Partnership for Health System Sustainability and Resilience

SWITZERLAND

Sustainability and Resilience in the Swiss Health System

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Introduction

The Swiss health system has experienced the strongest shock in the last 100 years due to the COVID-19 pandemic. Attention shifted from discussion of increasing health care costs to the availability of sufficient ICU capacities and vaccines, overworked health care workers and who should be in charge of controlling the pandemic. As the pandemic fades out, and new crises arise, it is useful to consider the overall sustainability and resilience of the Swiss health system.

Sustainability refers to the ability of a health system to constantly fulfil its key functions, such as efficiently providing high quality health care services, securing sufficient financial resources, and responding to demographic, epidemiological, technological and environmental challenges.

Resilience refers to the ability of a health care system to prevent, absorb, mitigate and rebound from shocks while minimising negative impacts on population health, health care services and the wider economy.

As part of the Partnership for Global Health Resilience and Sustainability (PHSSR), this report evaluates the sustainability and resilience of the Swiss health care system according to seven domains:

- Governance
- Financing
- Workforce
- Medicines and technology
- Service delivery
- Population health and social determinants
- Environmental sustainability

The report provides recommendations for the improvement of the sustainability and resilience of the health care system in each of these domains. It also includes two case studies, examining the role of public-private partnerships in times of crisis and the role of direct democracy as a means of de-radicalisation in times of crisis.

This Swiss report may be of interest to readers from other countries, as it illustrates the challenges faced by this generously financed and highly decentralised health care system in which private service providers and insurers play an important role. The report may also be of interest to those familiar with the current challenges to the Swiss health system, as the framing of these issues from the perspective of sustainability and resilience may lead to a different perception of some of these challenges.

The report is based on recent research findings and health data, as well as interviews with nine stakeholders relevant to the domains in question.

Findings: key themes for sustainability and resilience

The report has identified a number of strengths and challenges in the Swiss health care system. Table 1 summarises the key findings in the seven domains.

Table 1: Sustainability and resilience – summary of findings by key domains

DOMAIN 1	GOVERNANCE	
Strengths	**Sustainability**	**Resilience**
	↑ The decentralised and mixed governance mechanism has advantages both in normal times and in times of uncertainty. The decentralised approach supports sustainability owing to a balance of power both vertically (between state levels) and horizontally (between cantonal government departments). ↑ Direct democracy gives Swiss citizens and various interest groups a platform for intervention and decision-making on all three state levels.	↑ The corporatist approach and its openness to cooperative solutions with private partners helps to include experts and key interest groups in the design and setup of emergency measures. ↑ As such, direct democracy is an effective mean of de-radicalisation in times of crisis.
Weaknesses	**Sustainability**	**Resilience**
	↓ While the challenging governing setup supports sustainability, it does so at the expense of leadership, transparency, coherence and, most of all, speed. ↓ Interest groups, such as national umbrella associations, are both cooperative and also self-interested.	↓ Generally, there is a need for improvement in a number of interfaces, workflows and processes at both federal and cantonal levels. The COVID-19 pandemic demonstrated an increased need for coordination between the confederation and the cantons. ↓ Monitoring instruments for new diseases were not in place and were established only during the COVID-19 pandemic.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 2 FINANCING		
Strengths	**Sustainability**	**Resilience**
	↑ There is a broad base of funding, approximately two-thirds of which is generated by compulsory levies (mainly Social Health Insurance (SHI)). This diversification of funding sources makes the overall funding economically (i.e., its ability to generate funding) and socially (i.e., the population's acceptance of funding) sustainable. ↑ SHI is mandatory for all residents in Switzerland with a comprehensive set of health care services.	↑ SHI provides comprehensive coverage of health care services. This ensures significant flexibility to absorb shocks during a crisis (e.g., the cost of new treatments or pharmaceutical drugs can be covered by SHI in a timely manner).
Weaknesses	**Sustainability**	**Resilience**
	↓ Swiss health care system financing lacks transparency, especially with regard to SHI. While approximately 36% of funds are raised through SHI premiums, the share of health costs for which SHI law is responsible is estimated to be approximately 56%. ↓ There is potential for inefficiency as many services covered by SHI may have little scientifically proven clinical value or there may be more cost-effective alternatives. ↓ Payment schemes in the SHI are activity-based. Since individual service providers take (unit) prices as given, they have a strong incentive to increase revenues by generating greater volume.	↓ Provider payment schemes are static and, thus, not able to quickly reflect appropriate payment for the new services required during a health crisis.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 3	WORKFORCE	
Strengths	**Sustainability** ↑ Health care is relatively well staffed compared to other OECD countries. ↑ Health care staff are relatively well paid even when taking the higher cost of living in Switzerland into account.	**Resilience** ↑ At the beginning of the COVID-19 pandemic, many hospitals autonomously implemented emergency plans by reducing occupancy rates and creating pools of reserve staff. ↑ The success of a recent referendum should substantially contribute to improving the working conditions of nurses.
Weaknesses	**Sustainability** ↓ Despite relatively high physician density, many health care organisations struggle to recruit new physicians. Some specialities and rural areas are particularly affected. ↓ Nurses experience heavy workloads due to insufficient staffing, administrative overload, and inadequate work-life balance. ↓ The health care workforce shortage affects not only physicians and nurses but also other qualified personnel and is likely to worsen.	**Resilience** ↓ The lack of additional qualified ICU nurses was of crucial importance during the COVID-19 pandemic. However, the capacity of ICUs could not be increased in a sustainable way and actually decreased in the second year of the pandemic.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 4	MEDICINES AND TECHNOLOGIES	
Strengths	**Sustainability**	**Resilience**
	↑ Switzerland is usually relatively quick to adopt new medicines and technologies. ↑ The entire population has access to state-of-the-art medical technologies and medicines. ↑ Strong pharmaceutical and medical technology sectors contribute substantially to the strength of the economy.	↑ National mandatory medicine stock regulation is successful in managing supply fluctuations under normal circumstances.
Weaknesses	**Sustainability**	**Resilience**
	↓ The adoption of new medicines and technologies is increasingly challenged by regulatory hurdles and the small size of the Swiss market. ↓ The process for inclusion in SHI is increasingly challenging for industry and regulatory authorities. ↓ Access to non-fully listed medicines is often burdensome and inequitable. ↓ The use of generics and biosimilars is substantially lower than in other countries. ↓ The country lags behind most other high-income countries in the establishment of digital health platforms. ↓ The use of health data for quality monitoring, health policy development and public health research is severely hindered by barriers to data access and linkage.	↓ Shortages of off-patent medicines represent an increasing problem. ↓ Panic-buying and problems with cross-border logistics led to severe shortages of a number of essential medicines during the COVID-19 pandemic.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 5	SERVICE DELIVERY	
Strengths	**Sustainability** ↑ Most service providers in Switzerland are privately or publicly owned companies. This allows for an entrepreneurial and decentralised approach facilitating flexible and rapid decisions. ↑ Competition between providers combined with patients' free choice of providers should lead to improved quality, as service providers strive to meet patient expectations and competition creates pressure to improve both quality and efficiency.	**Resilience** ↑ There is an adequate number of acute care beds and ICUs, guaranteeing a sufficient standard of care during pandemics and other health crises (with regard to ICU nurses, see Workforce). ↑ There is regional (i.e., mostly cantonal) coordination of ICU capacity. This decentralised approach allows for a quick response by public-private partnerships.
Weaknesses	**Sustainability** ↓ Coordination of services is somewhat limited. Health care sectors remain segmented. This is especially the case in care provision following hospital discharge where there is poor interface between hospital care and outpatient services such as outpatient nursing, nursing homes and hospices, leading to deficiencies in quality of care. ↓ There is little coordination between the cantons in the planning of hospital inpatient care. One result of federalist planning is overall excess inpatient capacity in acute care. ↓ The system lacks binding quality standards for providers, a uniform methodological approach and robust outcome quality indicators (especially in ambulatory care). ↓ Prevention and health promotion activities are disparate and largely uncoordinated. A better balance between prevention and curative care is lacking.	**Resilience** ↓ The imposed restriction and deferral of elective procedures and treatments probably led to unnecessary cancellations of important operations and treatments in some hospitals during the COVID-19 pandemic. ↓ There is a lack of national coordination of ICU capacity.

Table 1 (continued): Sustainability and resilience – summary of findings by key domains

DOMAIN 6	POPULATION HEALTH
Strengths	Sustainability and Resilience ↑ Population health has increased substantially in the last decades in terms of life expectancy and healthy life years and is among the highest in the world.
Weaknesses	Sustainability and Resilience ↓ Health rates differ by socioeconomic status as people with compulsory education experience substantially lower health status. ↓ While some health behaviours have substantially improved, smoking and unhealthy diets remain critical risk factors with massive potential for harm. ↓ There is a critical lack of data on the health problems affecting the population due to a lack of diagnostic coding in outpatient care and a lack of large population cohort studies.
DOMAIN 7	**ENVIRONMENTAL SUSTAINABILITY**
Strengths	Sustainability and Resilience ↑ Hospitals have the incentive to keep the costs of inputs low due to flat-rate reimbursement of services in the inpatient sector. ↑ There are numerous hospital-level initiatives aimed at minimising ecological footprint. ↑ A federal action plan addresses health impacts due to climate change (e.g., threat of increased heat, poor air quality and the spread of harmful organisms, diseases and alien species).
Weaknesses	Sustainability and Resilience ↓ Neither the federal government nor the cantons conduct systematic data collection or monitoring of emissions from health care facilities. ↓ Both the number of unnecessary medical interventions and the quantity of pharmaceutical waste are high. ↓ A high proportion of older people and people with multi-morbidities are highly vulnerable to climate change-induced consequences such as the increased occurrence of heat waves.

The federal and decentralised setup of the Swiss state and the intricate mix of governance mechanisms are advantageous in both normal times and times of uncertainty. In combination with direct democracy, this approach supports sustainability by establishing a balance of power; the Federal Council and the cantons share responsibility under the critical scrutiny of the citizens. However, this complicated setup functions at the expense of leadership, transparency, coherence and, most of all, speed.

This report identifies the following key aspects regarding the sustainability and resilience in the Swiss health care system.

Sustainability

The diversification of funding sources makes overall funding economically and socially sustainable. However, social health insurance (SHI) premiums, which are community-rated but independent of income and wealth, are a potentially unsustainable source in the long term from a social point of view due to constantly increasing costs.

SHI costs are increasing due to (1) activity-based payment schemes in which individual service providers take prices as given, and have a strong incentive to increase revenues by generating excessive volume, and (2) many services covered by SHI potentially have little scientifically proven clinical value or there are more cost-effective alternatives. In addition, a better balance between prevention and cure remains lacking, with emphasis remaining on cure.

Health care is relatively well staffed in comparison to other OECD countries. Health care staff are also relatively well paid. Nevertheless, current health care workforce shortages affect physicians, nurses and other qualified personnel and are likely to increase further.

Generally, competition between service providers combined with patients' free choice of providers should lead to better quality, as providers strive to meet patient expectations. However, this liberal and decentralised approach has limitations. In the absence of a dedicated national quality agency, there is a lack of binding quality standards for providers, a lack of a uniform methodological approach and a lack of robust outcome quality indicators (especially in ambulatory care). Consequently, the use of health data for quality monitoring, health policy development, and public health research is severely hindered.

Switzerland's health care sectors are segmented and, consequently, the coordination of services is limited. This is especially the case in care after hospital discharge. Perhaps the most important reason for poor coordination is that Switzerland lags behind most other high-income countries in the establishment of digital health platforms. The information required for effective and efficient coordination is either not available or not in a format suitable for practical use.

Resilience

Switzerland's openness to cooperative solutions with private partners helps to include experts and key interest groups in the design and setup of emergency measures.

The direct democracy is an effective means of de-radicalisation in times of crisis as it gives those who oppose state measures a voice and gives citizens the role of referee.

Generally, interfaces and processes at both federal and cantonal levels are not optimised. Coordination between the confederation and the cantons has not proven adequate in times of crisis, such as during the COVID-19 pandemic.

The lack of additional qualified ICU nurses was of crucial importance during the pandemic. It is not yet clear whether ICU capacity (i.e., infrastructure and staff) needs to be increased overall or whether a stringent national coordination of current ICU capacity would be sufficiently adequate.

Looking ahead, the Swiss health care system faces many challenges. Some have to do with the federal and decentralised governance approach. Selectively, a more national and top-down approach might help to advance topics currently in need of further development. However, overall and with a view to sustainability and resilience, Switzerland must make the fact of its federal and decentralised architecture a strength.

Recommendations

We make 26 recommendations across the seven domains, as shown in Table 2.

Table 2: Recommendations across the seven domains

DOMAIN 1	GOVERNANCE
1A	Foster a regional (i.e., inter-cantonal) perspective with regard to the planning and financing of services by encouraging cantons to coordinate effectively.
1B	Secure the faster and more consistent involvement of parliament in future situations where emergency legislation is executed. Various solutions have already been proposed, ranging from an expansion of the Federal Council's reporting and accountability obligations, an institutional strengthening of parliamentary commissions and delegations, to giving the parliament the option to meet and make decisions digitally in crisis situations.
1C	Find ways to achieve better and faster coordination between the national government (Federal Council) and cantonal governments. Among the approaches discussed is a new 'joint federal and cantonal management body' for both normal times and crisis situations.
1D	Clarify the mandate and governance of an operative national crisis unit. This body should bring together experts from crisis management, health care, science, the private sector (e.g., industry), civil society, education and other sectors.
1E	Improve surveillance of epidemiological events with a distinction between three monitoring activities: (1) incidence of infection, (2) circulating variants and (3) immunity.

