

# Health system resilience and health workforce capacities: Comparing health system responses during the COVID-19 pandemic in six European countries

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## Abstract

**Background:** The health workforce is a key component of any health system and the present crisis offers a unique opportunity to better understand its specific contribution to health system resilience. The literature acknowledges the importance of the health workforce, but there is little systematic knowledge about how the health workforce matters across different countries.

**Aims:** We aim to analyse the adaptive, absorptive and transformative capacities of the health workforce during the first wave of the COVID-19 pandemic in Europe (January-May/June 2020), and to assess how health systems prerequisites influence these capacities.

**Materials and Methods:** We selected countries according to different types of health systems and pandemic burdens. The analysis is based on short, descriptive country case studies, using written secondary and primary sources and expert information.

**Results and Discussion:** Our analysis shows that in our countries, the health workforce drew on a wide range of capacities during the first wave of the pandemic. However,

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health systems prerequisites seemed to have little influence on the health workforce's specific combinations of capacities.

**Conclusion:** This calls for a reconceptualisation of the institutional prerequisites of health system resilience to fully grasp the health workforce contribution. Here, strengthening governance emerges as key to effective health system responses to the COVID-19 crisis, as it integrates health professions as frontline workers and collective actors.

**KEYWORDS**

COVID-19 pandemic, European comparison, health governance, health system resilience, health workforce capacities

**Highlights**

- The health workforce contributes to health system resilience.
- Comparative analysis of adaptive, absorptive and transformative capacities.
- Health systems prerequisites have little influence on capacity combinations.
- Governance emerges as key to health system responses to the coronavirus disease-2019 crisis.

## 1 | INTRODUCTION

The health workforce is a key component of any health system. Nurses, care assistants, medical laboratory technicians, doctors and many more health workers deliver services, which together help to realise the basic right of citizens to health care. This has led the World Health Organisation (WHO) to the categorical statement that there is no 'No health without a health workforce'.<sup>1</sup> This is even more true in times of crises like the present coronavirus disease-2019 (COVID-19) pandemic. The health workforce emerges as a fundamental part of how health systems have responded to the multiple and significant challenges posed by the Covid-19 pandemic.<sup>2-12</sup>

Current policy debates reflect this. For example, the European Commission, stresses that 21 out of 28 Member States need to improve their health workforce,<sup>13</sup> similarly WHO Regional Office Europe<sup>14</sup> and a newly established Pan European Commission on Health and Sustainable Development Goals urged European health leaders to take action against understaffing and underfinancing of the health workforce.<sup>15</sup> In collaboration with the WHO and the European Observatory, the European Union (EU) has also set up the COVID-19 Health Systems Response Monitor, which provides information and tools on how to expand the health workforce during the pandemic.<sup>16-18</sup> Most recently, an EU Expert Panel<sup>4</sup> developed policy recommendations on the resilience of health and social care services, which included strengthening workforce training and resilience and fostering collaboration across different professions and sectors.

In the debate of how health systems have responded to the Covid-19 pandemic, there has been considerable interest in the concept of health system resilience. In general terms, this describes the ability to prepare, manage, recover and learn from a crisis like the COVID-19 pandemic and better handling any similar crisis in the future.<sup>10,19,22</sup>

This includes two types of capacities: reactive capacities to absorb, survive and reorganise following acute instability; and proactive capacities to anticipate and prepare for relevant sources of instability.<sup>23</sup>

The literature on health system resilience acknowledges the importance of the health workforce.<sup>4,24,25</sup> For example, Chamberland-Rowe et al.<sup>23</sup> identify the health workforce as one of the building blocks of the health system, which form a prerequisite for health systems resilience. Hanefeld and colleagues<sup>25</sup> go one step further and argue the health workforce is one of three components of health system resilience, that is, besides health information systems and funding/financing mechanisms.

However, we continue to have little systematic, cross-country comparative knowledge about how the health workforce matters for health system resilience across different countries. The present crisis offers a unique opportunity to better understanding the specific contribution of the health workforce to health system resilience, and, more specifically, the adaptive, absorptive and transformative capacities of the health workforce, and how these differ across health systems.<sup>4,9,26</sup> The initial picture emerging from ongoing public health debates in Europe is that there are many examples of very quick up-skilling, an exceptionally high level of flexibility and very well developed ability to adapt to new demands, for example.<sup>11,16,18,27,28</sup>

At the same time, there is growing awareness of mental health needs and well-being of the health workforce, including the importance of appropriate personal protection equipment.<sup>11</sup> The WHO Regional Director for Europe reminds us that: 'We have no COVID-19 response if we do not care for our health-care and essential workers: their needs and well-being must be prioritized.'<sup>29</sup> The pandemic has reinforced a need to pay greater attention to both, the resources of the health workforce and the 'human face' of the health workforce.<sup>8,12,26,30</sup>

Currently, we continue to have little (if any) systematic knowledge about how the various new challenges the COVID-19 pandemic has been posing for health systems connect not only the health system resilience but also the role of the health workforce in these transformations.

