backed by rigorous enforcement.⁷⁸ In the United Kingdom, NHS England embeds an eight-week buffer stock requirement directly into tender conditions as a precondition of market access.⁷⁹

Cybersecurity is now part of that digital foundation. Healthcare is among the most targeted sectors for cyber threats: in 2023, EU countries reported 309 significant

cybersecurity incidents targeting the healthcare sector. Ransomware accounted for 54 percent of analyzed cybersecurity incidents in the health sector in 2021-23, with hospitals and providers particularly affected.^{80, 81} Yet cybersecurity investment remains structurally below threat exposure levels in many healthcare systems. Shortages of cybersecurity personnel reinforce this constraint.⁸² Cybersecurity should therefore be treated as baseline infrastructure, not as an add-on. Connected healthcare systems need enforceable minimum security standards and investment levels calibrated to actual threat exposure, supported by mandatory incident reporting.

Some countries have built stronger foundations. Within Europe, Sweden⁸³ and Finland^{84, 85} have developed nationwide digital health infrastructure, including interoperable records, national e-prescription systems, cybersecurity frameworks embedded in broader national security strategies and other effective tools. Saudi Arabia⁸⁶ and the United Arab Emirates⁸⁷ have made digital health a central pillar of their resilience agendas. But many other healthcare systems remain at an earlier stage of digital maturity, limiting their ability to use data for anticipation or maintain continuity when systems fail.

Critical infrastructure regulation provides the foundation for this shift toward secure and resilient digital healthcare systems. For example, Germany's critical infrastructure framework, known as KRITIS, defines healthcare as a critical sector and sets enforceable requirements, including state-of-the-art IT security, mandatory incident reporting to the Federal Office for Information Security (BSI), biennial third-party audits and active attack detection systems.⁸⁸

Funding is the other side of the resilience challenge: budgets focused on day-to-day activity leave little incentive for reserve capacity, while short cycles make long-term preparedness vulnerable once a crisis fades. Governments should ring-fence resilience funding, subject it to independent audit and link it to clear preparedness

● ● What gets funded gets built: resilience requires ring-fenced budgets, clear benchmarks and a common European floor.

benchmarks. At EU level, a harmonized minimum – akin to NATO's two percent defense benchmark – would set a common floor. Where new money is scarce, digitalization and AI can free resources through efficiency gains.

Saudi Arabia's Vision 2030 health reforms offer a concrete example of what ring-fenced resilience funding looks like in practice. Through the Health Sector Transformation Program, the government has explicitly allocated resources toward emergency preparedness, digital health infrastructure and reduced dependence on external supply chains, treating resilience as a funded strategic priority. The World Economic Forum's assessment finds that Saudi Arabia has made significant progress through its Vision 2030 reforms, particularly in digital health, integrated care, governance transformation and public-private partnerships. At the same time, it identifies further opportunities in primary healthcare, preventive and population health programs, workforce capacity, data-driven decision-making and continuity of care.

RECOVER

Recovery also depends on how quickly non-emergency care, postponed during the acute phase of a crisis, can be resumed without generating a secondary health burden. The COVID-19 pandemic, which was now more than four years ago, illustrated this clearly. Delayed screenings, elective procedures and routine care created backlogs that,

in several countries, took years to clear and contributed to excess mortality beyond the direct impact of the virus itself. Recovery is therefore not only about restoring capacity but about sequencing it correctly, prioritizing services based on clinical urgency rather than resuming operations uniformly. This requires the same kind of pre-established protocols and data visibility described under "Anticipate" and "Respond." Without a clear view of deferred care volumes and capacity, health systems risk recovering unevenly, favoring the most visible or profitable services over those with the greatest clinical need.

ADAPT

Adaptation is the highest-order competence: it means not only returning to the status quo after a disruption but restructuring governance and incentive structures so the system is better equipped for the next one. It requires cross-sector integration and deliberate design, and it is where the distance between what systems currently do and what resilience demands is greatest.

No single actor has both the authority and the incentive to drive system-level resilience: responsibility is fragmented across national, regional and EU bodies, international organizations, civil protection agencies, public health authorities and healthcare providers. Respondents are split on public versus private responsibility, centralized versus decentralized control, and who should lead. There is agreement on the goal of greater healthcare system resilience, but no consensus on the architecture needed to achieve it. Expert interviews confirm this pattern: silo thinking and unclear responsibilities are recurring barriers, while federal structures can impede coordination. Governance reform is not about restructuring for its own sake: it is about establishing the central architecture first – defining authority, binding frameworks and resources – and then determining which execution sits locally within that structure.

FROM COMPETENCE TO DELIVERY

Taken together, the five competences define what resilient healthcare systems must be able to do. The focus now shifts to the conditions that make those competences operational: workforce flexibility and digital infrastructure.