DOMAIN 2	FINANCING
2A	Prioritise reforms to increase financing transparency, such as: **Confederation:** strive for uniform financing sources of inpatient and outpatient services in SHI (Einheitliche Finanzierung ambulant und stationär EFAS). **Cantons**: limit financing to service-related and cost-based subsidies for public services not covered by SHI (Gemeinwirtschaftliche Leistungen GWL) and disclose those subsidies. **Insurers/Hospitals**: reduce cross-subsidisation of SHI-services in hospitals through generous PHI-tariffs.
2B	Continually and consistently assess services with regard to the criteria of clinical effectiveness, appropriateness and cost-effectiveness (WZW-Kriterien) and limit reimbursement to those services that fulfil these criteria. Strengthen the dissemination of these criteria through continuous operationalisation related to practice and by seeking medical community support (e.g., the adoption of medical guidelines or best-practice recommendations from movements such as Choosing Wisely).

Table 2 (continued): Recommendations across the seven domains

DOMAIN 3	WORKFORCE
3A	Improve working conditions for nurses and other health care personnel to reduce early career exit and low working hours. Measures to improve working conditions should include reducing the administrative burden, enriching job profiles and career opportunities and ensuring adequate staffing. With regard to nurses, these measures should partially be covered by the implementation of a nursing initiative for improved working conditions.
3B	Further increase the number of admissions to medical schools. The current number of 1,350 admissions per annum appears too low in the face of the lower workload chosen by the new generation of physicians, and an increasing and aging population. Furthermore, there is no lack of candidates, as fewer than one in four of those who apply to medical school are admitted.
3C	Promote specialisation at an earlier stage in medical schools to increase efficiency in medical education and strengthen the role of general practitioners.
3D	Prepare for a persistent shortage of qualified health care staff, as the success of current and future efforts to increase the workforce may be limited. Universal access to essential medical services must be guaranteed in times of persistent shortage, while access to 'nice to have' services may have to be limited.
3E	Explore different options to increase the ICU workforce in times of crisis. These options include establishing a qualified ICU reserve staff with periodic refresher training and updating of ICU skills, and the training and appointment of auxiliary ICU nurses to alleviate the burden on regular ICU staff in times of crisis. This approach could be extended to emergency departments.
DOMAIN 4	**MEDICINES AND TECHNOLOGY**
4A	The Federal Office of Public Health (FOPH) should explicitly and systematically include budget impact consideration in medicine price-setting decision-making. This would allow a reduction in the price of a medicine as its utilisation increases due to the extension of indications or unexpectedly high demand.
4B	Switzerland should participate in internationally coordinated efforts to solve challenges of global off-patent medicine shortages and the development of new medicines.
4C	Develop digital platforms for communication and event tracking between service providers and between service providers and health authorities. The platform should allow the exchange of structured patient information between health care providers.
4D	In times of crisis, coordination between industry and public authorities should occur at the national rather than the cantonal level. Delegation to the cantonal level increases coordination costs and dilutes responsibilities. Furthermore, relevant know-how in the public administration of medicines and technologies is greater at the national level.

Table 2 (continued): Recommendations across the seven domains

DOMAIN 5	SERVICE DELIVERY
5A	Cantons should coordinate acute inpatient care capacity more intensively with other cantons and generally foster (or at least not circumvent) ongoing structural change in order to: – eliminate excess beds, thereby reducing incentives to overtreatment – increase degree of specialisation (i.e., increase minimal number of cases), thereby improving outcome quality.
5B	Create improved quality data through improved outcome measurement by service providers (i.e., defining standards and devising appropriate indicators), the structured collection of individual data (i.e., registers) and access to these data for all stakeholders, including the public, government, insurers and researchers. In this context, a more top-down approach should be considered (i.e., a national quality agency such as NICE in England or Zorginstituut Nederland).
5C	Improve coordination and communication between service providers in general, especially after hospital discharge, by: – improving solutions for information exchange between service providers – reactivating missing interim care after hospital discharge.
5D	Improve integrated care with the aim of improving the quality and cost-effectiveness of services across the care chain. The creation of networks of service providers representative of different links in the care chain is essential. In the context of Switzerland's SHI, both service providers and insurers must collaborate on this issue.
5E	Safeguard ICU capacity by: – analysing whether certified ICU capacity needs to be increased; if it does, define the level of adequate buffer (i.e., beds and trained workforce) – determining a national approach for the coordination of ICU capacity in times of crisis – clarifying the financing of buffer capacity for national use.
DOMAIN 6	**POPULATION HEALTH AND SOCIAL DETERMINANTS**
6A	Strengthen efforts for the reduction of major preventable risk factors, such as smoking and unhealthy diets. The promotion of all tobacco products should be banned. Tobacco taxation should be extended to all dependency-inducing tobacco products. The option of a further increase of tobacco taxation should be evaluated.
6B	Build a comprehensive epidemiological information base on the status and evolution of population health. This should include the systematic coding of major diseases in ambulatory care and the establishment of a large-scale cohort representative of the overall population.
6C	Facilitate better navigation and understanding of the health care system by individuals with lower health literacy. These efforts should focus on more appropriate communication strategies by service providers and ensuring that SHI covers the costs of access to translation services.

Table 2 (continued): Recommendations across the seven domains

DOMAIN 7	ENVIRONMENTAL SUSTAINABILITY
7A	Achieve greater awareness of the carbon footprint of the health care sector through the systematic collection and monitoring of data of the greenhouse gas emissions of health care institutions.
7B	Implement policies encouraging the efficient use of resources in health care, including the use of financial incentives.

1. Introduction

The Swiss health care system experienced the strongest shock in the last 100 years in the shape of the COVID-19 pandemic. Attention shifted from discussion of increasing health care costs to the availability of sufficient ICU capacities and vaccines, overworked health care workers and who should be in charge of controlling the pandemic. As the pandemic fades out, and new crises arise, it is useful to consider the overall sustainability and resilience of the Swiss health care system.

Sustainability refers to the ability of a health system to constantly fulfil its key functions such as efficiently providing high quality health care services, securing sufficient financial resources and responding to demographic, epidemiological, technological and environmental challenges. Resilience refers to the ability of a health care system to prevent, absorb, mitigate and rebound from shocks while minimising negative impacts on population health, health care services and the wider economy.

As part of the Partnership for Global Health Resilience and Sustainability (PHSSR), this report evaluates the sustainability and resilience of the Swiss health care system according to seven domains:

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The report is based on recent research findings and health data, together with interviews with nine stakeholders relevant to the domains in question.

Table 2: Definitions of health system sustainability and governance underpinning the analysis

Health system sustainability	The ability of a health care system to continually deliver the key health care system functions of providing services, generating resources, financing, stewardship, incorporating principles of fair financing, equity in access, and efficiency of care, in pursuit of its goals to improve population health, and responsiveness to the needs of the populations it serves, and to learn and improve in doing so.
Heath system resilience	The ability of a health care system to absorb, adapt to, learn and recover from crises born of short-term shocks and accumulated stresses, in order to minimise their negative impact on population health and disruption caused to health care services.

2. DOMAIN 1
Governance

In an international comparison, the Swiss health care system can be characterised by a large number of actors and by federalism and decentralisation [2]. Switzerland has 26 cantonal health care systems each with its own health legislation. This decentralised structure results in cantonal differences in service provision (see Domain 5: Service delivery), health expenditure and, accordingly, health insurance premiums (see Domain 2: Financing).

Switzerland's decentralised and mixed governance mechanism has advantages in both normal times and in times of uncertainty. The decentralised approach supports sustainability in the sense that there is a balance of power. A corporatist approach with openness to cooperative solutions with private partners helps to include experts and key interest groups in the design and setup of emergency measures. This fast and pragmatic approach is explored in greater depth in Case Study 1: Role of public-private partnerships in a time of crisis.

While this challenging governing setup supports sustainability, it does so at the expense of leadership, transparency, coherence and, most of all, speed. Furthermore, interest groups, such as national umbrella associations, are both cooperative and self-interested, and some influenced and probably prevented a realistic appraisal of the epidemiological situation before the second COVID-19 wave in summer/autumn 2020 [3].

2.1 Sustainability

Responsibility and decision-making in a federal state

The federalist division of tasks and competences between the three state levels can be described as follows [2] (for a more comprehensive overview see De Pietro, et al. [4]): At the federal level, the Federal Office of Public Health (FOPH) is mainly responsible for health policy issues. The federal government's responsibilities include the supervision of social insurance, such as health insurance (SHI), and supplementary insurance, such as private health insurance (PHI). Its responsibilities also include the regulation of academic training of doctors and pharmacists, and the education and training of non-university-trained health professions. In addition, the federal government is responsible for the regulation of reproductive and transplantation medicine, medical research, and genetic engineering, as well as various tasks in the area of sanitary protection and prevention, such as combating addictive and communicable diseases and monitoring narcotics and vaccines, radiation protection, toxic substances and food. The Confederation may enact framework legislation for certain areas of public health; however, these can also be specified by laws implemented at the cantonal level.

Cantons are responsible for the enforcement of federal law and have additional independent responsibilities. These include the provision of health care (e.g., emergency, rescue, disaster and transport services), the construction, operation and planning of hospitals, the organisation of premium subsidies for the less well-off, the sponsorship of educational institutions in the health sector, the supervision of professional licencing and training, and enacting the sanitary police and regulatory law (e.g., licencing to practice, prevention of communicable diseases). Overall, this vast set of responsibilities represents a challenge, especially for smaller cantons, while also making cantons the most important source of public financing.

Municipalities have a complementary function. Their main responsibilities include the legal sponsorship of in-patient care facilities, such a hospitals or nursing homes, as well as community nursing for the care and support of the sick (care at home).

Therefore, Switzerland's universal health care system is highly decentralised, with cantons playing a key role in its operation [5]. The most important federal responsibility lies in legislation and supervision of mandatory SHI according to the Federal Health Insurance Act.

Figure 1: Division of tasks and responsibilities in health care

	Confederation (federal level)	Cantons	Municipalities
Provision of health care		Safeguarding service provision: – emergency/rescue/disaster/ transport services – sponsorship/infrastructure/ operation of hospitals – licensing/supervision of outpatient service providers	Safeguarding community-based service provision: – sponsorship/infrastructure/ operation of hospitals, retirement and nursing homes – long-term care and assistance at home – school medical doctor services
Social insurance	Framework legislation and supervision of health, accident, military and disability social insurances. Mandatory social health insurance (SHI): – supervision of insurers and approval of premiums – definition of benefit basket – setting licensing standards for providers – regulation of financing and provider payment schemes (including tariff setting) – medicine licensing and pricing – safeguarding and promoting quality of services – co-financing premium subsidies	SHI co-financing and implementation: – inpatient treatment subsidy (≥ 55%) – hospital planning (comissioning of services) – approval of negotiated tariffs/ determination/setting of tariffs – co-financing and allocation of premium subsidies – co-financing long-term care	SHI co-financing and implementation: – co-financing long-term care (frequently)
Sanitary protection	Standard setting	Implementation	
	Health promotion, prevention and information		
Education and training	Regulation: – academic professions – other health professions	Sponsorship of education and training institutions	
Health technology	Framework legislation: – reproductive and transplantation medicine – genetic engineering – medical research		
		All the residual tasks!	

Source: Adapted from Vatter (2017) [6].

In states with a federal structure, powers and decision-making are distributed to two levels of government, a federal government and several constituent units (in the case of Switzerland, 26 cantons and the municipalities). Decision-making in federations has two distinct characteristics [7]: (1) are decisions made by the federal government or the constituent units (i.e., centralised versus decentralised decision-making) and (2) are decisions unilateral or coordinated (unilateralism refers to policy measure decisions made by a government without consultation with or seeking agreement from other governments). As a decentralised federation, Switzerland is generally characterised by decentralised decision-making (i.e., by the cantons). Since the federal government and the constituent units rarely have legislative powers in different subfields of the same policy area (as Figure 1 above indicates), one would expect to find less coordination between federal and cantonal levels and, therefore, greater unilateralism in Switzerland than in, for instance, Germany [7].

Nevertheless, there is coordination at each state level. For instance, at the federal level, the Federal Council acts on the principle of collective responsibility. The Counsellor responsible for the Federal Department of Home Affairs (FDHA), which includes the Federal Office of Public Health (FOPH), acts as regulator of the SHI. In addition, the FOPH is primarily a coordinator of health topics in all public domains (e.g., social care, education, foreign affairs) at the national level.

At the cantonal level, there is a long tradition of cooperation between cantons. The Conference of Cantonal Directors of Public Health (Gesundheitsdirektorenkonferenz, GDK) was founded in 1919 as one of the first inter-cantonal government conferences. The organisation serves as a coordination platform between cantons and as a representation of the cantons' interests vis-à-vis the federal government [2]. Probably due to this long history, the peak intergovernmental council at the cantonal level, the Conference of Cantonal Governments (Konferenz der Kantonsregierungen, KdK), is side-lined by the sectoral GDK council in matters of health care, both during times of crisis, such as a pandemic (see Resilience, below) and in normal times [8]. In conclusion, the question of who represents the cantons (GDK, KdK, cantonal government, cantonal director of Public Health, cantonal parliament) depends on the issue and the circumstances and, thus, this question remains unanswered; this lack of transparency with regard to decision-making is not supportive of sustainability.

Other governance mechanisms

The Swiss health care system incorporates other governance mechanisms in addition to these governmental and hierarchical elements. At the national level, **managed competition** is the founding coordinating mechanism in all sectors of health care provision; country-wide, patients have a large degree of freedom concerning their choice of health care providers (e.g., physicians and hospitals) and the providers of health care services and products constantly compete for customers. The same applies to the predominant SHI, as all insurance companies have private legal forms of funding body (PLC, foundation, non-profit association, co-operative) but no entitlement to distribute earnings. This decentralised and market-oriented form of SHI operation has been affirmed three times by public referenda where possible changes to the state-run national health insurance system were put to the vote.