## 1.1 | Aim and scope

Against this background, the aim is to study health system resilience with a focus on the health workforce. More specifically, we analyse the adaptive, absorptive and transformative capacities of the health workforce during the first wave of the COVID-19 pandemic in Europe (January until about May/June 2020, although peaks may vary regionally), and we assess how these capacities differ across countries. We adopt a cross-country comparative perspective to assess how health systems influence the contribution of the health workforce. The study is based on a comparison of selected health policy and health services responses in six health systems in Europe, incorporating different types of systems (i.e. national health systems and social health insurance systems) and severity of the crisis (i.e. mortality rates) during the first wave of the pandemic.

## 2 | METHODS AND MATERIAL

We focus on health system resilience specifically in relation to the health workforce, namely on activities of health workforce planning, training and organisation. Here, we consider the health workforce across different parts of the health system: hospital and primary care services, old age care services and mental health services as well as public health services. Firstly, in terms of *planning*, the pandemic has made immediate and high demands on the health workforce and has pushed for its expansion. Examples of planning activities are recruitment of retired health personnel as well as medical and nursing students, and setting up job banks for volunteers with healthcare qualifications.<sup>18</sup>

Secondly, concerning *training*, the pandemic has highlighted the need for strengthening particular, specialist skills in the health workforce. This has included a variety of measures, such as training nurses in basic respiratory/pulmonary care, re-skilling retired doctors and up-skilling medical students. Thirdly, in terms of *organisation*, the pandemic

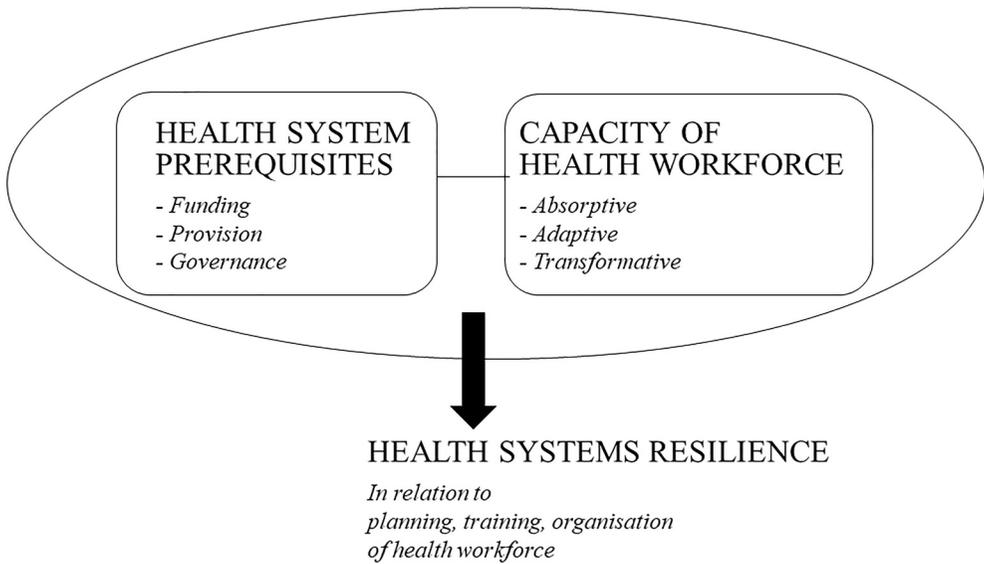


FIGURE 1 Overview of analytical framework. Source: authors' own figure, adapted and transformed from<sup>35</sup>

has made considerable demands on rapid changes of the organisation of hospital and primary care services as well as public health, long-term care and mental healthcare services. This is not only to deal with patients with Covid-19, but also to free-up resources in other health services and comply with new regulations to contain the pandemic.<sup>18,31</sup>

## 2.1 | Theoretical approach

Theoretically, we draw on the literature on health workforce research, studies of professions and comparative studies of health systems, governance and policy<sup>2,10,32,34</sup> in addition to the literature on health system resilience.<sup>4,23,25,35,36</sup> Figure 1 below gives an overview of our analytical framework.