None of these measures are quick or low cost. Workforce flexibility depends on multi-year investments in data infrastructure, training and change management, and many of the digital tools described below remain in early or pilot stages of deployment across most healthcare systems. The workforce challenge is not only about headcount; it is also about whether staff can be deployed flexibly and supported with the right tools. When demand changes, the workforce must be empowered to adapt services accordingly.⁸⁹ Demographic change is intensifying the problem on both sides: demand for care rises as populations age, while retirements reduce the available workforce at the same time. Germany offers a clear example of this, with its projected shortage of 1.8 million healthcare workers by 2035.⁹⁰ The European Union has also recognized healthcare workforce pressure as a regional priority, with EU initiatives focused on staffing and working conditions, particularly for nurses.⁹¹

● ● Resilience is neither quick nor cheap: it requires sustained investment in skills, data and digital infrastructure.

Japan illustrates what workforce adaptation can look like when it is built into the structure of the healthcare system. With around 29 percent of the population aged 65 or over, it faces one of the most acute versions of the demographic workforce challenge discussed here. It has responded with structural reforms rather than short-term fixes. These include the Long-Term Care Insurance System and the Community-Based Integrated Care System, which connects healthcare with prevention and social support. Japan has also invested in digital and care technologies to maintain capacity under demographic pressure.

Japan's example points to a broader lesson: workforce adaptation increasingly depends on digital tools that can release clinical capacity without adding staff. The most direct lever is to automate administrative and low-value tasks, with experts estimating the potential at 30-40 percent of the current administrative workload. Healthcare systems also need a small but sustainable set of shared workforce key performance indicators (KPIs) that make gaps visible and strengthen accountability for funding decisions. These could include available surge capacity, time to mobilize additional staff, vacancy rates by specialty and attrition trends.

The main barrier to adoption is not technology alone. AI adoption is also held back by regulatory fragmentation, unclear approval pathways, absent reimbursement models and fragmented, non-interoperable data. France's experience with AI-driven patient cluster analysis illustrates how technically sound tools can stall when governance and clinical acceptance are not aligned. Data-driven decision-making also requires organizational and cultural change, not just technical deployment. National health authorities and the European Commission must therefore set a coherent regulatory framework for AI-enabled tools, combining harmonized data standards with approval and reimbursement pathways that make adoption viable. Change management must also be part of any digital

implementation, ensuring that staff are equipped to use new tools and that processes are redesigned around them. Institutional trust must be built deliberately, not assumed.

Digital sovereignty belongs in the same agenda. For healthcare systems, reducing dependence on international providers, including hyperscalers, would support greater control over critical data and improve transparency over core digital services. The issue is thus not only how quickly healthcare systems adopt digital tools but whether they can govern the infrastructure on which those tools depend.

Taken together, the five competences and their enabling capabilities define what resilient healthcare systems need to build. The final chapter turns this agenda into stakeholder priorities, setting out what governments and policymakers, hospitals and healthcare providers, health insurers and pharmaceutical and medtech companies should do next.

From insight to action

Recommendations for stakeholders



Resilience will not improve through awareness alone: it requires deliberate decisions and committed budgets, backed up by clear ownership. This chapter sets out what each stakeholder can and should do, with practical, prioritized actions grounded in the evidence from this study.

The instinctive response to a resilience gap is to ask for more money. But that framing is too simple, and in most systems the money is simply not there. Healthcare budgets are already under severe strain. Moreover, the question is not only how much to spend on resilience but where the resources should come from. The answer will vary by stressor and will often involve many small, gradual changes rather than one large fix.

The economic case for preparedness is stronger than often assumed. Systems that invest before a crisis consistently recover faster and at lower total cost than those that do not. Across stressors and system types, a common set of tools recurs: transparency about gaps, organizational flexibility, smarter resource prioritization and allocation, agile steering and digital capabilities including AI. All of these tools support resilience, regardless of context.

Each stakeholder has a distinct role in strengthening health system resilience. Their mandates and capabilities differ, however, so the five competences should not carry equal weight across sectors.

Governments and policymakers currently devote less attention to Anticipate, with greater weight on Respond and Maintain. A more resilient system would spread effort more evenly, while placing greater emphasis on Anticipate and Adapt to address emerging stressors over time.

For hospitals and policymakers, acute shocks – from epidemics to natural disasters and conflicts – inevitably command attention. The need to keep critical services and infrastructure running leaves less capacity for anticipation and adaptation.

Insurers, by contrast, are geared toward Anticipate and Adapt, using risk models, actuarial forecasts and new

coverage models to address emerging risks. Their role in Respond and Recover is smaller, although reinsurers play a significant part in post-crisis reconstruction.

Pharma and medtech are oriented toward R&D, innovation and anticipating demand, giving Anticipate and Respond particular weight.

These profiles are not measures of performance: resources, mandates and responsibilities vary across sectors. Rather, they show where each stakeholder currently allocates – or should allocate – its resilience efforts across the five competences. ►P

The recommendations that follow are organized by stakeholder. Governments and policymakers, hospitals and healthcare providers, health insurers, and pharmaceutical and medtech companies each operate with different mandates and incentives and under different constraints. Each has a distinct contribution to make. The actions described are grounded in what each actor can realistically do with existing authority and resources, not what an idealized system might look like.

