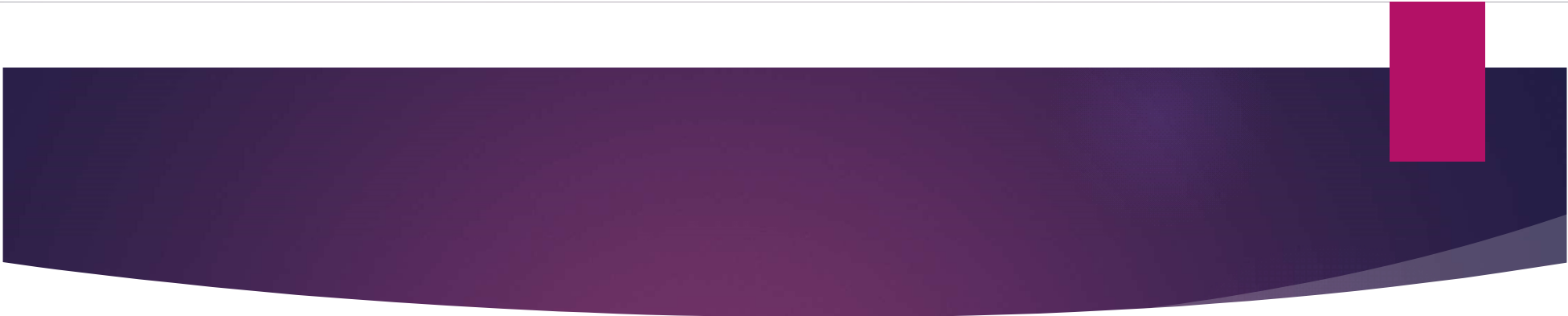




In the Name of God





Health systems resilience in managing the COVID-19 pandemic: lessons from 28 countries

REVIEW ARTICLE
NATURE MEDICINE
JUNE 2021

1 introduction

▶ C OVID-19 has caused an

unprecedented global crisis, including

- ▶ millions of lives lost, public health systems in shock and economic and social disruption, disproportionately affecting the most vulnerable.

- ▶ The pandemic has challenged local, national, regional and global capacities to prepare and respond.

- ▶ The various national strategies taken to control viral transmission are widely debated



2introduction

- ▶ However, the relative success of these strategies depends largely on how an existing health system is organized, governed and financed across all levels in a coordinated manner.
- ▶ The pandemic has exposed the limitations of many health systems, including some that have been previously classified as high performing and resilient.