We identify different ways in which the health workforce contributes to health system resilience by drawing on the distinction between three types of capacities for health system resilience,<sup>24,37</sup> which can exist at micro-, meso- and macro levels.<sup>23</sup> *Absorptive capacity* refers to the ability to maintain existing levels of services in terms of quantity and quality, using the same level of resources and capacities, for example existing hospital staff moving to other departments to keep workforce capacity stable. In contrast, *adaptive capacity* concerns the ability and willingness of the health workforce to accommodate change by using new sets of resources, for example medical students and volunteers joining the existing workforce to fill in the gaps. The degree of novelty is even greater in relation to *transformative capacity*, as in the ability of the health workforce to respond to changing environments through making fundamental changes to the function and structures of health systems, for example pharmacists taking over tasks of doctors to increase COVID-19 vaccination capacity.

The three sets of capacities are operationalised in different ways, including directly connected strategies (e.g. health workers moving to Covid-19 wards) and indirectly connected strategies (e.g. formalisation of e-consultations).

We focus on the health system as the central prerequisite of health system resilience and the specific capacities of the health workforce.<sup>4,23</sup> We distinguish between funding, provision and governance.<sup>32</sup> Each set of health systems prerequisite includes specific aspects related to health services and the health workforce, which we expect support absorptive, adaptive and transformative capacity of the health workforce to contribute to health system resilience.<sup>4,10,25,37</sup> For an overview of health systems prerequisites see Table 1 below.

TABLE 1 Overview of health systems prerequisites

(1) FUNDING	<ul style="list-style-type: none"> <li>• Regular funding: Principles for raising and allocating funding.</li> <li>• Relative flexibility of funding: Possibilities for reallocating funding and allocating extra resources.</li> </ul>
(2) PROVISION	<ul style="list-style-type: none"> <li>• Organisation of service delivery: Relative share of public, non-profit and for-profit provision, related level of integration of services, relative level of service provision including marked shortcomings in coverage.</li> <li>• Organisation of health workforce: Relative level of health human resources including marked shortages; relative level of training, characteristics of health division of labour including levels of collaboration and integration.</li> </ul>
(3) GOVERNANCE	<ul style="list-style-type: none"> <li>• Control over health system/workforce: Relative public/central control over health system and health workforce.</li> <li>• Integration of health workforce: Relative integration of health professions in health governance at systems, policy and organisation levels.</li> </ul>

Concerning *funding*, the literature on health system resilience suggests, this is especially a question of the relative stability of funding. Overall, public funding from taxes and/or social insurance contributions offers considerable stability. However, this can vary across countries, depending on the earmarking of funding together with the more general political priorities and economic resources of individual countries. Funding also needs to be flexible in order to be able to accommodate the shifting priorities in times of health crises. This includes the possibility of shifting funding between sectors and of allocating additional resources.<sup>38</sup>

The dimension of *provision* relates to both the organisation of health services and the organisation of the health workforce.<sup>39</sup> The relative mix of public, non-profit and for-profit provision gives an indication of the relative organisational complexity (and possible fragmentation) of health services. Health crises make more demands on coordination and here, existing levels of integration and associated flexibility can be an important resource. Similarly, adequate levels of service provision can offer buffers for higher demands in times of health crises. The same applies to the health workforce. It is easier to absorb sudden surges in demands when there is sufficient staff who are flexible because of high levels of training and who are used to working across professional and service boundaries.<sup>18</sup> It is also easier if solidarity and civil society engagement are shared values and trust and commitment are generally high.<sup>25,40</sup>

The dimension of *governance* concerns the relative public (central) control over health services and the health workforce, and the relative integration of the health workforce in health governance. The first aspect relates to issues of governance capacity, whereas the second is about the professional ownership of health governance. Both are crucial for governing health crises in a sustainable manner.<sup>25</sup> Importantly, we conceptualise health professions and professionalism as a subcategory of governance that may intersect with other modes of governance, thus making governance highly flexible and transformative.

## 2.2 | Case selection and material

We select Austria, Denmark, Germany, Italy, the Netherlands and the UK for the comparative analysis. The countries have different types of healthcare systems and we expect this makes for different health systems prerequisites, which in turn influence health workforce capacities.<sup>2,41,42</sup> In the first wave of the pandemic, the countries are also characterised by different scales of crisis as reflected in the relative pandemic burden. Mortality offers a timely indicator and excess mortality rather than deaths allows for robust comparisons across countries.<sup>43,44</sup> Table 2 below gives an overview of the countries included for comparison.