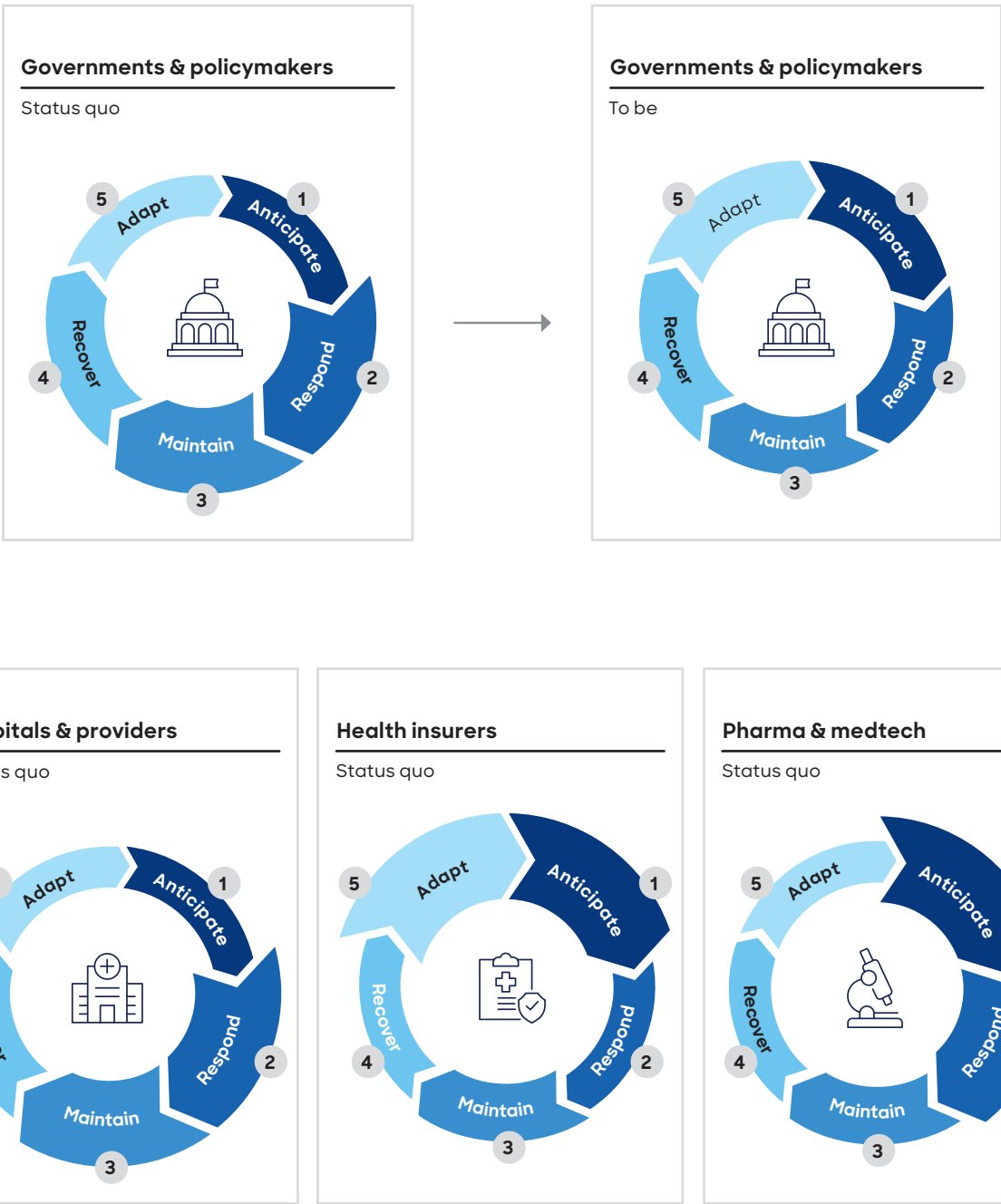
GOVERNMENTS AND POLICYMAKERS

Governments and policymakers must focus on flexible preparedness instead of risk-specific solutions. It is neither financially feasible nor sensible to build a separate institutional structure for every conceivable risk. The key therefore lies in flexible, generic capacities that can be adapted to different types of crises. Resilience is not built through the sum of many costly individual measures, but through smart, scalable structures that can be activated and expanded when pressure increases.

Governments must develop a comprehensive overview of the relevant risks facing their healthcare systems, combining likelihood of occurrence with potential impact on the system. Available healthcare capacities, including emergency beds in hospitals and other critical resources, need to be transparent in real time. During COVID-19, this

P Health players along the 5 steps

Where does each player devote the strongest focus for contribution?



Source: Roland Berger

was not the case in many developed countries. Only with such an overview can priorities be set and gaps identified.

Preparedness should follow an all-hazards approach. Instead of creating separate plans for every individual crisis, governments should develop generic response protocols that can be adapted to concrete situations. The challenge is not detection: reporting systems are well established and long-term stressors are already visible. The real gap lies in translating available signals into predictive models and actionable escalation logic. Rather than additional surveillance, what is needed is scenario-based foresight, that is to say, pre-agreed thresholds that convert known threats into concrete response decisions. Rapidly deployable crisis centers should have clearly defined mandates and responsibilities and be ready for swift activation. They should also rehearse different crisis scenarios regularly.

Robust communication structures are also essential. Healthcare systems need redundant channels and clear escalation levels, both for internal coordination and transparent communication with the public. At the same time, decentralization must be combined with central coordination. Regional actors need the capacity to act, while national bodies need a unified situational picture and predefined steering structures. In healthcare systems where delivery is not directly run by the state, governments also need to fix obligations in advance through regulation, rather than defining roles only once a crisis has begun.

Finally, governments must ensure that flexible capacities can actually be maintained before a crisis occurs. This requires structures that can be activated and scaled up when pressure increases. The objective is not to prevent every crisis, which would be impossible in any case. Rather, it is to ensure that healthcare systems can respond quickly and maintain essential services under pressure, adapting effectively to any type of disruption.

HOSPITALS AND HEALTHCARE PROVIDERS

Hospitals occupy a paradoxical position in the resilience landscape. Survey respondents identify them as the primary operational actors for resilience, yet activity-based financing models reward throughput, not preparedness. That operational role has two dimensions: hospitals must provide surge capacity in system-wide crises and remain operational when disruption affects the hospital itself. Reserve capacity generates no revenue in normal times and is systematically underfunded. Budget constraints are the single most cited barrier to resilience investment, and they are particularly acute for hospitals. Closing this gap requires action at the organizational level, even before structural incentives change.

Hospitals should embed resilience into the operating model. Resilience cannot be activated only in emergencies; it must be designed into daily operations. This means designating explicit executive accountability, with a named C-level member of the management team responsible for the topic. Depending on the hospital's structure, this could sit with the Chief Operating Officer (COO), the Chief Medical Officer (CMO) or a dedicated resilience lead. It also means introducing resilience-specific key performance indicators (KPIs) alongside standard operational metrics: available surge capacity, time needed to mobilize additional staff, critical medicine inventory coverage and administrative automation rates. Board-level dashboards should reflect these indicators, including unremediated vulnerabilities and recovery performance.

Hospitals also need to build multi-hazard preparedness. Emergency plans must evolve beyond narrow threat profiles to address cyberattacks, geopolitical disruption, extreme weather and mass casualty events simultaneously. WHO's newly established National Health Simulation Exercise Programme (NHSEP), launched in March 2026, offers a global model for institutionalizing structured, continuous stress-testing. In the United States, the Hospital

Preparedness Program mandates coalition planning; in Europe, the NIS2 Directive establishes mandatory cybersecurity and incident-reporting obligations.

Cybersecurity should be treated as baseline infrastructure. Cyberattacks have already disrupted clinical operations, making cybersecurity a direct patient safety imperative. Hospitals must elevate it to board-level governance, adopting enforceable standards aligned with national or international frameworks such as Germany's KRITIS framework or ISO/IEC 27001. Cybersecurity investment, which is currently around nine percent of IT budgets in European healthcare,⁹² must increase materially, with AI-driven anomaly detection and mandatory incident reporting embedded as standard practice.

Hospitals should also strengthen supply chain visibility, mapping critical supply dependencies and shifting from pure just-in-time models to data-driven buffer stock strategies – maintaining calibrated reserves of essential active pharmaceutical ingredients (APIs) and finished products. Active participation in national shortage reporting mechanisms completes the loop, enabling system-wide early intervention before patient care is affected.

Finally, hospitals should be incentivized to build emergency capabilities through performance-linked reimbursement models that reward measurable preparedness – such as surge capacity and trained emergency teams – rather than throughput alone. Targeted public funding and accreditation-linked standards can further close the gap, ensuring hospitals invest in critical capacities that generate no routine revenue but are essential for crisis response.

HEALTH INSURERS

Insurers have a distinctive role to play in strengthening the resilience of healthcare systems. Their financial steering power, combined with access to longitudinal data,

positions them not only as payers of care but also as active orchestrators of preparedness and early intervention. The objective should be to shift resources upstream, reducing avoidable demand and detecting emerging risks earlier, so that the system is better able to maintain care under pressure.

Insurers can first use smarter contract design to make prevention economically attractive. Traditional reimbursement models often reward activity rather than outcomes, creating limited incentives to avoid disease progression or unnecessary utilization. Outcome-linked reimbursement can change this equation. By tying parts of provider compensation to measurable improvements in health outcomes, adherence, prevention rates or avoidable admissions, insurers can create stronger incentives for early intervention. These models should be complemented by member-level incentives that reward participation in screening programs and effective management of chronic conditions. The result is a more resilient population with lower vulnerability to future health crises.

Resilience requires coordination beyond individual insurer boundaries. Many health risks, from pandemics to chronic disease and demographic pressures, are population-level challenges. Fragmented data and isolated prevention initiatives limit impact. Insurers should therefore collaborate on shared data standards and selected joint prevention programs, supported by common risk indicators. Pre-competitive cooperation can create scale while maintaining competition in products and customer experience. Aggregated and appropriately governed data can also provide a much stronger picture of emerging health risks than any individual institution can generate alone.