At both national and cantonal levels, the **integration of interest groups** (such as associations of healthcare providers or social insurance companies) adds a corporatist element to the policy process. These stakeholders play an important role, especially in the implementation of collective agreements on tariffs (i.e., corporatist actors of payers and providers negotiate contracts for service delivery under a public mandate). However, these interest groups and their representatives in the national parliament tend to block each other. As a result, few tariffs are agreed anymore (but are fixed by the government; see Domain 2: Financing); nor has there been any significant legal reform since 2012.

Switzerland is a nation very much oriented on consensus. Its most sophisticated form, direct democracy, gives Swiss citizens and all interest groups a platform for intervention and decision-

making at all three state levels. For instance, in June and November 2021, Switzerland's citizens showed their support for an intensely debated national COVID-19 law in two referenda (see Case Study 2: Direct democracy as a means of de-radicalisation in a time of crisis).

In summary, the Swiss health care system is highly decentralised. Health care is provided by the country's 26 autonomous cantons. The Conference of Cantonal Directors of Public Health (Gesundheitsdirektoren¬konferenz, GDK) often acts as the primary coordinator but it has no authority. The Swiss health care system combines aspects of managed competition and corporatism within a decentralised regulatory framework shaped by the influences of direct democracy [4]. This decentralised setup supports sustainability through a balance of power, both vertically between state levels and horizontally between cantonal government departments. While this challenging approach of "broken power – shared responsibility" [9] supports sustainability in the mid- to long-term, it does this at the expense of leadership, transparency, coherence and, most of all, speed.

2.2 Resilience

In this section, we discuss the resilience of health care system governance with respect to health crises (e.g., pandemics), war and terrorism (e.g., cyber-attacks, bombing, poison) and political distress (e.g., cross-border mobility). We discuss resilience before, during and after shocks.

Before (preparedness)

The Federal Office for Civil Protection (FOCP) conducts a regular comprehensive *Disasters and Emergencies in Switzerland* national risk analysis. The most recent report prior to the COVID-19 pandemic was in 2015. It identified, in order of importance, power shortages, pandemics and a wave of refugees as the three biggest risks.

In health care, preparation for and management of health emergencies is fundamentally the responsibility of the cantons and is thus dependent on their political willingness, as long as the confederation is not explicitly assigned further competences [10].

According to the Swiss constitution, the federal government has legislative power regarding communicable, widespread or particularly dangerous human and animal diseases (Article 118). The federal act on the control of communicable human diseases (Epidemics Act, EpidA) has been in force since 2016, and sets a legal basis for timely detection, monitoring, prevention and control. The EpidA also clarifies how work should be shared between the confederation and the cantons in crisis situations and outlines a three-level model applicable to normal, particular and extraordinary situations[7]:

- Under *normal* circumstances, the cantons implement the EpidA. If the situation worsens, the EpidA distinguishes between a particular situation and an extraordinary situation.
- In a *particular* situation, when cantonal governments are no longer able to contain the spread of a disease or the WHO declares an international health emergency, the federal government, after consulting the cantons, can impose containment measures.
- In an *extraordinary* situation, the federal government can introduce measures for the whole country or for individual areas. In this situation, there is no consultation required. Once more, except for the extraordinary situation, the cantons play a key role.

The results of an evaluation of pandemic planning preparedness in the cantons conducted at the end of the first wave of the COVID-19 pandemic were not reassuring. The vast majority of cantons did not take the risk of a pandemic seriously enough. At the beginning of the COVID-19 pandemic, only eleven cantons had up-to-date pandemic plans available for public viewing. In at least eight cantons, this planning instrument was completely lacking [11].

The EpidA together with the Influenza Pandemic Plan appear to have been adequate instruments for measures that directly served the containment and medical management of the pandemic (e.g., closing schools and assembly bans). However, particularly with regard to measures which addressed subsequent problems (e.g., the extension of short-time working compensation, liquidity assistance for small and medium-sized enterprises (SMEs) support for sport facilities), the federal government acted on the basis of emergency legislation (based on article 185 paragraph 3 of the Swiss constitution), the constitutional authority of which has been controversially debated among experts in constitutional law and in the national parliament [12–14].

Aside from pandemics, there are many other types of potential crisis. Effective crisis organisation should therefore not only be measured by pandemic plans and the division of tasks contained therein. Responsibilities can also be regulated within the framework of civil defence (i.e., to provide basic services to the population and to protect, rescue and care for people and animals). An ideal instrument for this is the cantonal civil defence law. This provides the basis for a tailor-made composition of the cantonal command organisation, adapted to each specific emergency situation. In 2020, 24 of the 26 cantons had a civil defence law, specifying which tasks fall under the responsibility of the canton, the municipalities and partner organisations. However, only two cantons have a contemporary legal basis for civil protection that differentiates the responsibilities of the crisis bodies according to situation and incident phase. Clarification of civil defence responsibilities at the cantonal level is required [11].

During (response/absorption)

Effective crisis management is dependent on interaction between the federal government and the cantons. During the COVID-19 pandemic, decision-making was both centralised at the federal level (especially during the first wave, in spring 2020) and unilateral (i.e., with little coordination). It was centralised due to the confederation-wide character of the pandemic, pressure at the international level, and the expectations of citizens. Together, these factors were afforded greater significance than local variations in the spread of the virus or policy experimentation [7]. Coordination between the confederation and the cantons as well as between the cantons was limited despite legal provisions encouraging coordination under the circumstances and despite the existence of established routes for coordination. This unilateral approach did not arise due to conflicts, but appeared to be the result of a prevailing view that centralised decision-making and close compliance by the cantons provided enough uniformity to manage the crisis [7]. It appeared that many of the cantons took a watch and wait approach [15]. This is somewhat surprising, as inter-cantonal government conferences could have played a prominent role during the pandemic. Nevertheless, KdK did not play a leading role but was side-lined by the sectoral councils. In particular, GDK reliably and efficiently partnered with the federal government [8]. It may be concluded that there is an overarching need for optimisation in a number of interfaces, workflows and processes at both federal and cantonal levels. Notably, with the declaration of a *particular situation* (as per the EpidA), the need for coordination between the confederation and the cantons increased significantly, both at the political-strategic level and at operational levels [15].

Monitoring instruments for new diseases were not in place but were established during the COVID-19 pandemic. The current “Sentinella” reporting system of the FOPH is used to obtain epidemiological data to monitor common communicable and other acute non-communicable diseases in family medicine. As a reporting system, it allows the monitoring of common, non-reportable communicable diseases such as influenza, pertussis (whooping cough) or mumps in Switzerland. Therefore, during and after the first COVID-19 wave in 2020, there was debate concerning whether or not systematic population testing was necessary for effective epidemiological surveillance. Both epidemiologists and economists engaged in this debate [16]. This call to action was not answered by the FOPH. Instead, public-private initiatives were launched (see Case Study 1: Role of public-private partnerships in a time of crisis).

Regarding how much evidence-based decision-making took place during the COVID-19 pandemic, the role of the academic task force needs to be reviewed. The establishment, in March 2020, of the Swiss National COVID-19 Science Task Force (ncs-tf) as an independent scientific advisory body within the federal government's crisis organisation was an innovative solution. Previously, the institutional involvement of science in Swiss crisis management had been sporadic and unsystematic, sometimes leading to tensions between the FOPH and individual epidemiologists [15, 17].

After (recovery, learning and adaptation/transformation)

Several reports on lessons learned from the management of the COVID-19 pandemic have already been published.

The parliamentary Control Committees (CC) have scrutinised the conduct of the Federal Council, the Federal Administration and other bodies entrusted with the tasks of the Confederation. In May 2022, the results of these investigations (with a focus on the first phase of the pandemic up to June 2020) were published, including a number of recommendations [18].

The FOPH commissioned an evaluation of the planning, appropriateness and effectiveness of health care measures in the context of the COVID-19 pandemic. The evaluation was launched in October 2020 and empirical work was completed at the end of June 2021. Based on a representative population sample, online surveys were conducted with selected groups of affected persons, relevant literature was analysed and numerous discussions were conducted with stakeholders. The following topics were examined in depth: the division of competences between the Confederation and the cantons, the availability and use of digital data, roles and responsibilities when communicating with the public, the use of the specialist competencies of stakeholders and ensuring treatment capacities during the pandemic [19].

The decentralised approach taken during the pandemic allowed for flexible cantonal experiments and adaptation to regional needs and particularities. However, the institutional willingness to learn appears to have been limited. According to a survey by Avenir Suisse, crisis management was dealt with heterogeneously. Only seven cantons have commissioned external auditing agencies to evaluate their cantonal crisis management [11].

2.3 Recommendations

RECOMMENDATION 1A

Foster a regional (i.e., inter-cantonal) perspective with regard to the planning and financing of services by encouraging cantons to coordinate effectively.

RECOMMENDATION 1B

Secure the faster and more consistent involvement of parliament in future situations where emergency legislation is executed. Various solutions have already been proposed, ranging from an expansion of the Federal Council's reporting and accountability obligations, an institutional strengthening of parliamentary commissions and delegations and giving the parliament the option to meet and make decisions digitally in crisis situations.

RECOMMENDATION 1C

Find ways to achieve better and faster coordination between the national government (Federal Council) and cantonal governments. As the pandemic demonstrated, responsibilities also shift depending on the situation. This contradicts the logic of crisis management, according to which crises should be handled as consistently as possible and from a single source. Among the approaches discussed is a new 'joint federal and cantonal management body' for both normal times and times of crisis [20]. The major challenge for all these approaches is twofold: (1) How can a delegation of the cantons be legitimized? (2) Connected to this, how can decisions be made binding for all cantons?

RECOMMENDATION 1D

Clarify the mandate and governance of an operative national crisis unit.
This body should bring together experts from crisis management, health care, science, the private sector (e.g., industry), civil society, education and other sectors.

RECOMMENDATION 1E

Improve surveillance of epidemiological events with a distinction between three monitoring activities: (1) incidence of infection, (2) circulating variants and (3) immunity.

3. DOMAIN 2
Financing

3.1 Sustainability

Revenue generation

The Swiss health care system has a broad funding base. Between 2010 and 2019, roughly 67% of total funding was generated by compulsory levies, i.e., taxes and social health insurance (SHI) premiums, less than 8% by voluntary contributions to private health insurance (PHI), and about 25% by out-of-pocket payments (OOP) (see Table 3). During this same period, total health care expenditure as a share of GDP amounted to approximately 11%. The diversification of funding sources makes overall funding both economically sustainable (i.e., its ability to generate funding) and socially sustainable (i.e., the acceptance of funding within the population).

Table 3: Funding indicators 2010–2019

Expenditure	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
As percentage of GDP	9.9	10.0	10.2	10.5	10.6	11.0	11.3	11.5	11.2	11.3
As percentage of all health expenditure										
Compulsory	64.3	64.8	66.2	67.0	66.1	66.2	65.5	65.9	65.7	66.8
Public (Tax)	30.5	31.4	32.3	31.4	30.8	30.5	29.7	30.3	30.3	30.4
Social Insurance (including SHI)	33.8	33.4	33.9	35.5	35.3	35.8	35.8	35.6	35.4	36.4
Voluntary private health insurance (PHI)	9.5	9.5	8.0	7.9	7.9	7.9	8.0	7.7	7.8	7.9
Out-of-pocket (OOP)	26.2	25.6	25.9	25.2	26.0	25.9	26.6	26.4	26.5	25.3

Source: OECD Health Statistics 2021 (retrieved 10 February 2022).

The tax base for generating revenue allocated to the health care system is broad. It includes taxation of individual income and wealth, company profits and the sale of goods and services. Taxes are levied at federal, cantonal and municipal levels of government. Cantonal level taxes are by far the most important source of public financing, with approximately 83% of taxes levied at the cantonal level, almost 11% at the municipal level and a little over 6% at the federal level. Cantonal taxes co-finance inpatient care, long-term care and public services not covered by SHI (Gemeinwirtschaftliche Leistungen, GWL). Individual incomes and company profits are taxed at all levels, individual wealth is taxed at the cantonal and municipal levels, and the sale of goods and services at the federal level only. To equalise differences in the tax base at the cantonal and municipal levels, fiscal equalisation schemes are in place at the national and cantonal levels. The broadness of the tax base across all government levels in combination with fiscal equalisation make tax revenues an economically and socially sustainable source of funding for the Swiss health care system.

Mandatory SHI is organised at the federal level under the Swiss Health Insurance Law. Premiums are community-rated but independent of income and wealth and are collected by private health insurance companies [4]. Premiums are set every year by health insurance companies based on (predicted) costs and must be approved by the FOPH. There is neither a de jure nor a de facto limit to increases in costs nor, therefore, to premiums. This makes SHI premiums an economically sustainable source of funding. However, in 2019, the average Swiss household spent 7% of its

household budget on SHI premiums, compared to 5.6% in 2012 [21]. Premium subsidies are available for poorer households but the increasing financial burden of SHI premiums has recently resulted in political initiatives aimed at easing this household burden [22, 23]. Thus, from a social perspective, SHI premiums are a potentially unsustainable source of funding in the long term.

Voluntary PHI is privately organised (often by the same health insurance companies that offer SHI plans) and supervised by the Swiss Financial Market Supervisory Authority (FINMA). Risk-based premiums are determined in a competitive market. Premiums are financed by households buying PHI plans. The share of funding from PHI premiums slightly decreased between 2010 and 2019, while the share of funding from SHI premiums increased (see Table 3). The diminishing importance of PHI premiums in total funding due to the increasing importance of SHI premiums could be economically unsustainable.