TABLE 2 Overview of selection of countries for comparative analysis

	NHS	Social insurance
Low burden	Denmark	Germany/Austria
High burden	Italy/UK	Netherlands

Abbreviation: NHS, National Health Service.

## 2.3 | Data collection and analysis

Country experts collected the material and provided short, descriptive country case studies, using written secondary and primary sources and expert information. This formed the basis for a comparative analysis. A step-by-step approach was applied: the lead (first and last) authors developed a first comparative analysis of the country case material and highlighted data gaps; the country case studies were subsequently revised and amended and the comparative results discussed by all authors; the procedure was repeated until data gaps were closed and consensus was reached.

## 3 | RESULTS

### 3.1 | What are the capacities of the health workforce?

During the first wave of the pandemic, the health workforce drew on a broad range of capacities. The *absorptive capacity* of the health workforce related particularly to hospitals and to freeing up capacities for newly established Covid-19 wards. In local hospitals, nurses in particular moved to other departments, and they went through some retraining in intensive care treatment. Measures by national governments amplified the capacity of the existing workforce. Besides the cancelation of elective surgery, several countries suspended the collective agreements about work responsibilities, and about working time and holidays (Germany, Denmark, Netherlands).

Another set of measures concerned relaxing quality standards. The approach in the Netherlands was direct; for example, the Health and Youth Care Inspectorate temporarily allowed hospital pharmacists to use prefabricated medicine. Instead of distributing medicines and corresponding fluids separately such as for antibiotics treatment, hospital pharmacists received authorisation to prepare drips to save time.<sup>45,46</sup> The approach in Denmark was more indirect, and the Danish Patient Safety Authority acknowledged COVID-19 as a mitigating circumstance in the case of clinical errors.<sup>47</sup> Absorptive capacity can also be concerned with securing the sheer availability of the workforce. For example, the federal government in Austria chartered special trains to ensure that care workers from Romania could return to their work despite border closures.<sup>30,48</sup> For their part, employers were responsible for paying for Covid-19 tests and hotel quarantine in case of a positive test result.<sup>49</sup>

In the first wave of the pandemic, the *adaptive capacity* of the health workforce in our countries focused on increasing health workers not least in the newly established Covid-19 wards in hospitals. This included especially the recruitment of new staff: recent graduates, returnees to clinical practice and retirees, and foreign health workers joined the existing health workforce. In the Netherlands, for instance, this included health workers whose registration had lapsed. The Health and Youth Inspectorate allowed re-entry into independent practice for those health workers whose registration had lapsed within the last 2 years; whereas all others had to work under supervision.<sup>50</sup> In Germany, health workers also moved from part-time to full-time employment.<sup>27</sup> Austria had a particular focus on increasing the number of carers and mental health workers. In relation to the former, a new labour market agreement included wage increases and some improvement of working conditions.<sup>51</sup>

Another set of strategies related to the adaptive capacity of the health workforce was concerned with changing the organisation of healthcare. One type of change concerned the introduction of new organisational forms. Teams for intensive care of patients with Covid-19 are a prominent example across countries. For example, in England,

with routine surgery slowing in many hospitals operating theatre practitioners retrained to work in new areas. Practitioners often joined four-person teams, working around the clock to attend Covid-19 related intubations, cardiac arrests and trauma calls.<sup>52</sup> Another example of the introduction of new organisational forms was the establishment of auxiliary hospitals in Germany. For instance, the organisation of an auxiliary hospital at Hannover<sup>53</sup> followed national guidelines by the federal public health authority and was based on nursing-led management; the hospitals drew on tailored training and electronic systems to support documentation and coordination.

Another type of change was the scaling-up of existing organisational forms. For example, in Denmark, many municipalities significantly redefined and accelerated existing structures for coordination to organise the discharge of patients with Covid-19.<sup>54-56</sup> Changing the organisation of healthcare can also involve different levels. For example, in Italy, initially, the regions drew up overall plans for re-organising health service to respond to the emergencies created by the pandemic, which also emphasised existing differences in regional models.<sup>57,58</sup> Subsequently, there has been a greater attempt to coordinate measures between central government and the regions. However, conflicts between the two levels of government are frequent and coordination looks difficult when discussing the measures to contain the pandemic.<sup>59-61</sup>