Insurers should also treat digital resilience infrastructure as a strategic investment. This includes funding or co-funding interoperable health data platforms, secure data exchange, real-time surveillance capabilities and advanced early-warning analytics. AI-enabled models

can identify unusual utilization patterns, disease clusters, supply constraints or vulnerable population segments before they become systemic problems.

For executive teams, the implication is clear: resilience should move from a risk management topic to a core strategic agenda. Public health insurers need to be explicitly mandated and incentivized to take resilience as a priority. Private health insurers should use resilience to differentiate their service proposition to customers. In both cases, insurers can improve health outcomes and reduce long-term claims volatility, while helping strengthen the wider healthcare ecosystem.

PHARMACEUTICAL AND MEDTECH COMPANIES

Finally, pharmaceutical and medtech companies have a central role to play in healthcare system resilience. Past pandemics have shown how critical their contribution can be, from protective equipment and diagnostic capacity to the rapid development of effective vaccines. Beyond acute crises, population aging has led to an increased burden of cancer, which cannot be addressed without pharmaceutical research and development.

At the same time, these industries are high-tech growth sectors. Public investment also helped the surrounding region develop a high-tech cluster for biopharmaceutical innovation, with a leading position in RNA technology. The resilience role of pharmaceutical and medtech companies is therefore inseparable from their economic role: innovative health industries support patient outcomes while strengthening high-tech employment and industrial capacity.

In Europe, EU institutions like DG SANTE and HERA, supported by financing bodies such as the European Investment Bank (EIB), are monitoring crises and supporting critical producers of medical devices and therapeutics, including vaccines. Governments in China and the United States are likewise supporting domestic

research and production. Gulf Cooperation Council (GCC) countries such as Saudi Arabia and Qatar have also developed resilience strategies in this area.

Complete autonomy is neither realistic nor economically viable. Regions therefore need to balance regional production and stockpiling capacity with international alliances that can secure access to critical medical products during an initial crisis period.

Resilience programs must prepare for rare events. For this reason, regulatory and public pricing policies need to keep critical producers commercially viable in non-crisis periods. Some recent policy shifts in the United States and healthcare reforms in Europe have made it less attractive to invest in pharmaceutical and medical device innovation and production. At the same time, China is catching up quickly, supported by government programs and innovative ecosystems. European and US stakeholders therefore need to ensure that regulatory and pricing policies support critical producers in normal times, so that essential innovation and production capacity is still available when the next crisis arrives.

What, then, does resilience require in practice? It requires aligned action across the healthcare value chain before the next disruption begins. Governments can set the framework and fund the capacities that markets will not maintain on their own. But resilience only becomes real when the rest of the healthcare value chain embeds that framework into how resources are allocated and decisions are made day to day. Only then does resilience move from a stated priority to a working feature of the healthcare system.

Sources

1. "What is a resilient health system? Lessons from Ebola," The Lancet, 385, 1910-1912
2. Strengthening health systems resilience: key concepts and strategies. European Observatory on Health Systems and Policies. WHO; 2020
3. "How Is Health System Resilience Being Assessed? A Scoping Review," Int J Health Policy Manag. 2024;13:8097 https://www.ijhpm.com/article_4635.html
4. "What is a resilient health system? Lessons from Ebola," The Lancet, 385, 1910-1912
5. "Shocks, stress and everyday health system resilience: experiences from the Kenyan coast," Health Policy Plan. 2020;35(5):522-535
6. "How Is Health System Resilience Being Assessed? A Scoping Review," Int J Health Policy Manag. 2024;13:8097 https://www.ijhpm.com/article_4635.html
7. "Exceeding human heat tolerance in a warming, ageing world: a global projection modelling study," The Lancet Planetary Health, 2026
8. Climate Change | WHO <https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>
9. AR6 Synthesis Report: Climate Change 2023 | IPCC <https://www.ipcc.ch/report/ar6/syr/>
10. International Health Regulations, 2005 | WHO
11. Health system resilience | OECD; Maintaining essential health services: operational guidance for the COVID-19 context: interim guidance, 1 June 2020 | WHO <https://www.oecd.org/en/topics/health-system-resilience.html>
<https://www.who.int/publications/i/item/WHO-2019-nCoV-essential-health-services-2020.1>
12. Health and Care Worker Deaths during COVID-19 | WHO <https://www.who.int/news/item/20-10-2021-health-and-care-worker-deaths-during-covid-19>
13. Germany plans for 1,000 wounded troops per day in case of conflict with Russia | Reuters
14. Building peace in fragile and conflict settings through health | WHO <https://www.who.int/activities/building-peace-in-fragile-and-conflict-settings-through-health>
15. ENISA threat landscape: health sector | ENISA <https://www.enisa.europa.eu/sites/default/files/publications/Health%20Threat%20Landscape.pdf>
16. ENISA threat landscape 2025 | ENISA https://www.enisa.europa.eu/sites/default/files/2026-01/ENISA%20Threat%20Landscape%2025_v1.2.pdf
17. Investing in Health for a Competitive, Secure, and Resilient Europe: A Strategic Call to Action | WEF / PHSSR https://reports.weforum.org/docs/WEF_PHSSR_European_Union_investing_in_Health_2025.pdf
18. Global strategy on human resources for health: Workforce 2030 | WHO <https://www.who.int/publications/i/item/9789241511131>

19. Health and care workforce in Europe: time to act | WHO Europe
<https://www.who.int/europe/publications/item/9789289058339>
20. OECD Employment Outlook 2025 | OECD
https://www.oecd.org/en/publications/oecd-employment-outlook-2025_194a947b-en/full-report/setting-the-scene-demographic-change-economic-growth-and-intergenerational-inequalities_9d481169.html
21. "Trends in Healthy Life Years Between 2005 and 2019 in 31 European Countries: The Compression or Expansion of Morbidity?" Int J Public Health. 2024;69:1607574
<https://www.ssph-journal.org/journals/international-journal-of-public-health/articles/10.3389/ijph.2024.1607574/full>
22. "Contribution of Frailty to Multimorbidity Patterns and Trajectories: Longitudinal Dynamic Cohort Study of Aging People," JMIR Public Health and Surveillance. 2023;9:e45848
<https://publichealth.jmir.org/2023/1/e45848>
23. Ageing and health | WHO
<https://www.who.int/news-room/fact-sheets/detail/ageing-and-health>
24. Climate Change | WHO
<https://www.who.int/news-room/fact-sheets/detail/climate-change-and-health>
25. "How Is Health System Resilience Being Assessed? A Scoping Review," Int J Health Policy Manag. 2024;13:8097
https://www.ijhpm.com/article_4635.html
26. "Building resilient health systems: a proposal for a resilience index," BMJ. 2017 May 23;357:j2323
<https://www.bmj.com/content/357/bmj.j2323>
27. "Governance and capacity to manage resilience of health systems: towards a new conceptual framework," Int J Health Policy Manag. 2017;6(8):431-435
https://www.ijhpm.com/article_3341.html
28. "Shocks, stress and everyday health system resilience: experiences from the Kenyan coast," Health Policy Plan. 2020;35(5):522-535
29. "How Is Health System Resilience Being Assessed? A Scoping Review," Int J Health Policy Manag. 2024;13:8097
https://www.ijhpm.com/article_4635.html
30. "On the resilience of health systems: A methodological exploration across countries in the WHO African Region," PLoS One. 2022 Feb 7;17(2):e0261904
<https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0261904>
31. "Countries' progress towards Global Health Security (GHS) increased health systems resilience during the Coronavirus Disease-19 (COVID-19) pandemic: A difference-in-difference study of 191 countries," PLOS Global Public Health 5(1): e0004051
32. "COVID-19 and resilience of healthcare systems in ten countries," Nat Med 28, 1314-1324 (2022)
33. "Evaluation of health system resilience in 60 countries based on their responses to COVID-19," Front. Public Health. 2023 Jan 9;10:1081068
<https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2022.1081068/full>

34. WHO: Health system resilience indicators (2024)
<https://www.who.int/publications/item/9789240088986>
35. Healthcare Costs Top List of American Concerns in 2026 Gallup Poll | National News | U.S. News
<https://www.usnews.com/news/national-news/articles/2026-03-31/healthcare-costs-top-list-of-american-concerns-in-2026-gallup-poll>
36. The Lancet: Without immediate action nearly 260 million people in the USA predicted to have overweight or obesity by 2050 | Institute for Health Metrics and Evaluation
<https://www.healthdata.org/news-events/newsroom/news-releases/lancet-without-immediate-action-nearly-260-million-people-usa>
37. Good health is the world's best investment – and the key to economic resilience | WEF
<https://www.gavi.org/vaccineswork/good-health-worlds-best-investment-and-key-economic-resilience>
38. The cost of inaction to strengthen the resilience of primary health care in Latin America and the Caribbean: a modelling study | medRxiv
<https://www.medrxiv.org/content/10.1101/2025.03.03.25323291v1.full>
39. Full Report: Ready for the Next Crisis? Investing in Health System Resilience | OECD
https://www.oecd.org/en/publications/ready-for-the-next-crisis-investing-in-health-system-resilience_1e53cf80-en/full-report.html
40. Strategic Foresight Toolkit for Resilient Public Policy | OECD
https://www.oecd.org/en/publications/foresight-toolkit-for-resilient-public-policy_bcdd9304-en.html
41. 2025 Strategic Foresight Report | European Commission
https://commission.europa.eu/strategy-and-policy/strategic-foresight/2025-strategic-foresight-report_en
42. From preparedness to action: HERA's role in the European Union's public and global health security architecture | CEPS
<https://www.ceps.eu/ceps-publications/from-preparedness-to-action-heras-role-in-the-eus-public-and-global-health-security-architecture/>
43. "The Innovative Health Initiative public-private partnership: a catalyst for big data-driven health research and innovation," Front. Med. 12:1554948
<https://www.frontiersin.org/journals/medicine/articles/10.3389/fmed.2025.1554948/full>
44. International COVID-19 vaccine inequality amid the pandemic: Perpetuating a global crisis? | PMC
<https://pmc.ncbi.nlm.nih.gov/articles/PMC8252691/>
45. Health systems resilience in managing the COVID-19 pandemic: lessons from 28 countries | Nature Medicine
<https://www.nature.com/articles/s41591-021-01381-y#Sec14>
46. Cabinet Office, Government of Japan – Disaster Management in Japan
https://www.bousai.go.jp/1info/pdf/saigaipamphlet_je.pdf