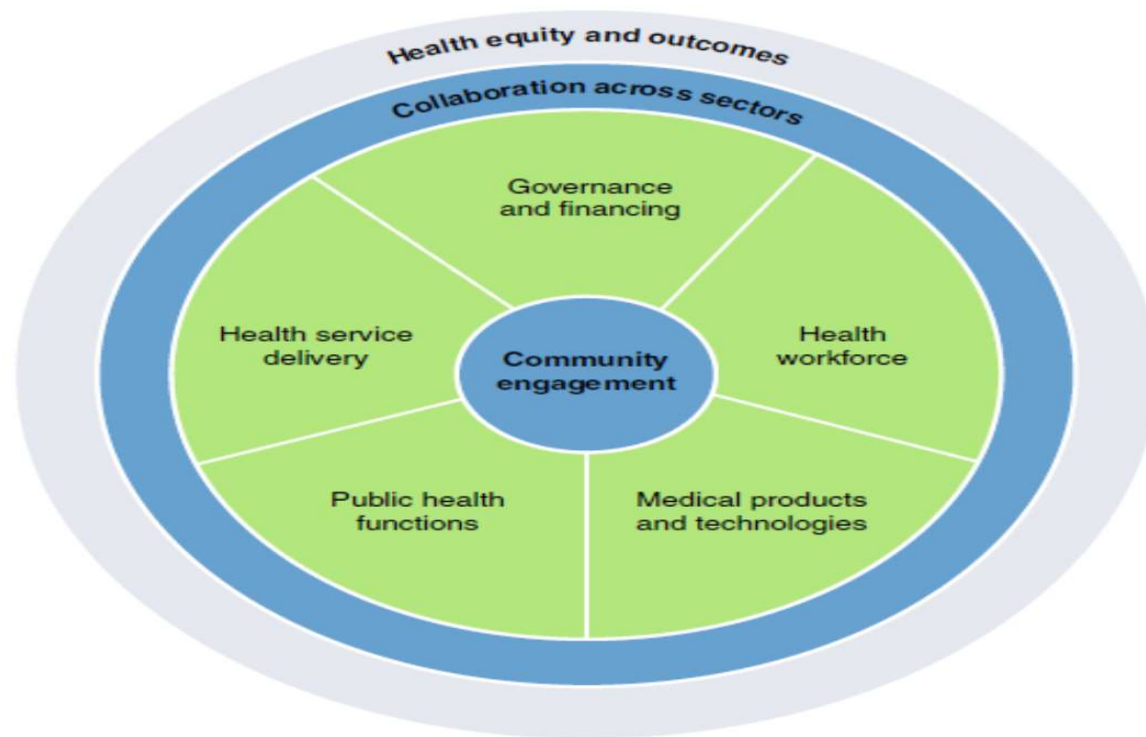
3introduction

- ▶ While resilience is a core concept in disaster risk reduction, its application to health systems is relatively new.
- ▶ we use an expanded health systems resilience framework centered on community engagement to examine 28 national responses to COVID-19.
- ▶ This analysis provides insights into the policies countries implemented and how these were implemented to tackle the pandemic.

4 Conceptual framework

- ▶ Our conceptual framework (Fig. 1) is grounded in the World Health Organization's (WHO) health systems framework¹³.
- ▶ We develop the framework elements by adding public health functions, including testing, contact tracing, disease surveillance and non-pharmaceutical public health interventions, which often operate separately from health service delivery.
- ▶ Yet, they are critical both to pandemic responses and to ongoing population health. Similarly, health information systems are vital functions for both public health and health systems as, ideally, they should be integrated to capture data at individual, health system and population levels.

Fig. 1 | Determinants of health systems resilience framework. The scheme illustrates the components of the resilient health systems framework we developed based on the WHO's health systems building blocks framework. The five elements of resilient health systems are centered around community engagement as core to all elements of health systems resilience.





6 Conceptual framework

- ▶ We centered our analysis on community engagement as core to all elements of health systems resilience (see Box 1 for more information on the analytical approach).
- ▶ To serve communities in a more equitable manner and promote healthy societies, resilience must be developed with these communities and according to their needs. There can be no health systems resilience without community engagement across domains¹⁴.
- ▶ We also acknowledge the critical role of coordination with non-health sectors as essential to providing necessary supports to address the social determinants of health.
- ▶ .

Box 1 | Analytical approach

The analysis presented in this review is based on a purposive selection of countries including positive and negative outliers in relation to reported COVID-19 deaths per capita among highly populous countries, as well as a selection of countries in the middle ground from different regions and with widely varying health systems and economic status. Figure 2 provides an overview of countries in our review. Countries were selected according to the recorded number of deaths attributed to COVID-19 per 100,000 inhabitants on 6 November 2020. Given the dynamic and continuously changing situation, the ranking of positive and negative outliers in terms of death per capita may have changed during the pandemic. The analysis is thus limited to this specific time period.

Five complementary methods were adopted to analyze national responses to COVID-19:

1. **Literature review:** using standardized methods, we identified peer-reviewed papers and public reports that examined national and subnational policy responses and extracted data for each country on five dimensions comprising 62 items. The dimensions and items were identified through a review of 14 existent frameworks.
2. **Semi-structured interviews and national government submissions:** to supplement the literature review, we asked the selected countries and country experts a set of questions related to the measures implemented to contain COVID-19 in their respective countries. A total of 45 interviews and written submissions were provided. Semi-structured interviews with COVID-19 national experts at the policy, operational and academic levels were recorded and transcribed in full. All interviews were coded through an inductive approach and thematic analysis, using QSR NVivo 12 software, drawing on techniques of the constant comparison method.
3. **In-depth case studies** of 6 countries to validate the data from the 28 countries.
4. **Expert validation of country-specific data** with country experts. Experts in countries were provided with the specific data for each of their respective countries to validate the data.
5. **Expert validation through roundtable discussions** with country experts. A total of 35 national and international experts in COVID-19 policies participated in two roundtable discussions.

تجزیه و تحلیل ارائه شده در این بررسی بر اساس انتخاب هدفمند کشورها از جمله نقاط مثبت و منفی در ارتباط با گزارش COVID-19 در مرگ سرانه در میان کشورهای پرجمعیت و همچنین مجموعه ای از کشورها در حد وسط از مناطق مختلف و سیستم های بهداشتی و وضعیت های اقتصادی بسیار متنوع.

پنج روش مکمل برای تجزیه و تحلیل به پاسخ های ملی به COVID-19 بکار گرفته شد:

1. مرور متون: با استفاده از روشهای استاندارد، مقالات و گزارشهای عمومی را که دارای بررسی همتا بودند شناسایی کردیم که پاسخ سیاستهای ملی و داده های استخراجی را مورد بررسی قرار داده و داده های مربوط به هر کشور در پنج بعد همراه با آیتم ها از طریق بررسی 14 چارچوب موجود شناسایی شد.

2. مصاحبه های نیمه ساختار یافته: برای تکمیل بررسی ادبیات، ما از کشورهای منتخب و کارشناسان کشورها سوالاتی راجع به اقدامات اجرا شده برای COVID-19 پرسیدیم. در مجموع 45 مصاحبه و ارسال کتبی ارائه شده است. مصاحبه های نیمه ساختار یافته با متخصصان ملی COVID-19 در سطح سیاست، عملیاتی و علمی ثبت و به طور کامل رونویسی شد. تمام مصاحبه ها با استفاده از نرم افزار QSR NVivo12، از طریق یک روش استقرایی و تحلیل موضوعی کدگذاری شدند.

3. مطالعات موردی عمیق 6 کشور برای تأیید اعتبار داده های 28 کشور.

4. اعتبار سنجی تخصصی داده های کشور خاص با کارشناسان کشور. برای اعتبارسنجی داده ها، داده های ویژه هر یک از کشورهای خود را در اختیار کارشناسان کشورها قرار دادند.

5. اعتبار سنجی خبرگان از طریق میزگرد با کارشناسان کشور. در مجموع 35 متخصص ملی و بین المللی در سیاست های COVID-19 در دو میزگرد شرکت کردند.



8 Conceptual framework

- ▶ Resilient health systems should aim to generate positive physical and mental health outcomes for all, including vulnerable and marginalized groups.
- ▶ In many countries, COVID-19 mortality rates have been disproportionately higher among older populations, minority ethnic groups, socioeconomically deprived populations and low-wage and migrant workers, emphasizing the interconnectedness between equity and health outcomes¹⁵.