The degree of novelty was even greater in relation to the transformative capacity, understood as the ability to respond to changing environments through making fundamental changes to the function and structures of health systems. One set of changes related to new service offerings, including the introduction of new mental health services. For example, in Austria, the main social insurance significantly increased the number of therapy sessions available for reimbursement under the social insurance scheme.<sup>62</sup> A smaller social insurance doubled the reimbursement for therapy sessions.<sup>63</sup> Across countries, there was an increase in the use of remote consultations and some countries formalised this change in health services delivery (Denmark, England, Germany, Netherlands). For example, in the Netherlands, the Dutch Health Care Authority further expanded the possibilities for the reimbursement of remote, electronic consultations.<sup>64</sup> It became possible to see a patient online already in connection with the first consultation as the 'old' requirement that the first consultation should be face-to-face was dropped. In England, National Health Service England has set up the Beneficial Changes Network to explore the potential for embedding innovations like electronic consultations in general practice that developed during COVID. There is a support programme and network as well as support for applied research.<sup>65</sup>

There were also changes in the form of a new type of provider organisation. The central government in Italy introduced Specialist Units for Continuity of Care.<sup>66</sup> The units are part of the local health authorities, but include different health professions and have a strong intersectoral focus. The units have the statutory duty to manage patients with Covid-19 who can be treated at home. A final set of changes concerned the health workforce more directly. As part of the expansion of the public health workforce,<sup>67</sup> Germany has seen the creation of a new job function, the contact manager, and many newly employed staff have received basic training in public health surveillance. There are also signs of improved collaboration between public health doctors and family physicians, as well as of greater recognition and acknowledgement of public health doctors at both organisational and policy levels.<sup>67</sup>

The range and reach of the capacities demonstrates the significant contribution of the health workforce to health system resilience. This resonates with studies of health professions and the notion, that the interests of health professions and the state are closely connected.<sup>68,69</sup> Importantly, during public health emergencies like the COVID-19 pandemic this connection exists at different levels. Firstly, health professions assume a key role in providing services for citizens in emergency situations, thus helping states to navigate effectively through the crisis. Secondly, health professions have the capacity to mediate between the interests of the state and the citizens, thus helping to maintain the trust and confidence of citizens. Thirdly, health professions are part of the regulatory architecture of healthcare systems and enjoy to different levels of self-regulatory competencies and capacity. These can be mobilised quickly to maximise governance capacities and establish effective crisis management.

### 3.2 | How do health systems prerequisites influence the capacities of the health workforce?

The influence of health systems is most visible in relation to the substantive areas of healthcare delivery, where the health workforce applies its capacities. For example, in Austria absorptive and adaptive capacities focussed on maintaining and increasing the supply of care workers in elder care. This reflects the structural shortcomings of a health system, where the predominance of the medical division of labour co-exists with shortages in elder care and a strong reliance on migrant carers.<sup>70</sup> In the Netherlands, similar shortages in elder care were the background for sending regional level hospital nurses to nursing homes to increase nursing home capacity to enable a faster hospital throughput.<sup>2</sup>

For the same reasons, the health system in Germany has been strongly hospital-centred and public health has long remained a poor relation.<sup>71</sup> Here, the first wave of the pandemic has offered a basis for turning public health in municipalities into an area for transformative capacities.<sup>67</sup> In the health system in Italy, the same hospital-centredness and corresponding poor integration across healthcare sectors formed the background for the introduction of new provider organisations in form of the Specialist Units for Continuity of Care.<sup>72,73</sup> In the case of England, many years of austerity policies as well as the prospect of Brexit had led to widespread and increasing shortages of hospital doctors and nurses.<sup>74,75</sup> Compared to other countries, maintaining and increasing healthcare workers in hospitals was an even stronger focus in relation to absorptive and adaptive capacities in the first wave of the pandemic.

The influence of health systems is less visible in relation to the specific range of capacities of the health workforce. During the first wave of the pandemic, the absorptive and adaptive capacities were particularly prominent, together with some transformative capacities. The lack of distinct patterns is striking, considering that we have included health systems, which differ on so many counts. In terms of funding, our countries include both National Health Services (Denmark, England, Italy) and Social Insurance Systems (Austria, Germany, Netherlands). There are also significant differences in terms of provision: public hospitals dominate in Denmark and England, whereas the provision of hospital services is more mixed in the other countries. This has implications for the relative integration across sectors, not least between health and social care. The picture is also varied in relation to the governance arrangements. These include elements of federalism (Austria, Germany), corporatism (Austria, Denmark, Germany, Netherlands), and medical self-regulation (Austria, Germany). Overall, health governance is mostly decentralised, with the exception of England. We had expected that this considerable variety in health system prerequisites would make for more varied capacities of the health workforce in our countries.