47. National Police Agency of Japan – Damage Situation of the Great East Japan Earthquake
https://www.japan.go.jp/tomodachi/2015/disaster-prevention_edition_2015/tokyo_dmat_saving_the_lives.html
48. Hospital Preparedness Program (HPP) | ASPR
<https://www.aspr.gov/readiness-response/healthcare-readiness/hpp>
49. Building a European Health Union | EEAS
https://www.eeas.europa.eu/eeas/building-european-health-union_en
50. COVID-19 lessons learned in health: the Council approves conclusions | Consilium
<https://www.consilium.europa.eu/en/press/press-releases/2020/12/18/covid-19-lessons-learned-in-health-the-council-approves-conclusions/>
51. Ebola disease caused by Bundibugyo virus – Democratic Republic of the Congo | WHO
<https://www.who.int/emergencies/disease-outbreak-news/item/2026-DON603>
52. WHO Director-General declares mpox outbreak a public health emergency of international concern | WHO
<https://www.who.int/news/item/14-08-2024-who-director-general-declares-mpox-outbreak-a-public-health-emergency-of-international-concern>
53. Worden L, Wannier R, Hoff NA, Musene K, Selo B, et al. (2019) Projections of epidemic transmission and estimation of vaccination impact during an ongoing Ebola virus disease outbreak in Northeastern Democratic Republic of Congo, as of Feb. 25, 2019. PLOS Neglected Tropical Diseases 13(8): e0007512
<https://journals.plos.org/plosntds/article/citation?id=10.1371/journal.pntd.0007512>
54. National Emergency Management Authority (NEMA) | IMOD
<https://mod.gov.il/en/departments/national-emergency-management-authority-nema>
55. Israel to invest \$51.8m in fortifying hospitals – Israel & Jewish News | JNS
<https://www.jns.org/israel-news/israel-to-invest-51-8m-in-fortifying-hospitals>
56. Health at a Glance 2025: Israel | OECD
https://www.oecd.org/en/publications/health-at-a-glance-2025_15a55280-en/israel_b3600fbc-en.html
57. Saudi Vision 2030 – Health Sector Transformation Program | KSA
<https://www.vision2030.gov.sa/en/explore/programs/health-sector-transformation-program>
58. Vision for eHealth up to 2025 | OECD Digital Policy Platform
<https://depp.oecd.org/policies/SWE1538>

59. A brief history of the Kanta Services - Kanta.fi; New Security Strategy for Society enhances Finland's comprehensive security | Finnish Government
<https://www.kanta.fi/en/a-brief-history-of-the-kanta-services>

<https://valtioneuvosto.fi/en/-/44601309/new-security-strategy-for-society-enhances-finland-s-comprehensive-security>
60. Digital together – Germany's Digitalization Strategy for Health and Care | Federal Ministry of Health
61. Healthcare sector: addressing labour shortages and working conditions | European Parliament, 10 February 2025
<https://www.europarl.europa.eu/news/en/agenda/plenary-news/2025-02-10/14/healthcare-sector-addressing-labour-shortages-and-working-conditions>
62. Annual Report on the Ageing Society [Summary] FY2024 | Cabinet Office Japan
<https://www8.cao.go.jp/kourei/english/annualreport/2024/pdf/2024.pdf>
63. Matsuda S, Yamamoto M. Long-term care insurance and integrated care for the aged in Japan. Int J Integr Care. 2001
<https://pmc.ncbi.nlm.nih.gov/articles/PMC1484411/>
64. Long-Term Care System in Japan | PMC
<https://pmc.ncbi.nlm.nih.gov/articles/PMC7533196/>
65. Population aged 65 and older | Destatis
<https://www.destatis.de/DE/Themen/Querschnitt/Demografischer-Wandel/Aeltere-Menschen/bevoelkerung-ab-65-j.html>
66. Germany: Country Health Profile 2023 (EN) | OECD; Germany's recovery and resilience plan – Reforms and Investments | European Commission
https://www.oecd.org/content/dam/oecd/en/publications/reports/2023/12/germany-country-health-profile-2023_2e55ab0e/21dd4679-en.pdf