OOPs include SHI deductibles and co-payments in SHI and all other health care service payments not covered by SHI or PHI plans. At 25%, their share in total funding is relatively high and remained almost constant between 2010 and 2019. While this high and stable share supports economic sustainability, international health system comparisons often assess high OOP-expenditure as an impediment to access to health care.

Coverage and resource allocation

The Swiss health care system provides state-of-the-art health care through public financing, SHI, PHI and OOP. SHI is the most important with regard to coverage of services and population. It is mandatory for all residents of Switzerland, with few exceptions (e.g., diplomats). All SHI plans give access to the same comprehensive set of health care services, including outpatient physician services, inpatient care, physiotherapy, pharmaceutical drugs, laboratory tests and medical supplies. The few gaps in SHI coverage are mainly with regard to dental care or long-term care [4]. PHI covers services beyond SHI coverage plans, such as dental care, access to private or semi-private hospital rooms and free choice of doctors in hospitals.

The set of health care services covered by SHI is generally not defined by a positive list (except for pharmaceutical drugs, laboratory tests and medical supplies). In principle, all clinically effective, appropriate and cost-effective services are covered. While the system is flexible and, in principle, should prevent zero-value care and excess utilization, most of the services covered are not systematically assessed for clinical effectiveness, appropriateness and cost-effectiveness (see e.g., Eidgenössische Finanzkontrolle (EFK) [24]). The few exceptions include selected services for which external contractors compose Health Technology Assessment (HTA) reports on behalf of the FOPH (see also Domain 4: Medicines and Technologies). Thus, many services covered by SHI may potentially have little scientifically proven clinical value [4] or may have more cost-effective alternatives. This potential inefficiency is a shortcoming of the coverage system that jeopardises long-term financial sustainability.

The allocation of resources to different health care sectors remained stable between 2010 and 2019 (see Table 4). Almost half of all resources are allocated to outpatient (approx. 25%) and inpatient care (20%), and the rest to long-term care (20%), drugs and medical devices (15%), diagnostic services (8%), rehabilitation (5%), administration (4%) and prevention (2%). However, due to technological progress and regulatory interventions there has been a shift from inpatient to outpatient services. Stability guarantees certainty for service providers regarding long-term planning of both the workforce and infrastructure which, generally, supports sustainability.

While the economic ability to generate funding for the Swiss health care system and its social acceptance generally contribute to sustainability, it is our view that the allocation of funding lacks transparency and is thus detrimental to sustainability. This lack of transparency mainly arises due to a lack of coordination in the federalist system. First, there is no explicit prioritisation of health care funding and expenditure over other public matters at any government level (i.e., horizontal) or across

Table 4: Resource allocation (% of total spending) 2010–2019

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Inpatient care	21.4	21.1	21.3	21.4	20.9	20.7	20.3	19.7	19.4	19.1
Outpatient care	25.3	25.1	25.4	25.6	26.2	26.3	26.4	26.5	25.9	26.3
Rehabilitation (inpatient + outpatient)	4.4	4.3	4.3	4.2	4.3	4.5	4.6	4.6	4.8	4.7
Long-term-care (inpatient + outpatient)	20.1	20.6	20.8	20.6	20.5	20.3	19.9	20.0	20.4	20.3
Services (including diagnostic)	5.3	5.8	6.0	6.4	6.7	6.8	7.2	7.6	7.7	8.1
Goods (drugs and devices)	16.1	15.7	15.3	15.1	14.8	14.9	15.1	15.2	15.2	15.3
Prevention	2.7	2.6	2.6	2.6	2.6	2.5	2.4	2.4	2.6	2.2
Administration	4.7	4.7	4.4	4.1	4.0	3.9	4.0	4.0	4.0	4.0

Source: Federal Statistical Office (FSO) 2021 (retrieved 10 February 2022).

different levels of government (i.e., vertical). Therefore, the Federal Finance Administration (FFA) has proposed budgetary targets for growth in health care expenditure [25]. Budgetary targets may be common in national health service (NHS) systems; however, in Switzerland's SHI system with direct democracy, a political process to define criteria for prioritisation would be required. Second, taxes at the cantonal level are also used to partly fund inpatient care covered by SHI, weakening incentives to provide treatment in the more cost-effective outpatient settings when possible. Furthermore, cantonal taxes are used to subsidise premiums for poor households (diluting the transparency of SHI funding) or to subsidise public services not covered by SHI (Gemeinwirtschaftliche Leistungen, GWL).

Provider payment

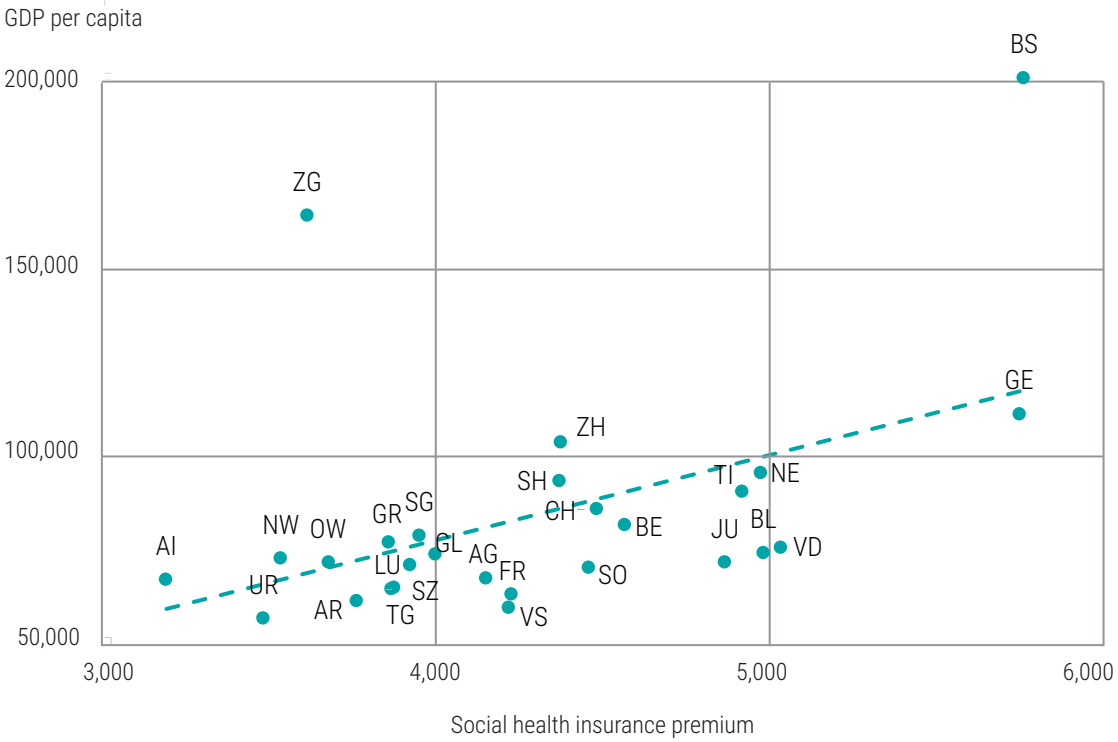
Payment schemes in the SHI system differ across service providers and are subject to regulation by FOPH (for a detailed overview, see De PietroCamenzind [4]). Physician services in the outpatient sector are reimbursed according to a national fee-for-service schedule that is negotiated between health care service providers and insurance companies. Prices for laboratories, pharmaceutical drugs and medical supplies are administered by the FOPH. Inpatient services are reimbursed according to a nationally uniform service-related (case) flat rate tariff. While payment schemes for inpatient and outpatient services are national, absolute prices may differ across cantons and individual service providers. Today, all payment schemes lack elements connecting payments to outcome quality (see Domain 5: Service delivery).

The maintenance of the tariff structure for inpatient treatment is assigned to SwissDRG, a joint institution of service providers, insurance companies and cantons. SwissDRG is responsible for the introduction, further development and maintenance of inpatient tariff structures. Such an organisation is still missing from outpatient services. A bill has recently been passed in parliament (effective as of January 2022) according to which a similar but separate organisation for outpatient services must be created within two years by insurer's associations and provider associations.

FOCUS BOX: Regional variation

The Swiss health care system is highly decentralised due to its predominant federal state structure and privately organised health care (see Domain 1: Governance). Even though SHI is organised at the federal level under the Swiss Health Insurance Law, there is considerable regional variation in SHI premiums (see Figure 2). In 2019, the average annual cantonal SHI premium for adults ranged from CHF 3,168 to CHF 5,794. SHI premiums reflect costs. There are a number of reasons for variation across cantons. First, costs reflect differences in supply-side factors, such as capacity and density of infrastructure and density of (specialised) providers, and demand-side factors, such as epidemiology, population structure. In addition, there are preference factors linked to utilisation and income [4]. SHI premiums are community-rated but independent of individual income and wealth. Figure 2 shows that at the cantonal level, SHI premiums vary with cantonal GDP per capita (income) and the regional variation in SHI premiums is correlated with regional income variation. In general, higher premiums tend to occur with higher income at the cantonal level. Thus, even though SHI premiums do not depend on individual incomes, there is a positive correlation with aggregate incomes. We propose that this is supportive of social sustainability.

Figure 2: Regional variation of 2019 SHI premiums (CHF)



Source: Federal Office of Public Health (Statistik der obligatorischen Krankenpflegeversicherung 2019, T 3.04 Mittlere Prämien in Franken je versicherte Person nach Kanton); Federal Statistical Office (Bruttoinlandprodukt, T 04.02.06.03 Kantonales Bruttoinlandsprodukt pro Einwohner).

A number of SHI payment scheme characteristics weaken economic sustainability. First, payment schemes are activity-based. Since individual service providers take (unit) prices as given, they have a strong incentive to increase revenues by generating excess volume [26]. Second, negotiations between service providers and insurance companies to reform the national fee-for-service schedule have been ongoing for several years without producing a result. This has resulted in an outdated fee-for-service schedule for outpatient services [26]. Third, annual negotiations of absolute prices for outpatient services between service providers and insurance companies regularly fail. In these situations, cantonal governments set prices. However, service providers or insurance companies often take legal action to challenge set prices. Thus, prices are often eventually set by courts of law rather than as a result of negotiation. Fourth, the heterogeneous mixture of payment schemes (and revenue sources) marks an obstacle to the integration of health care services across sectors.

Payment schemes in the PHI system are negotiated freely between insurance companies and service providers. PHI plans are supervised by FINMA. In recent years, FINMA has investigated provider payment in PHI [27] and found that invoices are often not transparent and unjustified, and that insurance companies are expected to implement the effective control of invoices. Based on FINMA's findings, we consider PHI payment schemes to be unsustainable.

Although SHI and PHI are separate insurance systems, interdependences exist. Hospitals, for example, level out what, in their view, is insufficient reimbursement in SHI with generous PHI tariffs. Due to the aforementioned pressure on PHI tariffs and the fact that younger people are no longer buying expensive PHI-coverage for inpatient services, the existing cross-subsidisation of SHI services in hospitals is expected to decline. Overall, this reduces the financial sustainability of many hospitals.

3.2 Resilience

In this section, we discuss the resilience of funding the Swiss health care system with respect to health crises (e.g., pandemics) and economic shocks (e.g., financial crises). We discuss resilience before, during and after a shock.

Before (preparedness)

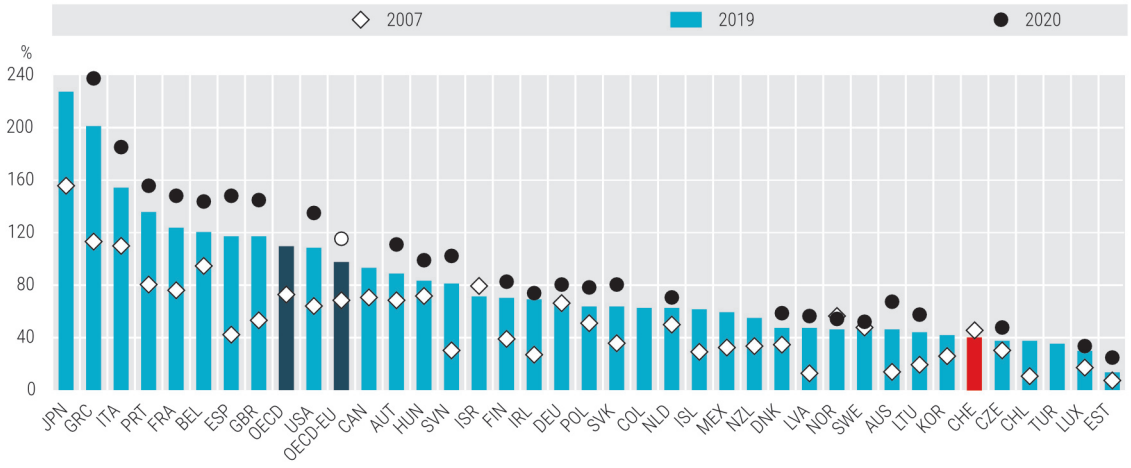
Several features of the funding of the Swiss health care system that are described in the subsection on revenue generation increase its preparedness to weather shocks. First, the system, in general, contains a broad mixture and stable base of funding. The diversification of funding sources is in itself a feature that makes the Swiss health care system resilient; should one funding source be impaired by a shock, others remain functional. Furthermore, not all cantons have the same financial resources at their disposal. As described above, fiscal equalisation schemes at the national and cantonal levels equalise differences in the tax base at the cantonal and municipal levels. Thus, shocks contained within certain regions can be better absorbed.

The resilience of SHI funding is guaranteed by the regulator, FOPH, which periodically performs a solvency test of the risks to which health insurers are exposed and their capacity to bear those risks. This involves requirements for the minimum level of reserves. With the appropriate reserves, a health insurance company should be able to withstand the average loss suffered from a shock [28]. Should an insurance company nevertheless suffer a shock and becomes insolvent, a contingency plan exists for bailing it out. For this purpose, contributions are levied by insurance companies on social health insurance premiums [29]. Thus, insurance companies offering SHI plans are well prepared for shocks.

FOCUS BOX: Health of government finances

As discussed, compulsory levies, such as taxes and SHI premiums, account for 67% of funding resources. The government can spend future taxes by issuing debt. The ability to issue debt is important in smoothing government spending, especially when facing shocks that negatively affect the tax base, such as a financial crisis or measures against a health crisis, or that necessitate increased spending, such as measures against a health crisis. The gross debt ratio as a percentage of GDP is a good measure of a government's ability to issue debt. Figure 3 shows Switzerland's (CHE) gross debt ratio as a percentage of GDP relative to other OECD countries. Switzerland's gross debt ratio as a percentage of GDP is 40%, giving the country good financial standing to weather future crises compared to other countries, thus increasing the health care system's financial resilience. One reason for the low debt ratio is the so-called debt brake, a mechanism designed to avert (chronic) structural imbalances in federal finances. A recent analysis by the FFA concludes that the COVID-19 crisis will not significantly affect long-term fiscal sustainability [30].

Figure 3: General government gross debt as a percentage of GDP



Adapted from OECD. Government at a Glance [31].

During (response/absorption)

Several features of the funding of the Swiss health care system are described in the subsections on coverage/resource allocation and provider payment that affect resilience during a crisis.

On the one hand, SHI provides comprehensive coverage in combination with no positive list of physician services. This implies sizable flexibility to absorb shocks during a crisis. On the one hand, this guarantees that households suffer less financial hardship in the face of economic and health shocks, while premium subsidies ensure that households are sheltered from individual economic shocks, such as job loss. On the other hand, it guarantees that, during a health crisis, new treatments or pharmaceutical drugs (e.g., vaccines) can be covered by SHI in a timely manner.

However, provider payment schemes are static and thus not able to quickly reflect appropriate payment for the new services needed in a health crisis. During the COVID-19 pandemic, the outpatient fee-for-services schedule was unable to incorporate new services such as testing, online psychotherapy or telemedicine. This was dealt with in an ad hoc manner, through consensual agreement to generously deal with existing service positions in the fee-for-services schedule (see

Domain 5: Service delivery). Furthermore, the COVID-19 pandemic raised the question of how providers should be reimbursed for forgone revenue due to regulation postponing or cancelling of elective treatments and for the high costs of expensive COVID-19 cases, such as long-term ICU patients.

After (recovery, learning and adaptation/transformation)

To the best of our knowledge, there are no institutionalised learning processes in place specific to health system financing in the aftermath of a crisis.

3.3 Recommendations

RECOMMENDATION 2A

Prioritize reforms to increase financing transparency

For example:

- Confederation: strive for uniform financing sources of inpatient and outpatient services in SHI (Einheitliche Finanzierung ambulant und stationär EFAS)
- Cantons: limit financing to service-related and cost-based subsidies for public services not covered by SHI (Gemeinwirtschaftliche Leistungen GWL) and disclose those subsidies
- Insurers/Hospitals: reduce cross-subsidisation of SHI services in hospitals through generous PHI tariffs.

RECOMMENDATION 2B

Continually and consistently assess services with regard to the criteria of clinical effectiveness, appropriateness and cost-effectiveness (WZW-Kriterien) and limit reimbursement to those services that fulfil these criteria.

Strengthen the dissemination of these criteria through continuous operationalisation related to practice and by seeking medical community support (e.g., the adoption of medical guidelines or best-practice recommendations from movements such as Choosing Wisely).

4. DOMAIN 3
Workforce

The Swiss health care service workforce represents a large share of the overall workforce (7.7% of FTE) and has increased in size by nearly 70% over the last 20 years [32]. The number of physicians and nurses per capita is among the highest in OECD countries. Nonetheless, some disciplines suffer a severe lack of physicians and specialised nurses. This shortage is likely to increase in the coming years as physicians from the baby boomer generation retire and demand increases due to population growth and aging.

The lack of specialised ICU nurses was a crucial bottleneck during the pandemic and avoiding the overloading of ICUs was declared the most important policy goal. However, the number of specialised ICU nurses decreased during the pandemic due to career dropouts motivated by extremely heavy workloads.

4.1 Sustainability

The Swiss health care system is relatively well staffed in comparison to other OECD countries, with 17.96 nurses and 4.35 physicians per 1,000 population (see Table 5). Taking into account the country's higher cost of living, salaries are high by international comparison with similar working conditions. Approximately a third of the health care workforce holds a foreign diploma. The importance of foreign-trained personnel is particularly high along Switzerland's borders with France, Germany and Italy, with thousands of health care workers crossing the border each day to work in Swiss hospitals and other health care institutions. This large proportion of foreign-trained health care personnel must be put into perspective, with foreign workers representing 30% of the Swiss workforce.

Despite relatively high physician density, many health care organizations struggle to recruit new physicians. Some specialities, such as psychiatry and general medicine, and certain locations, such as rural areas, are particularly affected. According to several studies, this shortage of physicians is expected to substantially increase in the future, as the baby boomer generation retires and is not fully replaced by newly trained physicians. A recent study of the canton of Bern, for example, found that two thirds of GPs accept very few or no new patients, and the number of patients per GP may soon reach 5,800 in some rural areas [33]. With a share of 42% of physicians [34], the number of GPs and paediatricians is also substantially lower than the number of specialists.

This increasing lack of physicians is due to a combination of factors:

(1) a substantial share of currently active physicians belong to the baby boomer generation, which is currently retiring or going to retire in the coming years [35];

(2) the salaries and incomes of self-employed physicians differ substantially across medical specialities. Those associated with lower incomes, such as generalists and psychiatrists, are associated with a greater shortage of physicians [36];

(3) the number of new physicians trained in Swiss universities is insufficient to meet the needs of the growing and aging population. The number of yearly admissions to medical schools has recently been increased by 50% from 900 to 1,350, but it will take several years for the current cohort of students to enter the labour market and it is unclear whether the increase will be sufficient; and

(4) while hospital physicians are mostly employed, physicians in outpatient care, including many specialists, often work as entrepreneurs with their own practices or as independent partners in group practices. This traditional model is increasingly challenged, as many retiring physicians struggle to find successors to continue their practice, and many newly trained physicians prefer salaried positions with lower workloads. Physicians thus tend to work fewer hours, resulting in a higher number of physicians required to treat the same number of patients.

Meanwhile, the relatively high density of nurses by international standards is, surprisingly, accompanied by difficulties recruiting qualified nurses for hospitals, nursing homes and outpatient long-term care services. Nurses represent the largest group of health professionals with nearly 190,000 individuals in 2019 [37]. Levels of professional qualification include auxiliary nurses with limited professional education, nurses with three years vocational training and nurses with bachelors' or masters' degrees. The shortage in labour supply is limited to more qualified nurses. As with physicians, the share of foreign trained nurses is approximately 30%, with shares of over 50% in the French- and Italian-speaking regions of the country.

Table 5: Size and pay of health care workforce

Workforce category, 2019	Rate	Change since 2009	Source
Practising nurses per 1,000 population	17.96	29.6%	[38]
Practising physicians per 1,000 population	4.35	13.6%	[38]
Practising dentists per 1,000 population	0.41	-21.1%	[38]
Practising pharmacists per 1,000 population	0.67	6.3%	[38]
Practising physiotherapists per 1,000 population	1.69		[39]
Practising care workers per 1,000 population	0.67	10.5%	[38]
Foreign-trained nurses (%)	30.10		[39]
Foreign-trained physicians (%)	36.30		[35]
Mean monthly basic pay (full-time equivalent) in CHF before tax (2022 exchange rate: 1 CHF ≈ 1 EUR ≈ 1 USD)			**Source**
General practitioner, self-employed (2014) *	18,222		[40]
General practitioner, salaried (2014) *	11,981		[40]
Consultant (2019)	11,321		[41]
Staff grade (2019)	10,073		[41]
Foundation doctor year 1/2 (2019)	7,348		[41]
Nurses & health visitors (2019)	5,594		[41]
Physiotherapists (2019)	6,290		[41]
Midwives (2019)	6,291		[41]
Minimum wage (canton Basel city) (2021)	3,822		[42]
Median wage income (2020)	6,665		[43]
Median wage income health care (2020)	6,821		[43]

* Wages of salaried practitioners and earnings of self-employed practitioners cannot be directly compared due to differences in social security contributions and additional income components.

A recent report estimates the need for 70,000 new nurses by 2029 [39]. A key factor driving this high additional need is the high rate of career drop-out of around 40% of nurses [44], which is mainly attributed to heavy workloads due to insufficient staffing, administrative overload and inadequate work-life balance. The improvement of nurses' working conditions was the subject of a pre-pandemic national referendum launched by the professional nurses organisations. The referendum, approved with 61% of the vote in November 2021, amended the constitution with a specific article assigning responsibility for the provision of a sufficient number of nurses to the federal and cantonal governments. The implementation of these measures will take several years, and their success is still uncertain.

The shortage of health care workers affects not only physicians and nurses but other qualified personnel such as medical practice assistants, medical-technical assistants and midwifes. This overall shortage is likely to further increase due to: (1) an overall lack of qualified personnel in all sectors of the economy, as non-health care sectors may be more successful at attracting new personnel due their higher flexibility and lower pressure on costs; (2) labour demand by the health care sector is likely to increase relative to the demands of non-health care sectors due to population growth and aging; and (3) recruitment of qualified personnel from neighbouring countries is likely to become more challenging, as these countries increase their efforts to retain these personnel.

4.2 Resilience

In this section, we discuss the resilience of the Swiss health care workforce with respect to health crises (e.g., pandemics) and political distress (e.g., cross-border mobility). We discuss resilience before, during and after the shock.

Before (preparedness)

The excess capacities held by hospitals and financed by cantons do not include staff reserves. Additionally, emergency drills mostly focus on the response to single major catastrophic events, such as large-scale accidents. The country's hospital workforce was thus not specifically prepared for a prolonged pandemic. However, many hospitals autonomously implemented emergency plans at the beginning of the COVID-19 pandemic by reducing occupancy rates and creating pools of reserve staff.

During (response/absorption)

The lack of additional qualified ICU nurses was of crucial importance during the pandemic. The prevention of acute hospital overload, defined as ICUs not being able to treat all patients in need, was declared the most important goal of national COVID-19 containment policies. The vast majority of restrictive public health measures were justified by this goal, and their relaxation was envisaged only when ICU utilisation rates decreased. However, ICU capacity could not be sustainably increased and it actually decreased by 10–15% in the autumn of 2021 compared to the pre-pandemic situation. This was due to the drop-out of ICU nurses, who could not be sufficiently replaced by new ICU nurses. The prolonged crisis put enormous strain on ICU teams, leading to the resignation of some of the most experienced ICU nurses, further increasing the strain on remaining team members.

Overall, the number of overtime hours for hospital staff during the pandemic did not differ substantially from the pre-pandemic period, as many inpatient treatments were cancelled or postponed due to restrictions on non-urgent procedures and patient fears of contagion in hospitals [45]. This illustrates the difficulties of redeploying nurses and physicians to those hospital wards most in need of additional staff.

After (recovery, learning and adaptation/transformation):

Since the end of the most acute phases of the pandemic, the discussion has focussed on two issues regarding the resilience of the health workforce: (1) how to improve the overall working conditions of nurses and (2) how to increase the number of qualified ICU nurses during a health crisis.

The push for better working conditions for nurses has been substantially strengthened by the approval of the "nursing initiative" by a 61% majority popular vote in November 2021. The initiative amends the constitution by adding several paragraphs recognising the importance of nursing as a key element of health care provision and obliging the federation and cantons to assure sufficient staffing. However, it will take several years before these measures can be implemented. The measures proposed to increase the number of qualified ICU nurses in times of crisis include higher pay, the coverage of course costs for ICU nurse training and additional benefits for nurses willing to complete ICU training and regularly refresh their ICU skills even if they generally work on other hospital wards in normal times [46]. Some of these measures are already being implemented.

4.3 Recommendations

RECOMMENDATION 3A

Improve working conditions for nurses and other health care personnel to reduce early career exit and low working hours. Measures to improve working conditions include reducing the administrative burden, enriching job profiles and career options and ensuring adequate staffing. With regard to nurses, these measures should partially be covered by the implementation of a nursing initiative for improved working conditions.

RECOMMENDATION 3B

Further increase the number of admissions to medical schools.
The current number of 1,350 admissions per annum appears too low in the face of the lower workload chosen by the new generation of physicians and the increasing and aging population. Furthermore, there is no lack of candidates, as fewer than one in four of those who apply to medical school are admitted.

RECOMMENDATION 3C

Promote specialisation at an earlier stage in medical schools to increase efficiency in medical education and strengthen the role of general practitioners.

RECOMMENDATION 3D

Prepare for a persistent shortage of qualified health care staff, as the success of current and future efforts to increase this workforce may be limited. Universal access to essential medical services must be guaranteed in times of persistent shortage, while access to 'nice to have' services may have to be limited.

RECOMMENDATION 3E

Explore different options to increase the ICU workforce in times of crisis.
These options include establishing a qualified ICU reserve staff with periodic refresher training and updating of ICU skills and the training and appointment of auxiliary ICU nurses to alleviate the burden on regular ICU staff in times of crisis. This approach could be extended to emergency departments.

5. DOMAIN 4

Medicines and technology

5.1 Sustainability

Adoption of new technologies

Switzerland is usually relatively quick to adopt new medicines and technologies, although several factors have increasingly hampered this advantage in recent years. The factors favoring quick adoption include high per capita income level, the absence of budget restrictions for health care providers, competition among providers to attract patients, and the important role that the pharmaceutical and med-tech industries play in the Swiss economy. The factors increasingly hampering the adoption of new medicines and technologies include challenges in the regulation of market access and the small size of the Swiss market.

The rapid adoption of new technologies can be illustrated with the example of diagnostic imaging devices. Switzerland is among the countries with the highest density of these devices, and the devices in use are predominantly state-of-the-art compared to those in use in other countries. The combination of multiple providers and a virtual absence of waiting times leads to pressure to be always up-to-date with the latest technology. Furthermore, radiologists push for the use of new technologies once they have seen them in action, and a relatively generous fee-for-service tariff finances the high rate of adoption.

The inclusion of new medicines in SHI requires approval by the Swiss Agency for Therapeutic Products (Swissmedic) and subsequent inclusion in the FOPH specialties list. Market approval by Swissmedic is based on the criteria of efficacy, safety and quality and its role corresponds to that of EMA in the EU and the FDA in the US. It is a challenge for Swissmedic to accomplish the approval processes with the same quality and speed as those much larger agencies, particularly given the increasing complexity of new medicines and medical products. According to Interpharma, the association of Switzerland's research-based pharmaceutical industry, the time from submission to Swissmedic to market approval has a median duration of 650 days, 35 days longer than EMA and 133 days longer than the FDA.

The process for inclusion in the specialities list appears to be even more challenging, as the officially scheduled duration of 60 days contrasts with a median duration of about 200 days, according to Interpharma [47]. The FOPH is responsible for this decision, which is based on the criteria of effectiveness, appropriateness and cost-effectiveness prescribed by the Social Health Insurance Act. However, the criteria defining cost-effectiveness have not been explicitly defined. This may lead to non-transparent reimbursement decisions but may also allow for the flexible consideration of the different value dimensions of a product. The specialities list includes the ex-factory price and the price to the public (respectively to SHI) as well as eventual limitations on prescriptions with regard to indication and treatment stage, to the number of packages prescribed, and to periodic assessment by other physicians.

The inclusion of a new medicine in the specialities list requires a price decision. The sometimes very high prices demanded by pharmaceutical companies and the political pressure for cost containment make it increasingly challenging to agree on an adequate price, as the FOPH has to weigh rapid access for patients against the impact of price on health care costs. Furthermore, international reference pricing is challenging if no price information is available or if official prices are ‘showcase prices’ above the true prices paid. The FOPH has reacted to this challenge by increasing the number of provisional inclusions in the specialities list and by introducing price models with undisclosed rebates for health insurers. Unfortunately, these undisclosed rebates reduce the transparency of the Swiss medicines market.

The delay in access to new medicines on SHI is, in part, mitigated by the possibility of acceding to yet unlisted medicines through a special process (Art. 71a-d KVV). An attending physician can request reimbursement for medication from the patient’s health insurer, and coverage may be authorised after the insurer has consulted with its in-house medical experts. This special process is becoming

increasingly important, with over 50,000 requests in 2021. However, it has been criticised for the additional administrative burden it places on physicians, health insurers and industry and on the access inequity it creates, as the degree of authorisation varies substantially between insurers [48].

Switzerland has no formal health technology assessment (HTA) process for new medicines and no formal or informal incremental cost-effectiveness ratio (ICER) threshold to limit the price of new medicines. However, HTAs performed in other countries and the ICERs applied in their reimbursement decisions influence Swiss medicine prices, and the pricing model used by FOPH combines the average price of a medicine in nine European countries with the average price of therapeutically equivalent medicines [49]. The FOPH has also recently put in place a process for the re-evaluation of currently reimbursed treatments, with the goal to disinvest from potentially cost-ineffective treatments. This process has so far focused on drugs, laboratory analyses and medical devices.

The use of generics and biosimilars is substantially lower in Switzerland than in other countries, while their prices are substantially higher. The volume market share of generics was 22% in 2019, compared to the OECD average of 53% [38]. The market share of biosimilars is even lower [50, 51]. This is due to financial incentives for physicians, the limited size of the Swiss market, and higher local distribution costs (especially for low-cost generics).

Digital health

Telemedicine has been in use for more than two decades in Switzerland and is provided by specialised organisations such as Medgate, Medi24 and Santé24. Insurance companies have incentivised the use of telemedicine via alternative insurance contracts with lower premiums and with telemedicine providers acting as gatekeepers. However, the share of telemedicine in overall health care provision is still limited and the rapid increase during the COVID-19 pandemic seems to have been temporary.

Switzerland lags behind most other high-income countries in the establishment of digital health platforms for the exchange of personal health information between different health care providers treating the same patient [52]. An electronic patient dossier (EPD) was planned as a central element of the Swiss digital health care strategy, but its implementation largely failed. The reasons for this failure include so-called "two-fold voluntary opting-in" with practicing physicians and patients free to decide whether or not to participate. While participation has now become mandatory for most providers, an ongoing fundamental limitation of the EPD is that it consists of an unstructured collection of documents, also called the "PDF graveyard," which lack a well-structured overview of the most relevant and up-to-date information.

The use of health data for quality monitoring, health policy development, and public health research is severely hindered by the fragmented health data landscape and data protection issues. This fragmentation is due both to the federal setting and to the high fragmentation of health care service provision and insurance by a multitude of independent businesses using an array of different IT systems. Furthermore, data is reluctantly shared due the concern that it may be used against one's own interests by regulators or in negotiations between health care providers and insurers. Linking health data collected by government agencies is also often impossible due to technical obstacles and data protection issues. The great potential of a systematic evaluation of real-world treatment data in improving health care and the health care system thus remains largely untapped.

Research and development

Switzerland has extremely strong pharmaceutical and medical technology sectors which contribute to roughly half of total goods exports [53]. The country also has a strong innovation capacity in the development of new medicines and medical devices due to a longstanding tradition in the chemical and precision engineering industries, a highly qualified workforce combined with an open and

flexible labour market, excellent technical universities and a stable and innovation-friendly regulatory environment. The importance of research and development (R&D) activities is shown by the 19% of employees working in R&D in the pharmaceutical industry [53] and the 9% of total revenues spent on R&D in the medical technology industry [54]. The growth rates of both industries are also substantially above the average growth rate of the economy.

5.2 Resilience

In this section, we discuss the resilience of medicines and technology in the Swiss health care system with respect to health crises (e.g., pandemics) and political distress (e.g., cross-border mobility). We discuss resilience before, during and after the shock.

Before (preparedness)

National regulation on medicine stocks mandates that companies importing a selection of essential medicines must hold 2–4 months' stocks of the average monthly sales of these medicines [55]. Pharmacies, hospitals and physicians tend to hold relatively small stocks of medicines in normal times due to timely restocking by wholesalers.

Shortages of off-patent medicines represent an increasing problem even in normal times. These shortages can occur locally (limited to Switzerland) or globally. Local shortages are mainly due to the limited size of the Swiss market and relatively high market entry costs. Specific off-patent drugs are often produced and sold by just a few pharmaceutical firms, thus increasing the probability of shortages. These shortages can, however, be overcome by importing medications from neighbouring countries. Global drug shortages are much more challenging to resolve, as they are mainly due to strong pressure on prices and the concentration of the worldwide production of single active substances in a handful of companies in countries such as China and India. These shortages can only be solved by coordinated measures at a global or European level. Similar internationally coordinated efforts are necessary for the development of new medicines in the face of the increasing health threat posed by antibiotic resistance.

During (response/absorption)

At the beginning of the pandemic, panic-buying and problems with cross-border logistics led to severe shortages of a number of essential medicines. These problems were less pronounced in pharmacies than in hospitals, where several essential medicines needed for placing patients in artificial comas and for intubation ran short. The situation was brought under control by a coordinated effort between hospitals and national and cantonal authorities. Hospitals posted information of their current stocks of critical medicines on a simple website and the Federal Office for National Economic Supply distributed the medicines it had obtained from the industry according to current requirements. The confidence created by this approach was reinforced by weekly online calls which resolved the counterproductive hoarding of medicines by hospitals. This approach was initiated by hospital pharmacists, but public authorities played a crucial role due to their power to sanction those not playing by the rules. The approach also worked better in the first phase of the pandemic, when it was coordinated by federal authorities, than in the second phase, when public responsibility was transferred to cantons.

Other challenges in the production, authorisation and distribution of pharmaceutical products, medical devices and consumables were successfully managed by improvised but highly effective private-public partnerships between industry and public authorities in the first year of the pandemic. These challenges included the circulation of employees and goods across national borders, the authorisation of vaccines, drugs and tests and the authorisation of new production sites. Swissmedic proved to be agile and it cooperated closely with the industry (see also Case Study 1). Coordination and cooperation between pharmaceutical companies was also very successful. Strong

research and production capacities played an important role, as they allowed a rapid response with the development of new tests and important contributions to the internationally coordinated production of vaccines. Coordination was less effective in the second year of the pandemic, when partnerships were dissolved at the national level and the cantons took over.

The poor level of communication digitalisation between service providers and health authorities was brutally exposed in the first weeks of pandemic, as infection reports were transmitted to the FOPH via fax machines and patient documentation was transferred between hospitals on paper. A major obstacle to digital communication between providers is the high fragmentation of health care provision into multiple service providers using a multitude of different practice and hospital information systems. Electronic contact tracing made a good start, with the rapid development of the Swiss-COVID-App assuring a high degree of privacy protection. But the tracking app failed, as the authorities charged with providing individual codes for new COVID-19 cases were overwhelmed by the high number of infections in the second wave of the pandemic in the autumn of 2020.

5.3 Recommendations

RECOMMENDATION 4A

The FOPH should explicitly and systematically include budget impact considerations in medicine price-setting decision-making. This would allow a reduction in the price of a medicine as its utilisation increases due to extension of indications or unexpectedly high demand.

RECOMMENDATION 4B

Switzerland should take part in internationally coordinated efforts to solve challenges of global off-patent medicine shortages and the development of new medicines.

RECOMMENDATION 4C

Digital platforms for communication and event tracking between service providers and between service providers and health authorities should be developed. The platform should allow the exchange of structured patient information between health care providers.

RECOMMENDATION 4D

In times of crisis, coordination between industry and public authorities should occur at the national rather than the cantonal level. Delegation to the cantonal level increases coordination costs and dilutes responsibilities. Furthermore, relevant know-how in the public administration of medicines and technologies is greater at the national level.

6. DOMAIN 5
Service delivery

Generally, most service providers in Switzerland are privately or publicly owned companies. This allows for an entrepreneurial and decentralised approach facilitating flexible and rapid decision-making. Additionally, regional and national experts work together in informal networks to promote the coordination of care and best practices (see Case Study 1: Role of public-private partnerships in a time of crisis).

Compared to other countries, the regulation of service provision is light. The most apparent downside of this loose regulation is probably the lag in quality measurement and monitoring.

6.1 Sustainability

Access and coordination

The Swiss health care system as a whole and the SHI in particular provide easy access to all levels of care. Since gatekeeping by GPs is not the default setting, the coordination of services is somewhat limited. The sectors remain rather segmented, not least because of different ownership and heterogenous tariff schemes (see Domain 2: Financing). Although structural changes are occurring, excess inpatient capacity remains. The ongoing shift from inpatient to ambulatory care is changing the organisation of hospitals and the landscape of hospital infrastructure.

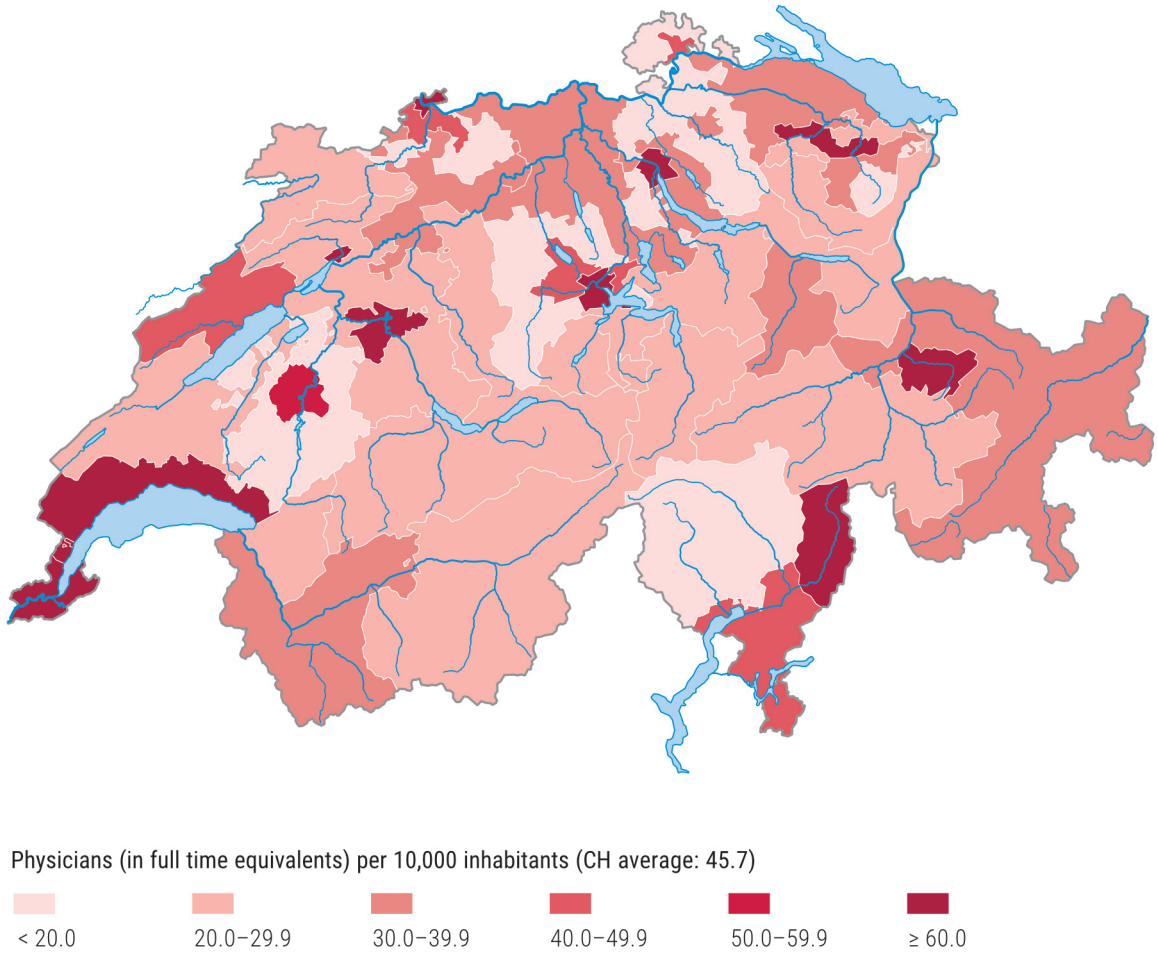
In ambulatory care, the standard SHI contract provides free choice of physicians in both primary care and specialist care without need for a referral. Alternatively, insured individuals can opt for other contracts that include gatekeeping and more actively managed care performed by either physician networks or Health Maintenance Organizations (HMOs) in return for a premium discount. In 2018, 71.8% of the insured [29] were willing to respect some restricted choice of physician by opting for plans operating with lists of selected physicians or simply the requirement that they make initial contact with a medical call centre provided by the insurers. However, a considerably lower percentage (27.5%) [56] was estimated to be insured by either a HMO plan or another binding physician network plan (excluding simple list models) in the same year. Thus, easy access to care with little coordination across sectors is still the predominant service model. This choice by the public, and the resulting lack of coordination, comes at a price. Brunner, et al. [57] have estimated the maximum potential for greater efficiency through better coordination of care if all insured persons were placed in the most restrictive (and hence the most coordinated) HMO plan to be 3% of total SHI related costs. With the proposed revision of the Social Health Insurance law, the FOPH hopes that the introduction of mandatory initial counselling (i.e., gatekeeping) for all insured persons will mean that entry into the health care system will be better coordinated. Additionally, corresponding care networks defined as separate service providers and patient care management programmes are promoted by the FOPH, both with the aim of strengthening coordinated care.

It is important to remember that most GP practices are small businesses highly committed to their existing patients. However, these GPs feel less responsibility for patients not enrolled in their practices. At a time when new patients have increasing difficulty finding a GP, primary care for patients without a GP may be rationed. From a public health perspective, it would probably be more effective to reallocate some GP time from existing patients to underserved patients without a GP.

Ambulatory care, meanwhile, lacks service planning at both federal and cantonal levels. This results in geographical disparities with regard to the distribution of providers and, therefore, access to care. As an example, Figure 4 shows that the density of practising physicians is much higher in cities than in rural areas. Two challenges arise from such disparities.

Firstly, a higher density might foster supply-induced demand. Regional cost differences are mainly, although not exclusively, caused by quantity differences. Analyses of regional quantity differences show that the density of specialists is one suggested variable that exerts the strongest influence on the consumption of health care services [58, 59]. Consequently, in 2020, the federal parliament

Figure 4: Density of practicing physicians 2018



Source: Adapted from Federal Statistical Office [60].

created a new possibility to limit the licensing of doctors who are allowed to charge the SHI; in the future, cantons will be able to decide for themselves whether they want to limit the number of specialist doctors in certain geographical regions.

Secondly, in some regions the supply of GPs is already or will be too low in the future. Cantons or municipalities do not have a uniform approach to overcoming this issue. One of the most frequently mentioned approaches is the setup of regional/communal health centres in combination with increased interprofessional cooperation. The latter is particularly important considering the increasing number of people suffering from chronic or multiple illnesses.

Acute care hospitals provide both inpatient care and specialised ambulatory care. As tariff schemes in SHI and generous reimbursement in PHI both favour inpatient settings, hospitals focus on inpatient treatments. Nevertheless, in recent years there has been a shift from inpatient to ambulatory care. This ongoing process is the result of both technological innovations and new federal and cantonal regulations, including lists of treatments that may only be performed in ambulatory settings. Hospitals have reacted to this shift by creating departments or additional new sites where exclusively ambulatory care is provided. This allows for separated staff planning and process design, both with the goal of achieving lower operating costs.

Planning of hospital inpatient care is the responsibility of the cantons (see Domain 1: Governance). There is little coordination between the cantons with the exception of highly specialised medical care (HSM), which is coordinated on a national level [61]. An explicit and binding regional planning approach is only just evolving in some areas of Switzerland (Northwest around Basel, Eastern Switzerland around St. Gallen, Central Switzerland around Lucerne). As a result of this federalist planning, there continues to be overall excess inpatient capacity. Nevertheless, a structural change can now be observed; ten years after SHI hospital financing reform (effective as of 2012), which fostered competition between hospitals, smaller hospitals in rural areas have closed, and inefficiently operated hospitals have not been included in the cantonal hospital list. One reason for this slowly occurring structural change is to be found in the multiple and, therefore, conflicting roles of the cantons (see Domain 1: Governance and Domain 2: Financing) as regulators (hospital planning, approval of negotiated tariffs, licensing of physicians), financers (subsidies for inpatient treatments), owners and operators (hospitals are valued as a provider of high-quality jobs, especially in rural areas).

Regarding the coordination of care after hospital discharge, there are indications that quality deficiencies at the interfaces with downstream sectors (e.g., outpatient nursing, nursing homes, hospices) have intensified since the 2012 revision [61].

Quality: Monitoring and improving

Generally, competition between providers combined with patients' free choice of provider should lead to better quality, as service providers strive to meet patient expectations and competition creates pressure to improve both quality and efficiency. This decentralized approach lacks a dedicated national quality agency, binding quality standards for providers, a uniform methodological approach, and robust outcome quality indicators (especially in ambulatory care). Accordingly, the tariff structures in place do not include financial incentives to foster quality, in either primary or secondary care.

In April 2021, rather late for a highly developed health care system, an amendment to the Federal Act on Health Insurance (HIA) to improve quality and cost effectiveness entered into force. With this, new instruments directed at actors at all levels were put in place [62]. Firstly, the Federal Council now acts as a strategic body and has established a Federal Quality Commission (FQC). Secondly, the associations of healthcare providers and insurers have to conclude agreements on quality development that are applicable throughout Switzerland. Thirdly, healthcare providers must comply with these quality agreements. Hence, quality agreements between health care providers and insurers have become mandatory and will be approved by the Federal Council. In this way, the Federal Council aims to take the lead in quality development, a lead that has been eagerly awaited by some but questioned by others. Up to now, quality standards and clinical guidelines were neither defined nor administered by government agencies but by medical associations, service providers (e.g., integrated care networks), academic institutions (e.g., institutes of primary health care) or other interest groups (e.g., national associations of health professions). Those who question the new role assumed by the Federal Council fear that it jeopardises this decentralised approach, which many consider best suited to Switzerland.

Regardless of whether the new role of the Federal Council is welcome or not, no national quality agency with authoritative powers will be set up. Instead, the newly founded Federal Quality Commission (FQC), which became active in 2021, commissions third parties to run national quality development programmes, and can also support national or regional quality development projects. Another organisation, the long established Swiss National Association for Quality Development in Hospitals and Clinics (ANQ), which previously only focused on inpatient treatments (acute somatic, psychiatry, rehabilitation), has, since 2021, led ongoing projects for ambulatory treatments. ANQ publishes standardised quality data nationwide, providing transparency with regard to outcome quality at the hospital/clinic level which promotes quality development in the Swiss health care sector.

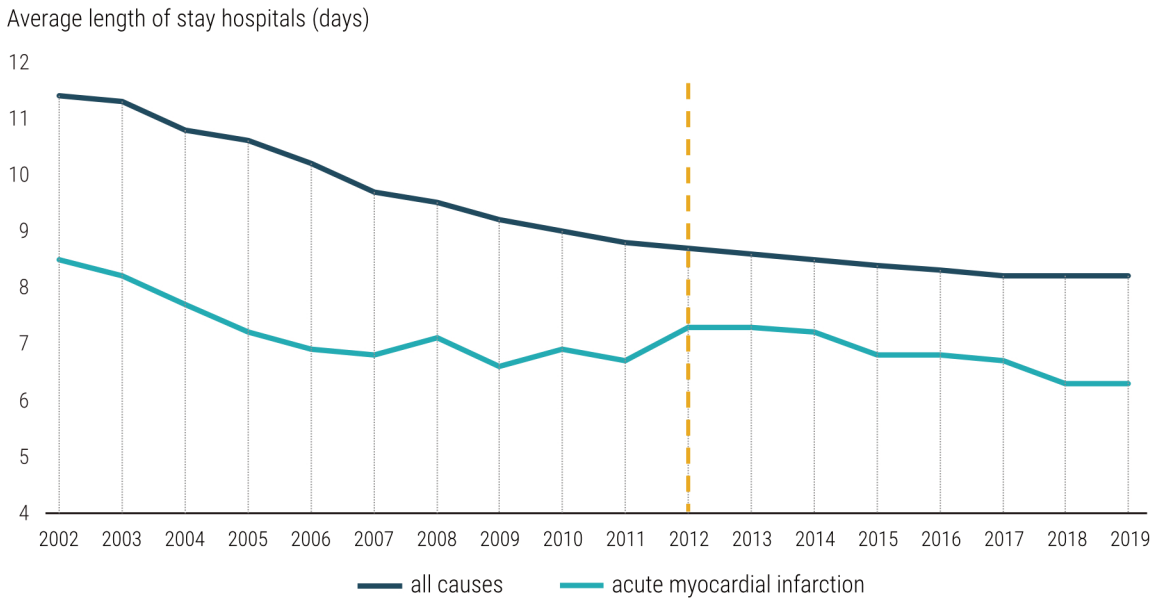
Efficiency: Monitoring and improvement

The requirement for all services provided under SHI to be cost-effective (see Domain 2: Financing) stipulates that individual providers must be monitored.

In ambulatory care, practising physicians in primary and secondary care are reimbursed by a fee-for-service (FFS) scheme. Together with the Swiss Medical Association (FMH), health insurers audit the efficiency of the outpatient medical profession. On the one hand, each individual insurer does this by means of individual invoice checks, on the other, one of the insurer's associations (Santésuisse) uses statistical methods to carry out systematic efficiency audits on behalf of the entire industry. The aim of these audits is to identify statistically conspicuous service providers whose costs are significantly above the average. Those who report above-average costs are required to justify them. Excess costs that remain unexplained must be reduced and, if necessary, repayments made.

In inpatient care, DRG-based reimbursement has been in place since 2012. A national benchmarking of severity-adjusted case costs, which is used as a basis for base rate negotiations, puts continuous pressure on hospitals to become more efficient. However, as Figure 5 shows, the length of stay in hospital had long been reducing even before this additional pressure.

Figure 5: Average length of stay in hospital (2002–2019)



Source: OECD Health Statistics 2021 [38], data retrieved 10 March 2022.

Prevention and health promotion

A decentralised approach with fragmented and multiple responsibilities has resulted in disparate and largely uncoordinated prevention and health promotion activities, despite a considerable number of programmes and projects. A better balance between prevention and cure [63] is still missing, with emphasis remaining on the latter.

In Switzerland, numerous governmental and non-governmental actors at federal, cantonal and municipal levels are involved in prevention and health promotion. Their unaligned policies are detrimental to sustainability. The Confederation is particularly active in the prevention of addiction (alcohol, tobacco, drugs), communicable diseases, occupational accidents and diseases, as well as

in the prevention of non-occupational accidents. The cantons and private actors (such as cancer or rheumatism leagues) play a central role in the prevention of non-communicable disease and mental illness and in health promotion (e.g., campaigns and counselling services). Disease prevention and health promotion legislation at federal and cantonal levels only concerns partial areas and is relatively vaguely formulated [64]. In 2012, an attempt to create a sound and consistent legal basis (i.e., federal law on prevention and health promotion) failed in parliament. Prevention was, and probably still is, considered an individual task rather than a top-down order to be followed.

As shown in Domain 2: Financing (Table 4), spending on prevention is low (2.2% of overall spending in 2019) and has been decreasing since 2010 (2.7%). The focus of the SHI lies in the financial coverage of medical treatments and not on preventive measures. Only a few exceptions are covered by the SHI, such as colon cancer screening after the age of 50 or gynaecological screening examinations (including Pap smears).

6.2 Resilience

In this section, we discuss the resilience of service delivery in the Swiss health care system with respect to health crises (e.g., pandemics), natural disasters (e.g., floods, avalanches) and accidents (e.g., train or air crashes). We discuss resilience before, during and after the shock.

Before (preparedness)

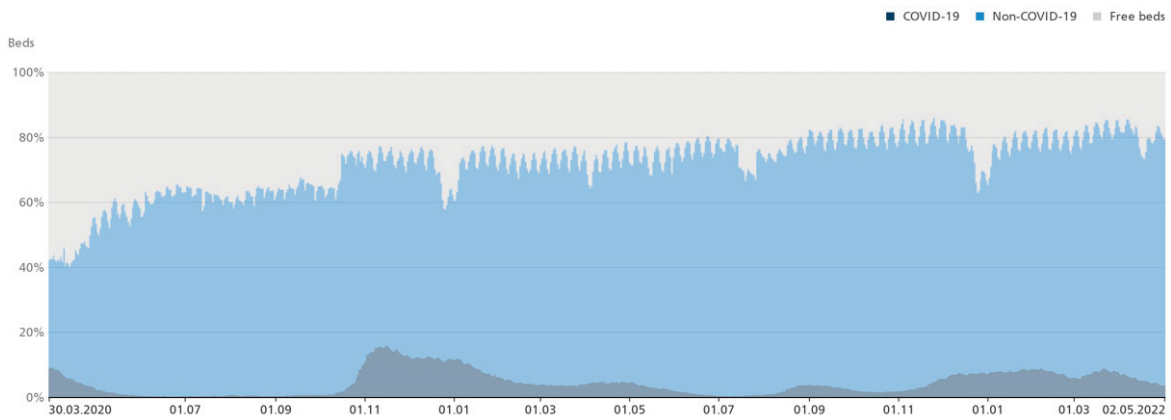
An adequate (or rather too high) number of acute care beds and ICUs guarantee a sufficient standard of care in pandemics and other health care crises. In Switzerland, the main limiting element during the COVID-19 pandemic was the lack of adequately trained ICU nurses (see Domain 3: Workforce). Conversely, the number of hospital beds was not a limiting factor.

The availability of specific resources is central to the management of any crisis. Ideally, preparedness also includes reserves for contingencies and regulates responsibilities and procedures in case new or additional resources need to be obtained during a crisis. Preparedness strategies and specifications, in turn, depend on the type and duration of a possible crisis. Ultimately, it is a matter of risk policy and weighing up the costs of precautions against the reduction in damage made possible by adequate precautions in the event of a crisis [15]. Here, we focus on hospital capacity overall and ICU capacity specifically.

In 2019, Switzerland's hospital capacity of 4.6 beds per 1000 people was slightly higher rate than the OECD average of 4.4, while the occupancy rate of curative (acute) care beds in the same year was 81.3%, clearly higher than the pre-COVID-19 OECD average of 76.2% [38]. During the first wave of the COVID-19 pandemic, the occupancy rate dropped to around 60% and only regained its former level of about 80% in autumn 2021 (see Figure 6).

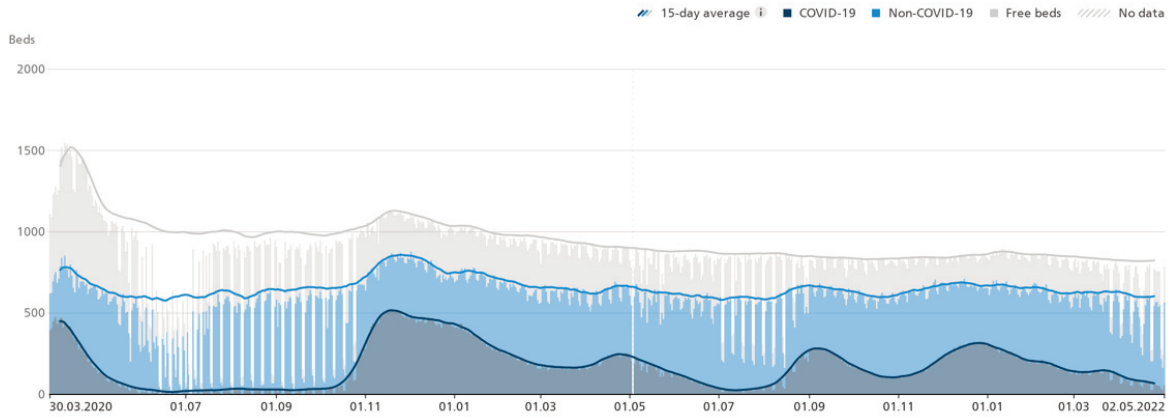
The ICU capacity during the COVID-19 pandemic proved to be critical but sufficient. As shown in Figure 7, ICU beds even decreased during the pandemic due to a shortage of trained ICU nurses [11] (see Domain 3: Workforce). Nevertheless, surveys and interviews reveal that pandemic-specific ICU care remained guaranteed at a high-quality level even though hospitals reached capacity limits several times. According to expert interviews, hospitals were never forced to (explicitly) triage patients in the ICU [19].

Figure 6: Development of total hospital capacity occupancy 30 March 2020 to 2 May 2022



Source: Federal Office of Public Health [65].

Figure 7: Development of beds in intensive care units (ICUs) 30 March 2020 to 2 May 2022



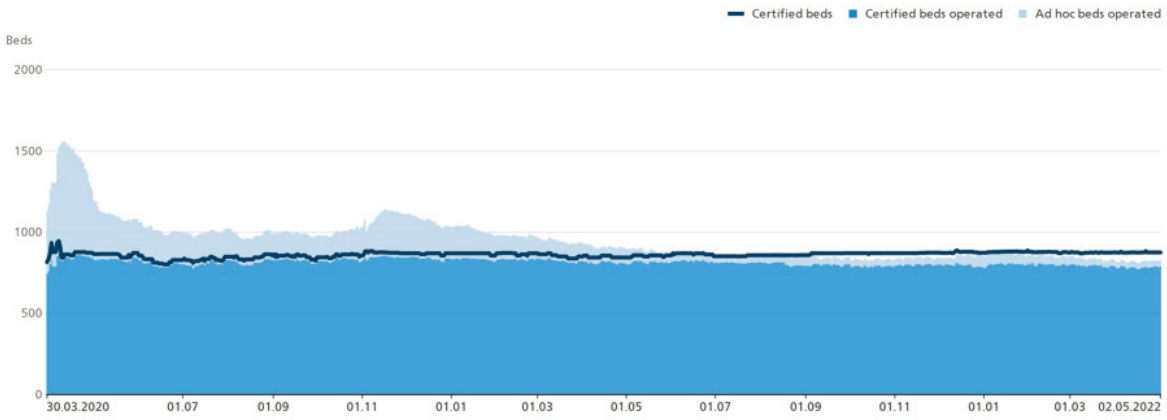
Source: Federal Office of Public Health [65].

During (response/absorption)

Additional workforce capacities can be created by shifting staff, training staff at their own hospital and deploying military and civil-defence staff to hospitals and care institutions [19]. The imposed restriction and deferral of elective procedures and treatments probably led to unnecessary cancellations of important operations and therapies. In ambulatory care, remote consultation and therapy was (temporarily) made more easily available. The fear of contamination also dissuaded many patients from visiting health care facilities. The decentralised Swiss approach allowed for the quick response of public-private partnerships (see Case Study 1: Role of public-private partnerships in a time of crisis).

One reason that ICU capacity overall was sufficient even in the most difficult times of the COVID-19 pandemic was the prompt creation of ad hoc beds (i.e., additional places for treatment outside of certified rooms where patients were cared for with the help of other specialist staff from areas such as anaesthesia). In some cantons, anaesthesia staff were shifted from hospitals working in elective care to central hospitals to maintain emergency and intensive care operations [19]. As Figure 8 shows, ICU capacity increased significantly in spring 2020 and winter 2020/21.

Figure 8: Development of certified and ad hoc beds intensive care units (ICUs) 30 March 2020 to 2 May 2022



Source: Federal Office of Public Health [65].

However, the number of free ICU beds varied greatly between cantons. Moreover, cantons that had reduced their ICU capacities had significantly fewer free ICU beds available in late summer 2021. Thus, analyses of ICU beds lead to the counterintuitive conclusion that ICUs in most cantons were less busy at the peak of the pandemic than during subsequent waves such as in late summer 2021 [11].

Only during the peaks of the pandemic in spring 2020 and winter 2020/21 did elective procedures and treatments have to be deferred. The criticism that standard care had been too severely restricted in spring 2020 was confirmed by in-depth analyses commissioned by the FOPH [19]. A report on behalf of the FOPH showed that the lack of flexibility in existing capacities in many regions led to unnecessary cancellations of important operations and therapies. It is likely that political decision-makers did not trust the health care facilities to independently decide about the cancellation of activities [19]. As a result, silent triage was probably a reality in many hospitals (i.e., hospitals had to make their own decisions regarding cancellations and prioritising care) [11].

In ambulatory care, remote consultation and therapy were (temporarily) made more easily available and supported by the FOPH during the lockdown in spring 2020 and in the second wave of the pandemic in autumn/winter 2020/21 using temporary billing solutions for remote video link or telephone consultations. FOPH's recommendations aimed to ensure uniform billing practices throughout Switzerland during the COVID-19 pandemic. These remote services had to involve direct and simultaneous verbal contact, i.e., video link or telephone. For example, in ambulatory psychiatric care, in the case of telephone therapy sessions between a doctor and a patient who was already undergoing therapy, time limits could be applied irrespective of the patient's age or need for treatment, analogous to the limits for psychiatric diagnosis and therapy in the doctor's practice, i.e., 75 minutes in an individual setting [66].

After (recovery, learning and adaptation/transformation)

The FOPH commissioned an evaluation of the planning, appropriateness and effectiveness of health care measures in the context of the COVID-19 pandemic (see Domain 1: Governance).

6.3 Recommendations

RECOMMENDATION 5A

Cantons should coordinate acute inpatient care capacity more intensively with other cantons and generally foster (or at least not circumvent) ongoing structural change in order to

- eliminate excess beds, thereby reducing incentives to overtreatment
- increase degree of specialisation (i.e., increase minimal number of cases), thereby improving outcome quality

RECOMMENDATION 5B

Create improved quality data through improved outcome measurement by service providers (i.e., defining standards and devising appropriate indicators), a structured collection of individual data (i.e., registers), and access to these data for all stakeholders, including the public, government, insurers and researchers. In this context, a more top-down approach should be considered (i.e., a national quality agency such as Nice in England or Zorginstituut Nederland).

RECOMMENDATION 5C

Improve coordination and communication between service providers in general, especially after hospital discharge, by

- improving solutions for information exchange between service providers
- reactivating missing interim care after hospital discharge

RECOMMENDATION 5D

Improve integrated care with the aim of improving the quality and cost-effectiveness of services across the care chain. The creation of **networks of service providers** representative of different links in the care chain is essential. In the context of Switzerland's SHI, both service providers and insurers must collaborate on this issue.

RECOMMENDATION 5E

Safeguard ICU capacity by

- analysing whether certified ICU capacity needs to be increased; if it does, define the level of adequate buffer (i.e., beds and trained workforce)
- determining a national approach for the coordination of ICU capacity in times of crisis
- clarifying the financing of buffer capacity for national use.

7. DOMAIN 6
Population health and social determinants

Population health has increased substantially in the last decades in Switzerland and is among the highest worldwide. Table 6 compares selected population health indicators with the UK and with Switzerland's three large neighbours – Germany, France and Italy. While life expectancy for women is similar to the high levels in France and Italy, life expectancy for men is above that of neighbouring countries and actually the highest worldwide. Infant mortality is in line with the other countries in the table. Perceived health status as reported in health surveys lies substantially above the levels of the other countries, with 81.2% of respondents reporting good or very good health. At 8 to 15 percentage points, the difference appears quite substantial.

Table 6: Selected population health indicators, 2019

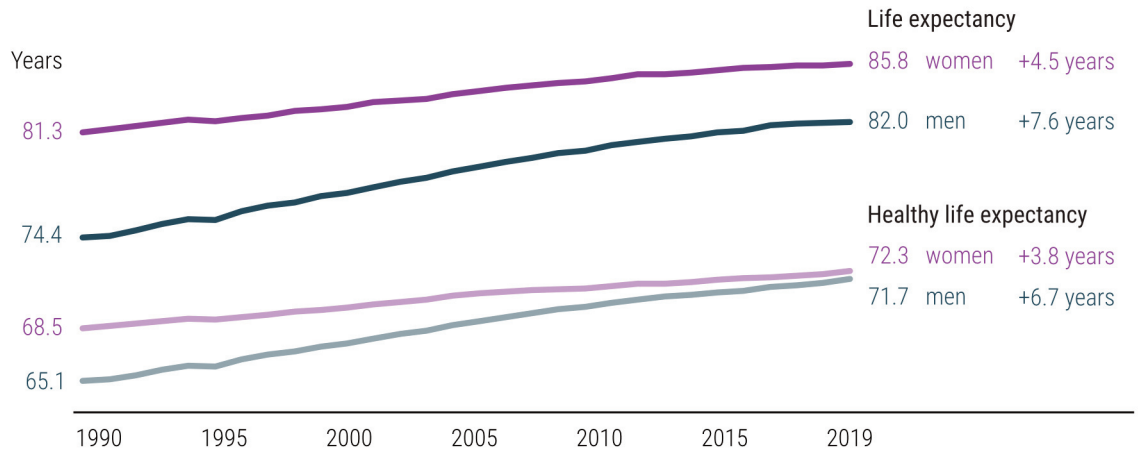
Selected population health indicators (2019)		Switzerland	Germany	France	Italy	UK
Life expectancy at birth (years)	women	85.8	83.7	85.9	85.7	83.3
	men	82.1	79.9	79.9	81.4	79.6
Infant mortality at birth (per 1000 live births)*		3.3	3.2	3.8	2.4	3.7
Good or very good self-reported health status, population aged 15+	overall	81.2%	65.6%	66.6%	72.8%	72.9%
	lowest income quintile	70.6%	49.4%	57.7%	70.5%	62.5%

* no minimum threshold of gestation period or birthweight.

Source: OECD Health Statistics 2021 [38].

Data from the Global Burden of Disease (GBD) study shows a substantial increase of population health in Switzerland from 1990 to 2019 with regard to life expectancy at birth and healthy life expectancy (see Figure 9) [67]. Life expectancy among men increased by 7.6 years over those 29 years, corresponding to more than three months gained per year. Despite starting from a substantially higher level of life expectancy in 1990, women gained an additional 4.5 years by 2019. Importantly, according to the GBD study, most of these life years gained were years of relatively good

Figure 9: Evolution for life expectancy and healthy life expectancy by sex, 1990–2019



Source: Global Burden of Disease Study 2019 [67].

health. