
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Editorial

# Lessons learned from the COVID-19 pandemic

The COVID-19 pandemic has brought immense human suffering and loss of life, resulting in an unprecedented shock to health systems all over the world. And at least initially, it also left policymakers, health professionals, and decision makers scrambling for information and ideas on how to manage its impact. The research and information community responded with a number of online databases which were developed to track cases, deaths and hospitalizations, as well as country policy responses – mostly focusing on travel restrictions, fiscal measures and lockdowns [1–4]. While these provided key information, often in real time, a major deficiency in these initiatives was a lack of detailed information on how health systems were responding to the pandemic and how health systems transformed in response. Health systems naturally are one of the main factors that influence how well countries can handle a health crisis like the COVID-19 pandemic, and much has been done to strengthen health systems over the past two years. From increasing ICU bed capacity or expanding the health workforce, to managing vaccination rollouts, the measures put in place by health systems can help to explain why some countries have been able to keep death rates comparatively low even in the presence of severe COVID-19 outbreaks, or indeed, why select countries have avoided (at least some) COVID-19 waves almost entirely. Well-functioning and well-resourced health systems have also, in many cases, been able to limit disruptions to regular health service delivery, preventing sharp increases in waiting times. Alternatively, others have at times been forced to convert their health systems into almost exclusively Covid-care. For many countries, the inability of the health system to cope with the pressures of COVID-19 was a significant factor behind repeated lockdowns.

It is therefore of utmost importance to track how health systems responded to COVID-19, both for the sake of accountability as well as to support countries looking for policy options. In an effort to fill this gap in knowledge, the European Observatory on Health Systems and Policies, WHO European Regional Office and European Commission joined together to create the COVID-19 Health System Response Monitor (HSRM) [5]. The HSRM was established in March 2020 to collect and organize up-to-date information on how health systems in 50 countries, mainly in the WHO European Region, were responding to the COVID-19 pandemic.

The HSRM follows a structured template, which looks at key health system functions related to the pandemic and the context in which these functions operate, including prevention measures and the actions of other sectors. This approach helps to facilitate comparability across countries, as well as ensure that information on responses in key parts of the health system are not overlooked. The template has also been replicated outside of the European region, for example in Asia, led by the Asia Pacific Observatory [6].

Maintaining the HSRM so that it is sufficiently up to date is a serious undertaking. The HSRM relied heavily on the work of the Health Systems and Policy Monitor (HSPM) Network of the European Observatory on Health Systems and Policy, which brings together an international group of high-profile institutions from Europe and beyond with high academic standing in health systems and policy analysis. The content collected on the HSRM platform has been used to enhance cross country learnings through topical policy snapshots, policy briefs, Eurohealth issues, studies, webinars and more [7–11].

All articles in this Special Issue are based on the content collected in the HSRM, mainly during the period between March 2020 and late 2021. This issue contains both thematic articles, which focus on a topic contained in the template of the HSRM (Table 1), and comparative country articles, which compare country responses from a selection of 3 to 8 countries (Table 2). Each paper provides a synthesis of lessons learned and considers why some countries seem to have more successfully managed the pandemic while others have not, while flagging up perspectives for future research. This special issue aims to provide coherent and comprehensive insights on lessons learned from the COVID-19 response, which will support policymakers while they prepare for future outbreaks but also for other health system shocks that affect the supply and demand of health services. Below we briefly highlight some of the key findings coming out of the articles.

The first set of articles are structured around the thematic areas of the template. **Rajan et al.** focused on **'preventing transmission'** and identified valuable lessons for tackling future disease outbreaks [12]. The authors emphasize the importance of governance in introducing measures to reduce COVID-19 transmission, and identify the need for a clear strategy with explicit goals and a whole systems approach to implementation.

The next two articles look at '**Ensuring sufficient physical infrastructure and workforce capacity**'. First, **Winkelmann et al.** consider a range of options for boosting health system capacity that are particularly relevant currently as virtually all countries are tackling backlogs of care in their systems [13]. For example, many countries mobilized additional staff, redeployed existing staff, used private providers, expanded hospital and ICU capacities and used regional and cross-country patient transfers. Second, **Berger et al.** had an in-depth look at hospital and ICU capacity across countries [14]. They used HSRM data and combined this with national and international statistics on hospitals admissions, capacities and COVID-19 cases. They found substantial variation in strategies used to manage the surge in cases and huge variation in the utilization of hospital resources among COVID-19 patients (e.g. the duration of hospital treatment in the first wave of COVID-19 per SARS-CoV-2 case ranged from 1.3 (Norway) to 11.8 (France).

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**Table 1**
The HSRM template and corresponding thematic articles in this special issue

| Template section | Core information | Paper in this special issue | Authors |
|---|---|---|---|
| Preventing transmission | Key public health measures<br>Measures in place to test and identify cases, trace contacts, and monitor the scale of the outbreak | What have European countries done to **prevent the spread of COVID-19**? Lessons from the COVID-19 Health System Response Monitor | Selina Rajan, Martin McKee, Cristina Hernández-Quevedo, Marina Karanikolos, Erica Richardson, Erin Webb, Jonathan Cylus |
| Ensuring sufficient physical infrastructure and workforce capacity | Physical infrastructure<br>Measures to address shortages<br>Steps to maintain or enhance workforce capacity<br>Workforce skill-mix and responsibilities<br>Training and HR initiatives | European countries' responses in ensuring sufficient **physical infrastructure and workforce capacity** during the first COVID-19 wave | Juliane Winkelmann, Erin Webb, Gemma A Williams, Cristina Hernández-Quevedo, Claudia B Maier, Dimitra Panteli |
| | | A country-level analysis comparing **hospital capacity and utilisation** during the first COVID-19 wave across Europe | Elke Berger, Juliane Winkelmann, Helene Eckhardt, Ulrike Nimptsch, Dimitra Panteli, Christoph Reichebner, Tanja Rombey, Reinhard Busse |
| Providing health services effectively | Planning and patient pathways for COVID-19 cases<br>Maintaining essential services | **Providing health services** effectively during the first wave of COVID-19: A cross-country comparison on planning services, managing cases, and maintaining essential services | Erin Webb, Cristina Hernández-Quevedo, Gemma Williams, Giada Scarpetti, Sarah Reed, Dimitra Panteli |
| | | Transformations in the landscape of **primary health care** during COVID-19: Themes from the European region | Stephanie Kumpunen, Erin Webb, Govin Permanand, Evgeny Zheleznyakov, Nigel Edwards, Ewout van Ginneken, Melitta Jakab |
| Paying for services | How countries are paying for services<br>Entitlements and coverage | How resilient is **health financing policy** in Europe to economic shocks? Evidence from the first year of the COVID-19 pandemic and the 2008 global financial crisis | Sarah Thomson, Jorge Alejandro García-Ramírez, Baktygul Akkazieva, Triin Habicht, Jonathan Cylus, Tamás Evetovits |
| | | Balancing financial incentives during COVID-19: a comparison of **provider payment adjustments** across 20 countries | Ruth Waitzberg, Sophie Gerkens, Antoniya Dimova, Lucie Bryndová, Karsten Vrangbæk, Signe Smith Jervelund, Hans Okkels Birk, Selina Rajan, Triin Habicht, Liina-Kaisa Tynkkynen, Ilmo Keskimäki, Zeynep Or, Coralie Gandré, Juliane Winkelmann, Walter Ricciardi, Antonio Giulio de Belvis, Andrea Poscia, Alisha Morsella, Agnė Slapšinskaitė, Laura Miščikienė, Madelon Kroneman, Judith de Jong, Marzena Tambor, Christoph Sowada Silvia Gabriela Scintee, Cristian Vladescu, Tit Albreht, Enrique Bernal-Delgado, Ester Angulo-Pueyo, Francisco Estupiñán-Romero, Nils Janlöv, Sarah Mantwill, Ewout Van Ginneken, Wilm Quentin |
| Governance | Pandemic response plans<br>Steering of the health system<br>Emergency response mechanisms<br>Regulation of health service provision to affected patients | Centralizing and decentralizing **governance** in the COVID-19 pandemic: The politics of credit and blame | Scott L Greer, Sarah Rozenblum, Michelle Falkenbach, Olga Löblová, Holly Jarman, Noah Williams, Matthias Wismar |

The special issue then turns to '**Providing health services effectively**', a key challenge for health systems not only during system shocks. Adaptations in the provision of care revealed similarities across countries. **Webb et al.** identify the most common strategies for adapting service delivery, including postponing elective care, reconfiguring hospital wards, using private sector capacity, and increasing digital health services [15]. **Kumpunen et al.** look at primary care providers, who were often underutilized during the pandemic [16]. They document a transformation of primary care models that included the use of multi-disciplinary primary care teams, identification of vulnerable populations for medical and social outreach, and the expanded use of digital solutions. Both articles will inspire policymakers concerned with building back after the pandemic and highlight the need for new models of care.

The huge changes in demand for, and supply of, health care services as well as economic contractions in many European countries have required changes in '**paying for services**' in virtually all countries. **Thomson et al.** take a broad view on health financing policy and discuss how to maintain adequate financial resources for health in the presence of economic shocks [17]. The authors highlight that most countries in the WHO European Region do not use automatic stabilizers for public revenue for the health system, which would automatically increase public spending on health as the economy declines, and suggests that permanent changes are needed to reduce procyclical financing and strengthen resilience. **Waitzberg et al.** review changes in payment mechanisms for hospitals and healthcare professionals, distinguishing between adjustments compensating income loss and those covering extra costs related to COVID-19 [18]. Here, the specifics of the health system's financing played a role – in countries that used salary or capitation payments for professionals and global budgets for hospitals, income loss did not occur because of the separation between volume levels and payment, whereas providers in countries with activity-based payments experienced income losses, which was compensated through extra budgets, higher fees, and new payments to incentivize and compensate remote services. Both articles show that yet more can be done to better prepare financing systems for unexpected drops in public revenues, smoothing provider income losses due to reduced demand, and covering extra costs related to providing new types of services.

The final thematic article underscores the importance of **'governance'** in driving an effective health systems response to the COVID-19 pandemic. **Greer et al.** study one particular element of governance, the role of centralization vs. decentralization, in relation to the politics of credit and blame [19]. Their piece highlights that public health measures were relatively easier to implement earlier in the pandemic, but as

**Table 2**
Comparative country articles in this Special Issue

| Comparative country articles | |
|---|---|
| **Nordic** responses to Covid-19: Governance and policy measures in the early phases of the pandemic | Ingrid Sperre Saunes, Karsten Vrangbæk, Haldor Byrkjeflot, Signe Smith Jervelund, Hans Okkels Birk, Liina-Kaisa Tynkkynen, Ilmo Keskimäki, Sigurbjörg Sigurgeirsdóttir, Nils Janlöv, Joakim Ramsberg, Cristina Hernández-Quevedo, Sherry Merkur, Anna Sagan, Marina Karanikolos |
| A comparison of health policy responses to the COVID-19 pandemic in **Canada, Ireland, the United Kingdom and the United States of America** | Lynn Unruh, Sara Allin, Greg Marchildon, Sara Burke, Sarah Barry, Rikke Siersbaek, Steve Thomas, Selina Rajan, Andriy Koval, Mathew Alexander, Sherry Merkur, Erin Webb, Gemma A Williams |
| Lessons learned from the **Baltic countries'** response to the first wave of COVID-19 | Erin Webb, Juliane Winkelmann, Giada Scarpetti, Daiga Behmane, Triin Habicht, Kristiina Kahur, Kaija Kasekamp, Kristina Köhler, Laura Miščikienė, Janis Misins, Marge Reinap, Agnė Slapšinskaitė-Dackevičienė, Andres Võrk, Marina Karanikolos |
| A reversal of fortune: comparison of health system responses to COVID-19 in the **Visegrad Group** during the early phases of the pandemic | Anna Sagan, Lucie Bryndova, Iwona Kowalska-Bobko, Martin Smatana, Anne Spranger, Viktoria Szerencses, Erin Webb, Peter Gaal |
| A comparison of health system responses to COVID-19 in **Bulgaria, Croatia and Romania** in 2020 | Aleksandar Džakula, Maja Banadinović, Iva Lukačević Lovrenčić, Maja Vajagić, Antoniya Dimova, Maria Rohova, Mincho Minev, Silvia Gabriela Scintee, Cristian Vladescu, Dana Farcasanu, Susannah Robinson, Anne Spranger, Anna Sagan, Bernd Rechel |
| COVID-19 pandemic health system responses in the **Mediterranean countries**: a tale of successes and challenges | Ruth Waitzberg, Cristina Hernández-Quevedo, Enrique Bernal-Delgado, Francisco Estupiñán-Romero, Ester Angulo-Pueyo, Mamas Theodorou, Marios Kantaris, Chrystala Charalambous, Elena Gabriel, Charalampos Economou, Daphne Kaitelidou, Olympia Konstantakopoulou, Lilian Venetia Vildiridi, Amit Meshulam, Antonio Giulio de Belvis, Alisha Morsella, Alexia Bezzina, Karen Vincenti, Gonçalo Figueiredo Augusto, Inês Fronteira, Jorge Simões, Marina Karanikolos, Gemma Williams, Anna Maresso |
| Tackling the COVID-19 pandemic: Initial responses in 2020 in selected **social health insurance countries** in Europe | Andrea E Schmidt, Sherry Merkur, Anita Haindl, Sophie Gerkens, Coralie Gandré, Zeynep Or, Peter Groenewegen, Madelon Kroneman, Judith de Jong, Tit Albreht, Pia Vracko, Sarah Mantwill, Cristina Hernández-Quevedo, Wilm Quentin, Erin Webb, Juliane Winkelmann |

time progressed, this shifted as populations pushed back against restrictions, particularly in countries where the population had lower trust in government, which becomes even more apparent in the comparative articles discussed below.

Indeed, the second set of articles of this Special Issue focus on country comparisons and highlight the breadth of the Health Systems and Policy Network, with 33 country experiences recorded in these papers. They complement the thematic articles described above either by narrowing in on certain aspects of the COVID-19 response or by providing a wider overview of the response across countries. **Sperre Saunes et al.** review the governance response in the Nordic countries of Denmark, Finland, Norway, and Sweden [20]. They found that the countries' strong welfare systems and the high levels of trust in government contributed to a comparatively less devastating impact from the pandemic compared to other countries. **Unruh et al.** describe a very different experience in Canada, Ireland, the United Kingdom and the United States of America [21]. They found that inconsistent messaging and alignment between health experts and political leadership was a key factor in lacking compliance with public health measures in these countries (although less so in Ireland). **Webb et al.** compare the centralized responses of the Estonian, Latvian, and Lithuanian health system, and witnessed the creation of the Baltic bubble during the first wave, one of the few regional open border arrangements during the pandemic [22]. **Sagan et al.** look at the Visegrad countries of the Czech Republic, Hungary, Poland, and the Slovak Republic which managed to control the first outbreak with strict measures, but then saw an erosion in support and loosening of measures as political and economic considerations started to prevail [23]. **Džakula et al.** describe a similar experience in Bulgaria, Croatia, and Romania [24]. After initial success, political and economic interests started to become dominant while public trust in government faded. The countries in all four of these articles describe a common pattern in which after acting quickly to minimize the initial impact of COVID-19, over time, weaknesses appeared that emphasize the need to strengthen the health workforce and balance the flexibility of service delivery to care for both COVID and non-COVID patients.

**Waitzberg et al.** compare the country responses in Cyprus, Greece, Israel, Italy, Malta, Portugal, and Spain [25]. With Italy and Spain among the hardest hit in the early phases of the pandemic, the authors acknowledge the value of learning from others (or first movers as they call them), especially in conditions of uncertainty. **Schmidt et al.** also cover a large country group, focusing on social health insurance (SHI) countries including Austria, Belgium, France, Germany, Luxembourg, the Netherlands, Slovenia and Switzerland [26]. They found that, perhaps surprisingly, SHI funds which play an important role as purchasers in these health systems were generally not very involved in crisis management and that their responsibilities in some countries shifted to the national government. This implies that the roles of SHI funds as well as other key health system actors may need to be carefully assessed so that they can be better prepared for future shocks.

Taken together, these articles provide a wealth of information about the response to COVID-19 in the WHO European Region. We thank all of the authors and reviewers involved in creating this Special Issue.

When the articles for this special issue on the European response to the COVID-19 pandemic were commissioned in the autumn of 2020, we could not have imagined that COVID-19 would still be such a major policy priority more than two years after the WHO declared COVID-19 a global pandemic. By now, there is no country that has not been affected by the crisis. Indeed, many countries which appeared to be good performers early in the crisis or even when we began to write this special issue eventually experienced outbreaks, in some cases severe ones. The truth is that virtually no country has consistently managed the pandemic well. This is unsurprising given the difficulty in maintaining COVID-19 measures over a long period of time. Nevertheless, there are many examples of good practices and potentially innovative initiatives within countries contained in the articles of this special issue that provide options for countries as they continue to re-orient their health system to deal with COVID-19 or to prepare for future crises.

Going forward, most countries in Europe have opted to put their faith in vaccines, and to a lesser extent, kept in place some social distancing measures, which only recently are being lifted. Health systems are therefore likely to continue to experience COVID-19 waves for the foreseeable future; their ability to cope with these pressures, not to mention other shocks, depends on having good information and policy options. In support of this, the country information on the COVID-19 HSRM will remain available as an archive of policy responses and there will also be a focus on ongoing analysis of key issues related to the recovery from the pandemic and making the system more resilient. These include, among others, how to support, retain and train sufficient workforce (a key bottleneck laid bare during the pandemic); how to estimate and tackle care backlogs; how to implement new models of care, including multidisciplinary approaches to the management of long

Covid patients; how to manage the increasing need for mental health services; and how to appropriately use digital and remote health services by assessing in which areas they work and do not.

In the coming months and years, countries would derive great benefit from undertaking health system stress tests to identify weaknesses in the context of a range of different shocks. To this end, country experiences contained in the COVID-19 HSRM archive can be utilized as a sort of menu to inform remedial actions. One of the key advantages of this resource is that countries do not need to rely solely on their own policy experiences but also can explore concrete examples that have been applied elsewhere, being mindful of course of specific country contexts. We would advocate that such opportunities for policy knowledge transfer can provide a kind of leap-frogging effect for countries in devising appropriate policy responses for the future, be they as pre-paredness blueprints for a number of theoretical scenarios or national strategies to address other health system shock events.

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