https://reforms-investments.ec.europa.eu/recovery-and-resilience-facility-1/country-pages/germanys-recovery-and-resilience-plan_en
67. Budget to Build Necessary Infrastructure for Rising Sea Levels and Climate Change | Ministry of Finance, Singapore
<https://www.mof.gov.sg/news-resources/newsroom/budget-to-build-necessary-infrastructure-for-rising-sea-levels-and-climate-change/>
68. Urgency to Strengthen Coastal Defences | PUB, Singapore's National Water Agency
<https://www.pub.gov.sg/Resources/News-Room/PressReleases/2025/03/Urgency-to-Strengthen-Coastal-Defences>
69. Sugar reduction in drinks: 2015 to 2024 | Fingertips, Department of Health and Social Care
<https://fingertips.phe.org.uk/static-reports/obesity-physical-activity-nutrition/sugar-reduction-drinks-2015-2024.html>
70. Vartiainen, E., "The North Karelia Project: Cardiovascular disease prevention in Finland," Global Heart / Global Cardiology Science & Practice, 2018
<https://pmc.ncbi.nlm.nih.gov/articles/PMC6062761/>
71. Global strategy on human resources for health: Workforce 2030 | WHO
<https://www.who.int/publications/i/item/9789241511131>

72. "The Fragmented Nature of Pandemic Decision-making: A Comparative and Multilevel Legal Analysis," *European Journal of Health Law*, 29(1), 1-5
https://brill.com/view/journals/ejhl/29/1/article-p1_1.xml
73. Health Emergency Preparedness and Response (HERA) | European Commission
https://health.ec.europa.eu/health-emergency-preparedness-and-response-hera_en
74. Hospital Preparedness Program (HPP) | ASPR
<https://www.aspr.gov/readiness-response/healthcare-readiness/hpp>
75. "Training Nurses for Disasters: A Systematic Review on Self-Efficacy and Preparedness," *Healthcare*. 2025;13:3323
<https://www.mdpi.com/2227-9032/13/24/3323>
76. rescEU – European Civil Protection and Humanitarian Aid Operations | European Commission
https://civil-protection-humanitarian-aid.ec.europa.eu/what/civil-protection/resceu_en
77. Critical medicines Act - Public Health | European Commission
https://health.ec.europa.eu/medicinal-products/critical-medicines-act_en
78. "L'ANSM prononce 8 millions d'euros de sanctions financières à l'encontre des laboratoires pharmaceutiques qui n'ont pas respecté leurs 4 mois de stock de sécurité," ANSM, 24 September 2024, updated 19 December 2024
<https://ansm.sante.fr/actualites/lansm-prononce-8-millions-deuros-de-sanctions-financieres-a-lencontre-des-laboratoires-pharmaceutiques-qui-nont-pas-respecte-leurs-4-mois-de-stock-de-securite>
79. Managing a robust and resilient supply of medicines | GOV.UK
<https://www.gov.uk/government/publications/managing-a-robust-and-resilient-supply-of-medicines/managing-a-robust-and-resilient-supply-of-medicines>
80. ENISA threat landscape: health sector | ENISA
<https://www.enisa.europa.eu/sites/default/files/publications/Health%20Threat%20Landscape.pdf>
81. Cybersecurity in healthcare | European Commission
https://commission.europa.eu/topics/digital-economy-and-society/cybersecurity-healthcare_en
82. What's driving cybersecurity investments and where lie the challenges? | ENISA
<https://www.enisa.europa.eu/news/whats-driving-cybersecurity-investments-and-where-lie-the-challenges>
83. Swedish eHealth Agency - Vision eHealth 2025 / national eHealth infrastructure
<https://www.ehalsomyndigheten.se/>
84. A brief history of the Kanta Services | Kanta.fi
<https://www.kanta.fi/en/a-brief-history-of-the-kanta-services>
85. New Security Strategy for Society enhances Finland's comprehensive security | Finnish Government
<https://valtioneuvosto.fi/en/-/44601309/new-security-strategy-for-society-enhances-finland-s-comprehensive-security>

86. Saudi Vision 2030 – Health Sector Transformation Program
<https://www.vision2030.gov.sa/en/explore/programs/health-sector-transformation-program>
87. Digital health ecosystem | The Official Platform of the UAE Government
<https://u.ae/en/about-the-uae/digital-uae/whole-of-government-approach/digital-health/Digital-health-ecosystem>
88. BSI – Kritische Infrastrukturen (KRITIS)
https://www.bsi.bund.de/DE/Themen/Regulierte-Wirtschaft/Kritische-Infrastrukturen/kritis_node.html
89. Global strategy on human resources for health: Workforce 2030 | WHO
<https://www.who.int/publications/i/item/9789241511131>
90. Is the recruitment of foreign trained health professionals the solution to Germany's health care crisis?
<https://www.internationalhealthpolicies.org/featured-article/is-the-recruitment-of-foreign-trained-health-professionals-the-solution-to-germanys-health-care-crisis/>
91. Europe's dependence on foreign-trained doctors and nurses has cross-border ripple effects, finds new WHO/ Europe report
<https://www.who.int/europe/news/item/16-09-2025-europe-s-dependence-on-foreign-trained-doctors-and-nurses-has-cross-border-ripple-effects--finds-new-who-europe-report>
92. What's Driving Cybersecurity Investments and where lie the challenges? | ENISA
<https://www.enisa.europa.eu/news/whats-driving-cybersecurity-investments-and-where-lie-the-challenges>

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