### 3.3 | Comparative overview of health systems prerequisites and capacities of health workforce

Major findings of our comparative analysis are summarised below. Table 3 provides an overview of the health system prerequisites and the capacities of the health workforce.

## 4 | DISCUSSION

Our analysis suggests that in the first wave of the pandemic, the contribution of the health workforce to health system resilience has drawn on different combinations of absorptive, adaptive and transformative capacities. However, we cannot detect any distinct patterns across countries or relate capacities to health systems prerequisites in any systematic way (Table 3).

In some respects, this is highly surprising. The Covid-19 pandemic has presented health systems with many and significant problems that were quite unexpected. The strength of institutions lies in the fact that they offer stability,

TABLE 3 Overview of health systems prerequisites and capacities of health workforce

Health system prerequisites		Capacities of health workforce				
Funding	Provision	Governance	Absorptive	Adaptive	Transformative	
<b>Austria</b>	<ul style="list-style-type: none"> <li>-Social insurance funding</li> <li>-Additional emergency funding</li> <li>-Highly flexible allocation of funding</li> </ul>	<ul style="list-style-type: none"> <li>-Welfare-mix in provision; Weak integration across sectors,</li> <li>-High density of health workforce, but shortages in elder care &amp; mental health;</li> <li>Predominance of medical division of labour</li> </ul>	<ul style="list-style-type: none"> <li>-Federalist &amp; corporatist governance; federal government, social insurance &amp; provinces as main players</li> </ul>	<ul style="list-style-type: none"> <li>-Specially chartered trains for Romanian carers to return to Austria despite closed borders</li> <li>-Increase in carers (numbers of foreign carers; wage increases &amp; improvement of working conditions)</li> <li>-Increase of therapy sessions reimbursed by social insurance; increase in fees</li> </ul>	<ul style="list-style-type: none"> <li>-New service offerings in mental health (online consultations, free hotlines)</li> </ul>	
<b>Germany</b>	<ul style="list-style-type: none"> <li>-Social insurance funding</li> <li>-Additional emergency funding, including bonuses for nurses in elder care</li> <li>-Highly flexible allocation of funding</li> </ul>	<ul style="list-style-type: none"> <li>-Welfare-mix in provision; Weak integration across sectors</li> <li>-Overall high workforce density;</li> <li>Predominance of medical division of labour</li> </ul>	<ul style="list-style-type: none"> <li>-Federalist and decentralised governance based on corporatism</li> <li>-Poor integration of non-medical professional interests</li> </ul>	<ul style="list-style-type: none"> <li>-Redeployment of nurses in hospitals</li> <li>-Cancellation of elective treatment, overtime work, holidays</li> </ul>	<ul style="list-style-type: none"> <li>-Recruitment of new staff (more full time staff, returnees to clinical practice, retired workers, foreign trained workers)</li> <li>-Establishment of auxiliary hospitals (existing staff &amp; up-skilled nurses)</li> </ul>	<ul style="list-style-type: none"> <li>-Upward mobility of public health staff/doctors (policy &amp; organisational levels)</li> <li>-Greater collaboration between public health doctors and family physicians</li> </ul>
<b>Netherlands</b>	<ul style="list-style-type: none"> <li>-Social insurance funding</li> <li>-Additional emergency funding, including bonus for nurses</li> <li>-Flexible allocation of funding</li> </ul>	<ul style="list-style-type: none"> <li>-Publicly regulated, private provision;</li> <li>Some integration across sectors</li> <li>-High density of health workforce, but shortages in some hospital specialties &amp; elder care</li> </ul>	<ul style="list-style-type: none"> <li>-Governance based on corporatism &amp; medical self-regulation; increasing decentralisation and marketisation</li> <li>-Poor integration of nursing interests</li> </ul>	<ul style="list-style-type: none"> <li>-Increase in capacity in hospitals by partial suspension of quality standards, cancellation of overtime work, holidays</li> </ul>	<ul style="list-style-type: none"> <li>-Recruitment of health workers with lapsed registration</li> <li>-Scaling up of ICU care with new teams</li> </ul>	<ul style="list-style-type: none"> <li>-New service offerings in mental health (psychological support for health workers)</li> <li>-Formalisation of e-care provision (hospitals, primary care)</li> </ul>

(Continues)

TABLE 3 (Continued)