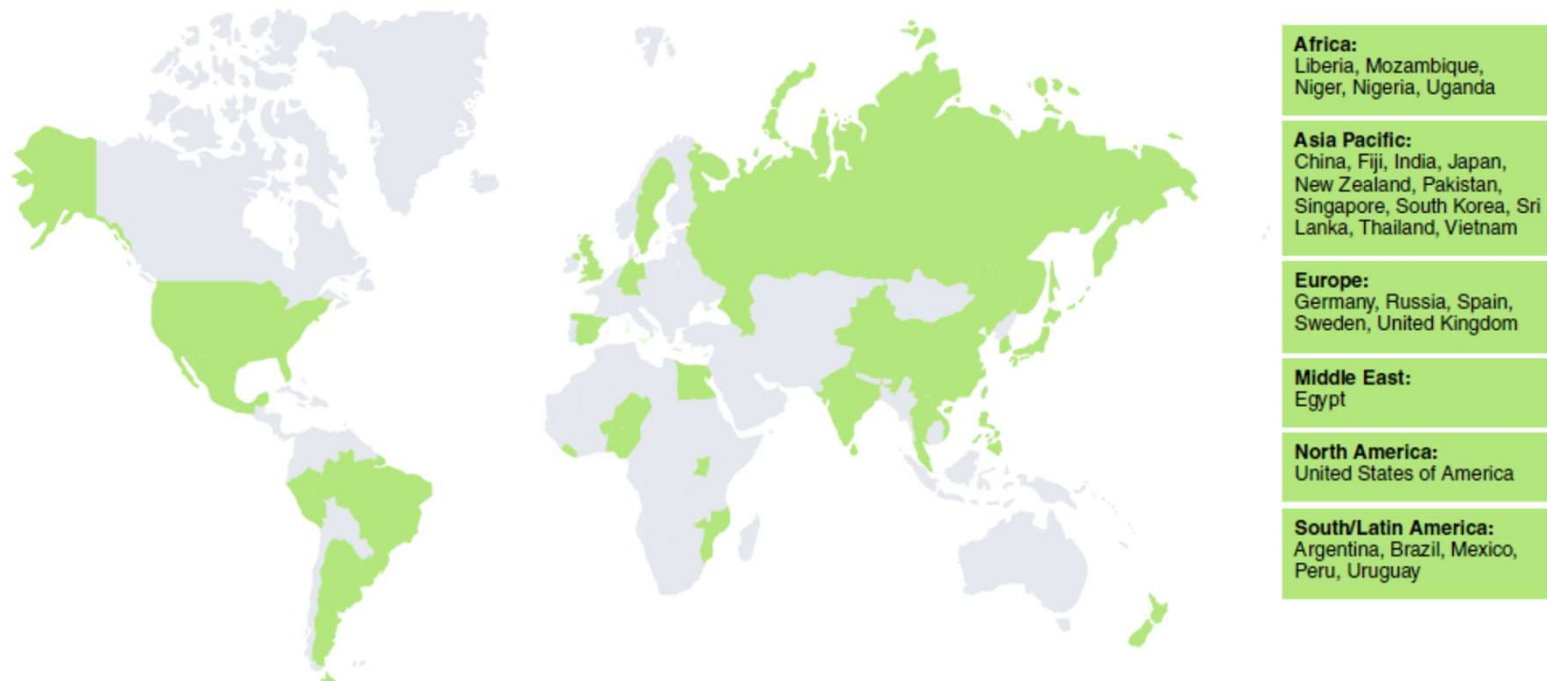
COVID-19 responses in 28 countries

- ▶ Using our framework, we organized our results beginning with domains often viewed as external to health, which are nevertheless central determinants of health systems resilience—governance, finance, collaboration across sectors and community engagement— before exploring domains more closely associated with traditional views of health and health systems—health service delivery, health workforce, medical products and technologies and public health functions.

10 COVID-19 responses in 28 countries

- ▶ We offer illustrative examples of selected countries for each domain in Tables 1–6. We analyzed 28 countries based on a purposive selection, including positive and negative outliers in relation to reported COVID-19 deaths per capita among highly populous countries, as well as a selection of countries in the middle ground (as of 6 November 2020). Figure 2 provides an overview of countries in our review.

Fig. 2 | Countries included in the review. The map presents an overview of countries selected according to the recorded number of deaths attributed to COVID-19 per 100,000 inhabitants on 6 November 2020. Countries are listed according to region and in alphabetical order.



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COVID-19 responses in 28 countries

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Governance, finance and collaboration across sectors

12 Governance, finance and collaboration across sectors

- ▶ COVID-19 has made policymakers and the wider public acutely aware of the
- ▶ relationship between health systems, domestic economies and governance.
- ▶ Government decisions determine healthcare infrastructures,
- ▶ regulations and guidelines, defining access to medication
- ▶ and treatment, the provision of health coverage and the financing
- ▶ of these.

13 Governance, finance and collaboration across sectors

- ▶ Countries took whole-of-government approaches to strengthen health systems in response to COVID-19, particularly those with experience of other health-related disasters, such as Ebola.
- ▶ These decisions were, in most countries, made by translating evidence-based research into policies that preserve health system capacity, while protecting both public health and livelihoods. As such, most countries established temporary COVID-19 advisory groups to inform government decisions.
- ▶ However, in the majority of countries, the views represented on these committees were largely biomedical.

14 Governance, finance and collaboration across sectors

- ▶ coming from public funds, and depends on healthcare infrastructures,
- ▶ workforce and supplies to provide much-needed surge capacity
- ▶ within health systems. Additionally, fiscal support measures,
- ▶ including relief packages aiming at helping businesses stay viable,
- ▶ protect jobs or provide financial aid to low-income households and
- ▶ the unemployed have been taken by many countries.

15 Governance, finance and collaboration across sectors

- ▶ These policies
- ▶ support people to adhere to public health guidance, with the aim
- ▶ of preventing infections, in turn mitigating the strain on the health
- ▶ system resulting from the need to deliver high-intensity COVID-19
- ▶ care. To further enhance the reach of health services, many countries
- ▶ reviewed took specific actions to mitigate potential financial
- ▶ and physical barriers to care, such as covering part or all of the costs
- ▶ of COVID-19 care, and funding the establishment of testing and
- ▶ treatment centers in communities¹⁶.

16 Governance, finance and collaboration across sectors

- ▶ Importantly
- ▶ , the outcomes resulting from financial expenditures on health and well-being are
- ▶ only as good as the structures that support them. Thus, they require governance expertise across levels, sectors and domains and depend on a system's ability to reach (vulnerable) populations.