	Health system prerequisites				Capacities of health workforce		
	Funding	Provision	Governance	Absorptive	Adaptive	Transformative	
<b>Denmark</b>	-National and local tax funding -Additional national emergency funding	-Predominance of public hospitals; Strong integration of elder care & municipal health/social care; weaker integration of hospitals, GPs & municipalities weaker -Marked shortages in elder care & rural general practice	-Governance based on public corporatism with broad integration of public & professional interests	-Temporary suspension of collective agreements (work responsibilities, working times) -Pandemic recognised as mitigating circumstances for clinical errors -Redeployment and retraining of existing staff in hospitals & municipalities	-Recruitment of new personnel for Covid-19 wards - Refocussing of nested structure of intersectoral/professional meetings at regional/municipal and hospital levels -Accelerated coordination between hospitals & general practice	-Agreement on reimbursement of newly introduced video consultations in general practice	
<b>England</b>	-National tax funding -Additional national emergency funding	-Predominance of public hospitals -Poor integration of health & social care -Widespread and increasing shortages of hospital doctors & nurses	-Centralised health governance -Danger of de-coupling from local stakeholders	-Redeployment of staff to free bed space and staff capacity in hospitals	-Increase in staffing levels (retired staff, new graduates) -New acute Covid-19 teams	-Formalisation of increased use of remote consultations in general practice supported by Beneficial Change Network	

TABLE 3 (Continued)

	Health system prerequisites			Capacities of health workforce		
	Funding	Provision	Governance	Absorptive	Adaptive	Transformative
Italy	<ul style="list-style-type: none"> <li>-National tax funding</li> <li>-Additional national emergency funding, including bonuses for health workforce</li> </ul>	<ul style="list-style-type: none"> <li>-High welfare-mix in provision</li> <li>-Strong hospital centredness with low integration across sectors</li> </ul>	<ul style="list-style-type: none"> <li>-Decentralised and fragmented governance</li> <li>-Poor integration of doctors</li> </ul>	<ul style="list-style-type: none"> <li>-Extension of working hours and flexible management of workforce (central government)</li> <li>-Postponement of elective surgery and reassigned staff (local hospitals)</li> </ul>	<ul style="list-style-type: none"> <li>-Recruitment of new personnel, mostly with temporary contracts (central government)</li> <li>-Plans for reorganisation of health services (regions)</li> <li>-Reorganisation of service delivery (regions and local providers)</li> </ul>	<ul style="list-style-type: none"> <li>-Abolishment of entry exams for doctors; introduction of Specialist Units for Continuity of Care (central government)</li> </ul>

Abbreviation: COVID-19, coronavirus disease-2019.

Sources: Authors' own table; based on expert information; European Observatory on Health Systems and Policy's Health in Transition series [32]. Austria – [48,49,51,62,63,70]; Denmark – [28,47,54,55,56,92]; England – [52,65,74]; Germany – [27,57]; Italy – [57,59,60,61,66,72,73]; Netherlands – [45,46,64].

for example in relation to the funding, provision and governance of health systems.<sup>32,76</sup> Under such circumstances of high uncertainty, these institutions provide a springboard for 'ready-made' responses to the crisis; that is because these responses lie dormant in the institutions and just wait to be activated. Based on this, we should expect stronger path-dependency concerning the health workforce contribution to health systems resilience as reflected in clear patterns of capacities that vary across different types of health system prerequisites. However, we found that policy responses were quite similar.

In other respects, our findings may not be that surprising. Crises like the Covid-19 pandemic may require a certain set of responses. Parts of the health workforce need to move to the more acute areas of health service delivery; this inevitably involves new skill mixes as well as task shifting. Similarly, central government needs to play an influential role and irrespective of usual funding mechanisms, the governments in all countries provided additional emergency funding. This is an argument about *functionalism* and about the power that lies in the nature of the problems at hand. Health policies, here related to the health workforce, develop because they are functional to the external environment, which at present is dominated by the Covid-19 pandemic.<sup>77</sup>

Another argument, why we should not be surprised by our findings relates to the conceptualisation of health systems. Cross-country comparison has been a growth industry since the early 1990s, and this has enhanced scholarly debate over health systems and typologies.<sup>32,78,79</sup> For instance, Wendt has presented an elaborate expansion of health system typologies,<sup>80,81</sup> which has been further developed by Böhm et al.<sup>82</sup> and most recently by Reibling et al.<sup>83</sup> These typologies include the health workforce as a distinct category next to finance, service provision and health status<sup>81,83</sup> or as part of a broader category of physical and human resources.<sup>79</sup> However, the typologies do not consider the specific role and centrality of the health workforce for the functioning of health systems. Our findings underline the fact that the conceptualisation of health systems might probably be all too general to capture the specific institutional prerequisites at play in relation to the health workforce. It might be helpful to pay greater attention to professionalism and the professions in future research and specify the importance for health system resilience.

Recent developments in the literature on health system resilience also highlight this complexity. There is a growing shift from resilience as a capacity of the health system to an acknowledgement that this capacity rests on the ability of actors to adapt, learn and transform health systems.<sup>23,24</sup> Kruk et al.<sup>84</sup> define health system resilience as a joint capacity of health actors, institutions and populations. Studies have also moved from treating health system resilience as an output to treating health system as a process.<sup>24</sup> A prominent example is the 'Operational model of health system resilience' developed by Chamberland-Rowe and colleagues,<sup>23</sup> which includes inputs and mediators in addition to outputs. This relates to another change of perspective, namely from top-down to bottom-up. An influential example is the emergence of the concept of 'every-day resilience', which puts the interest in the meso- and micro-levels of health service organisation and delivery centre stage.<sup>85,86</sup> Similarly, Basara and colleagues<sup>85</sup> stress the importance of what they call the 'software' of health system resilience, that is: leadership, power and values, in addition to funding and infrastructures.

The emerging concern for agency in the literature on health system resilience resonates with insights from studies of professions. The health workforce is populated by health professions, who are part and parcel not only of health service delivery, but also of governance arrangements across health systems in Europe. Such governance arrangements are interlinked with the concept of professionalism, which furnishes health professions with a unique capacity to mediate between the 'state' and the 'citizens' and to ensure trust in institutions and regulatory measures.<sup>33,69,87</sup> This gives health professions an important strategic position in how health systems respond to the COVID-19 pandemic.<sup>88</sup> In a situation of crisis and shocks, the power of professionalism might be reinforced, because it can provide guidance for both health policy (through professional experts, scientific knowledge) and frontline practice (through ethical guidelines, professional standards and competencies). Interestingly, professionalism draws on highly standardised regulatory frameworks and knowledge systems, which enjoys highest currency across otherwise different healthcare systems.

Governance can be the key to effective health system responses to the COVID-19 crisis also more generally.<sup>89,90</sup> Transparency, solidarity, coordination, decisiveness, clarity and accountability, among others, are emerging

as important issues for managing the COVID-19 pandemic.<sup>4,6</sup> This is interesting because governance opens windows of opportunity for systematically integrating the health workforce (and its professional groups) into the analysis of health systems.<sup>3,34</sup> As a 'middle-range theory',<sup>91</sup> governance can inform the analysis of public health problems in highly effective ways. Governance spans across macro- and micro-levels of health systems and may therefore help us to understand resilience 'from the inside out', that is the health workforce capacities of its frontline staff, and more generally, the power of professions and professionalism.

## 4.1 | Limitations of the study

We collected data in the first wave of the pandemic, where the levels of uncertainty generally were very high. This offers a unique case for studying the specific capacities of the health workforce when contributing to health systems resilience. However, concerning institutional prerequisites, it may take time for their influence to show. This assumption naturally can only be explored in future research. Furthermore, many shocks are cyclical and therefore allow for learning, as Hanefeld et al.<sup>25</sup> argue. These learning processes might also increase variety of the responses over time. As we were looking at the first cycle of the COVID-19 pandemic, such opportunities for learning and planning are naturally limited.

It is also important that the different types of healthcare systems included in our sample are all shaped by a common regulatory framework of the European Union and that this framework has been strengthened throughout the Covid-19 crisis.<sup>40</sup> Institutional pathways might also be more visible, if we had chosen countries that are characterised by a greater variation of institutional prerequisites, for example by including health systems in countries in the Global South.<sup>19</sup>

## 5 | CONCLUSION

Our comparative analysis set out to analyse health system resilience with a focus on the health workforce. We sought to identify the specific adaptive, absorptive and transformative capacities of the health workforce, and to assess how health systems influence these capacities. In our comparative analysis, we found that during the first wave of the pandemic, the health workforce in our countries drew on a wide range of capacities. However, our analysis also revealed that different health systems seemed to have little influence of the specific combinations of capacities of the health workforce. This challenges our understanding of health systems and calls for a reconceptualisation of the institutional prerequisites of health system resilience, in order to fully grasp the manifold and unique health workforce contribution. Two major conclusions can be drawn from our research. Governance emerges as key to effective health system responses to the COVID-19 crisis, and health professions are part and parcel of governance as frontline workers and collective actors. One important step forward towards health system resilience, therefore, would be to improve health workforce capacities and strengthen the integration of health professions in health governance.

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### CONFLICT OF INTEREST STATEMENT

No conflict of interest declared.

### ETHICS STATEMENT

Not applicable.

## DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

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