COVID-19 responses in 28 countries

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Community engagement



16 Community engagement

- ▶ Deep engagement with local communities is central to resilient health systems as a way to inform service delivery, decision-making and governance and to meet the needs of communities before, during and after crises. Community engagement strategies, such as building partnerships with local leaders and working alongside community members to tailor messages
- ▶ and campaigns are crucial during public health emergencies¹⁷

17Community engagement

- ▶ Several countries reviewed engaged networks of community health workers (CHWs) to encourage active community participation in COVID-19 responses. Their roles range from creating awareness through door-to-door visits, supporting contact tracing efforts, maintaining essential health services, providing necessary medication to patients without COVID-19, surveillance or monitoring adherence to quarantine measures and assessing mental well-being¹⁹. They are also key to identifying and referring patients who face barriers to accessing healthcare services. For example, Thailand, Singapore, Nigeria

18 Community engagement

- ▶ However, many of these efforts depended on volunteers.
- ▶ During early response efforts, a few countries conducted surveys
- ▶ to understand public sentiment regarding evolving measures. Japan
- ▶ conducted a survey in April 2020 to understand compliance with
- ▶ social distancing measures, using the results to inform response
- ▶ strategies.

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COVID-19 responses in 28 countries

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Health service delivery

19 Health service delivery

- ▶ Health systems globally have employed
- ▶ three common approaches to rapidly scale up health system infrastructure,
- ▶ namely by constructing new treatment facilities, converting
- ▶ public venues and reconfiguring existing medical facilities to
- ▶ provide care for patients with COVID-19.

20 Health service delivery

- ▶ Thus, some of the health
- ▶ systems reviewed invested significant resources into rapidly creating
- ▶ dedicated field facilities. For example, in early 2020, China established
- ▶ two specialty field hospitals in under 2 weeks²¹. Where field
- ▶ hospitals were set up to house patients with COVID-19, countries
- ▶ often drew on their armed forces and military field hospital models,
- ▶ or adapted existing large public facilities.

21 Health service delivery

- ▶ Other health systems relied on home care for patients with
- ▶ mild to moderate COVID-19, with facilities available if patients
- ▶ were unable to safely self-isolate within their homes. Additionally,
- ▶ the majority of reviewed countries canceled elective surgeries in an
- ▶ effort to ensure system capacity for COVID-19 care.

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COVID-19 responses in 28 countries

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Health workforce

22 Health workforce

- ▶ Resilient health systems manage crises by having
- ▶ an adequate, trained and willing workforce. Yet, in many countries,
- ▶ COVID-19 has spread quickly among health workers as they have
- ▶ been the most exposed to the virus, with data indicating that they
- ▶ have been disproportionately affected by the pandemic²⁸

23 Health workforce

- ▶ As cases surged globally, most reviewed countries reallocated
- ▶ healthcare professionals, including primary-care workers, to emergency
- ▶ care wards, intensive care units (ICUs) and diagnosis and
- ▶ surveillance activities. Several recruitment strategies were implemented
- ▶ to increase the healthcare workforce.

24 Health workforce

- ▶ In some countries (for example, Japan, Mozambique, Singapore and South Korea), healthcare professionals were supported by measures such as organization of shifts to avoid extended hours without rest, leaves from duty for mental
- ▶ and physical recovery, accommodation near their workplaces to protect
- ▶ their families, and childcare.

25 Health workforce

- ▶ Several countries reported making psychological support available
- ▶ for health workers, such as counseling or trauma support, to maintain
- ▶ well-being and morale.

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COVID-19 responses in 28 countries

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Medical products and technologies

26 Medical products and technologies

- ▶ High-quality prevention, diagnosis
- ▶ and management of COVID-19 require the ongoing development,
- ▶ production and sustained distribution of mass quantities of
- ▶ medical products and technologies. However, overreliance on a few
- ▶ countries for production, competition among countries and supply
- ▶ chain disruptions have caused global supply shortages.

27 Medical products and technologies

- ▶ Governments also worked beyond the typical health sectors
- ▶ and developed guidelines and specifications for non-health sectors
- ▶ to supplement the existing medical product manufacturing lines.
- ▶ In India, automotive manufacturers were repurposed to produce
- ▶ low-cost ventilators and PPE³².

28 Medical products and technologies

- ▶ In response to increased demand driven by widespread community
- ▶ transmission, countries enacted laws to prevent hoarding and
- ▶ exploitative pricing, as well as policies prohibiting export of medical
- ▶ supplies, while relaxing import licensing requirements and tariffs³⁸.

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COVID-19 responses in 28 countries

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Public health functions

29 Public health functions

- ▶ Public health interventions embedded
- ▶ within communities, such as testing, contact tracing, quarantine or
- ▶ self-isolation, and surveillance are crucial functions to break chains
- ▶ of transmission⁴⁰.

30 Public health functions

- ▶ Testing and contact tracing are a case in point that clearly illustrates why public health and health systems must act together in a coordinated manner.
- ▶ Diagnostic tests to identify whether a person is, or has been,
- ▶ infected are foundational to infectious disease responses to pinpoint
- ▶ locations of spread, and provide care and treatment if it exists.
- ▶ Testing strategies are broadly classified as passive or proactive.

31 Public health functions

- ▶ Many of the countries reviewed relied on passive testing strategies, where symptomatic individuals self-present to a healthcare facility for testing after meeting certain criteria.
- ▶ However, some countries adopted proactive testing strategies characterized by programs tailored to the unique needs of specific populations as an important
- ▶ tool toward breaking chains of transmission and offering a clearer
- ▶ epidemiological picture^{42,43}.

32 Public health functions

- ▶ Proactive testing must be accompanied by comprehensive contact
- ▶ tracing in partnership with communities. Contact tracing is
- ▶ the systematic process of following up with individuals who may
- ▶ have been exposed to COVID-19⁴⁴.

33 Public health functions

- ▶ The majority of countries reviewed introduced digital contact tracing
- ▶ tools. Even when fully operational, they may not be accessible,
- ▶ acceptable or feasible for use among those with limited access to, or
- ▶ concerns in using, adequate technology such as migrants, refugees
- ▶ or those experiencing homelessness, among others⁴⁸.

34 Public health functions

- ▶ All countries reported on quarantine and isolation protocols. While necessary to outbreak management, unless done in coordination with communities, quarantine measures can have negative impacts on mental health and well-being, become a source of stigma and be deployed at the significant cost of
- ▶ human rights⁴⁹.

35 Public health functions

- ▶ Given the high transmissibility of severe acute respiratory syndrome coronavirus 2, surveillance needs to be geographically comprehensive to provide accurate depictions of disease burden and epidemiology to prevent and mitigate community transmission⁵³

36 Public health functions

- ▶ By implementing
- ▶ active surveillance approaches, countries have expanded
- ▶ surveillance coverage from healthcare settings into communities,
- ▶ such as through primary care, thereby strengthening epidemiological
- ▶ surveillance among vulnerable populations.

37 Discussion

- ▶ Assessing health systems resilience is vital in helping policymakers plan for sustainable recovery and strengthen systems to better prepare and respond to current and future crises.
- ▶ The similarities across countries with divergent health outcomes makes clear that there is no one silver bullet toward a resilient health system. Nevertheless, there are a number of characteristics of well-performing countries across the resilience.

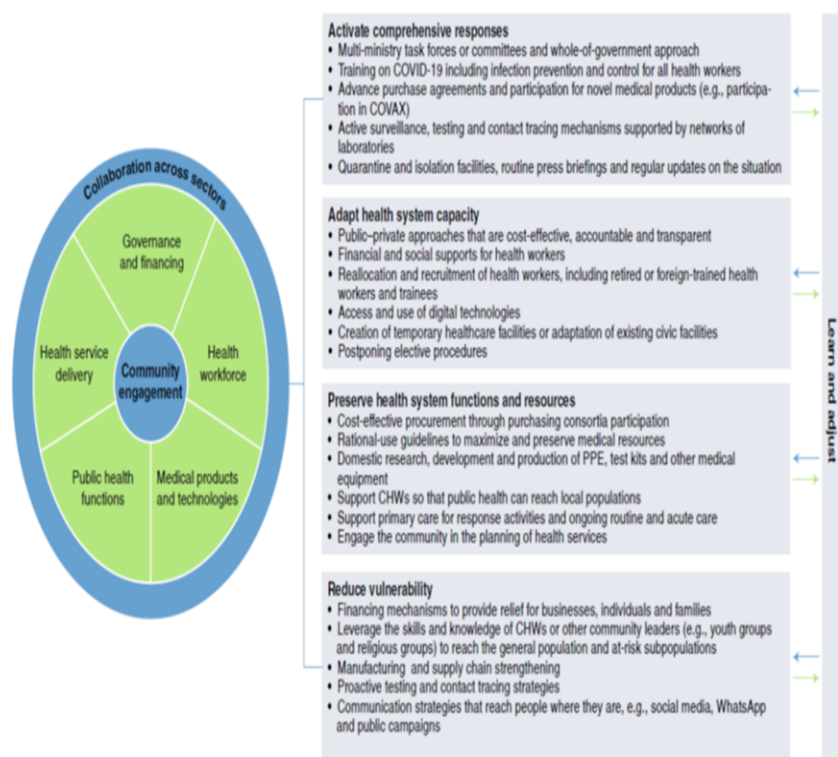
38 Discussion

- ▶ These are summarized as four elements of resilience that are featured in highly effective country responses. These elements draw on the concept that resilient health systems are systems that:
- ▶ (1) activate comprehensive responses, which are responses that consider and address health and well-being as intertwined with social and economic considerations;

39 Discussion

- ▶ (2) adapt capacity within and beyond the health system to meet the needs of communities;
- ▶ (3) preserve functions and resources within and beyond the health system to maintain pandemic-related and non-related routine and acute care;
- ▶ (4) reduce vulnerability to catastrophic losses in communities, both in terms of health and well-being, as well as individual or household finances; all while continually learning, monitoring and adjusting in light of emerging evidence or the evolving epidemiological situation (Fig. 3).

Fig. 3 | Four resilience elements of highly effective country responses. The framework presented expands upon and applies the determinants of health systems resilience framework to identify four resilience elements characteristic of highly effective country responses to COVID-19.



▶ اینها به عنوان چهار عنصر تاب آوری به طور خلاصه بیان می شوند که پاسخ های بسیار موثر کشورها را نشان می دهد.

▶ این عناصر از این مفهوم استفاده می کنند که سیستم های بهداشتی تاب آوری سیستم هایی هستند که:

▶ ۱. فعال کردن پاسخهای جامع، که پاسخهایی است که سلامت و رفاه را با ملاحظات اجتماعی و اقتصادی درهم آمیخته و آنها را مورد توجه قرار می دهد.

▶ (۲) ظرفیت سازگاری درون و فراتر از سیستم بهداشتی برای تأمین نیازهای جوامع؛

▶ (۳) حفظ عملکردها و منابع در داخل و خارج از سیستم بهداشتی برای مراقبتهای حاد مربوط به پاندمی و مراقبت های روتین غیر مرتبط با پاندمی و مراقبت های حاد

▶ (۴) کاهش آسیب پذیری در برابر تلفات فاجعه بار در جوامع هم از نظر بهداشت و رفاه و هم از نظر مالی در سطح فردی یا خانوادگی، یادگیری مداوم، نظارت و تنظیم با توجه به شواهد موجود یا وضعیت اپیدمیولوژیک در حال تکامل (شکل ۳).

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Discussion

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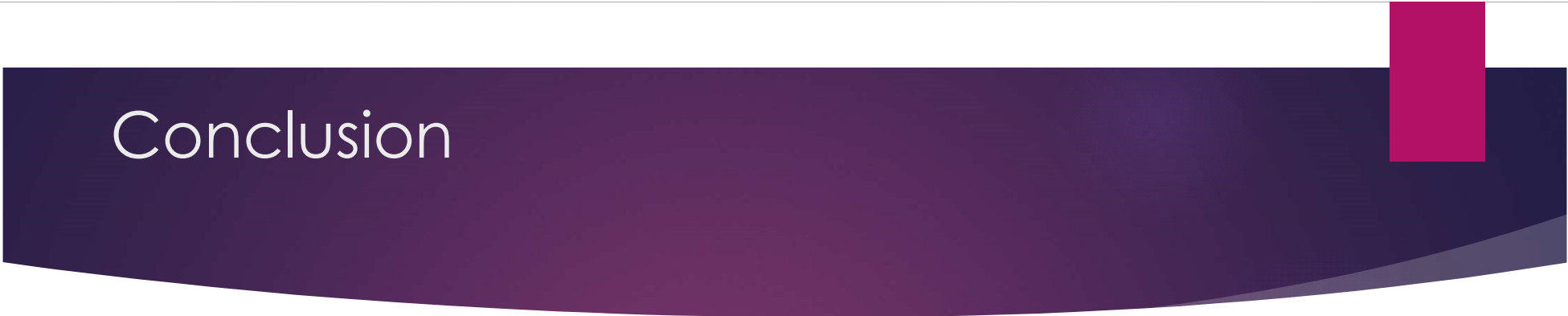
High-performing countries

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Discussion

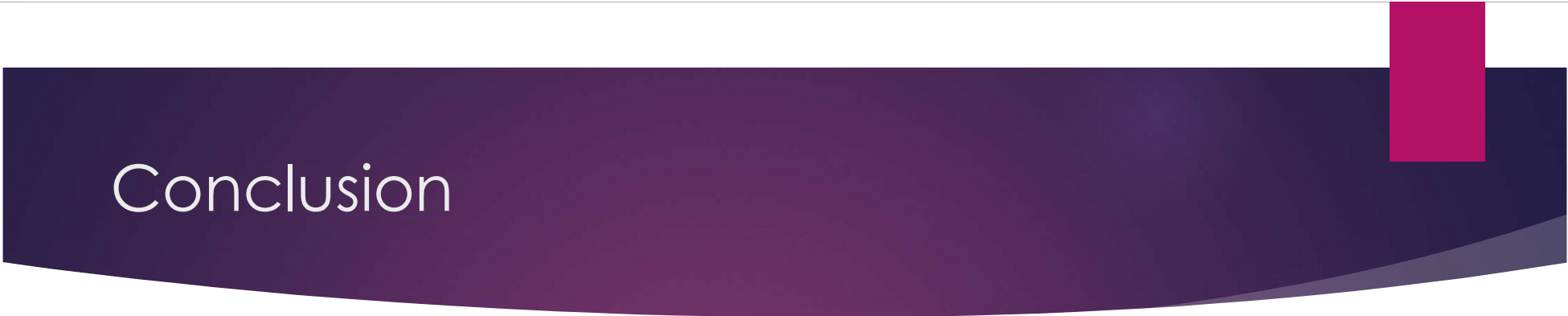
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Building resilient health systems



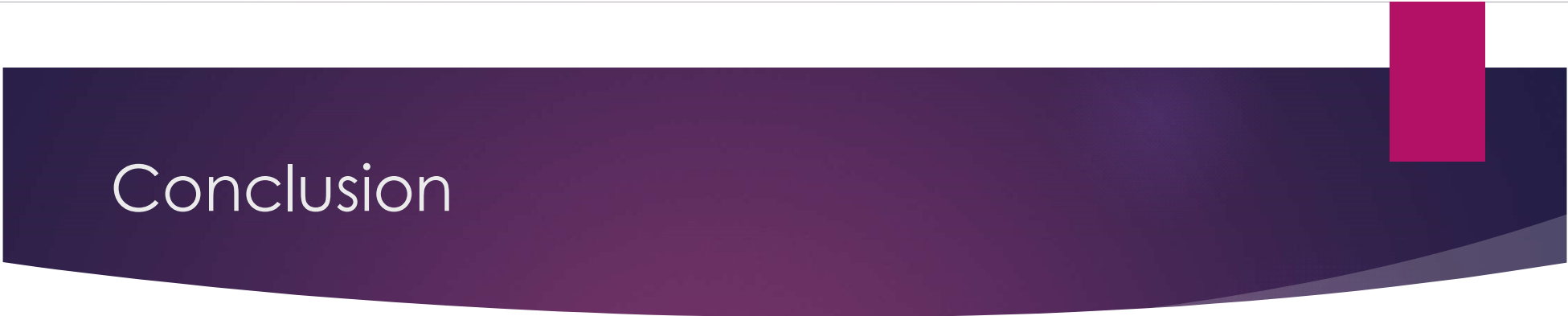
Conclusion

- ▶ Our findings and recommendations are not new, and there have been prior incremental moves to expand what constitutes, influences and governs health and healthcare.
- ▶ COVID-19 demands dynamic systemic transformation.
- ▶ The pandemic has fundamentally challenged health systems and the communities they serve globally.



Conclusion

- ▶ The effect of a major shock represented by the pandemic is to manifest the points where the system is weakest, and to demonstrate the interdependencies of a range of health, social and economic structures.
- ▶ While the evidence of system failures has come at a huge cost in human and monetary terms, it has also pointed to what needs to change.
- ▶ With over 3 million global deaths and pervasive social and economic costs, the pandemic must serve as a call for transformation and investment toward resilience and people centeredness, beginning with health systems.



Conclusion

- ▶ COVID-19 provides a renewed prospect for solidarity, both within and between countries.
- ▶ It also serves as a reminder that health is more than healthcare and that a whole-of-government approach to health and well-being is needed to create healthy populations able to collectively prevent and respond to crises, leaving no one behind.



THANK YOU
FOR YOUR
ATTENTION

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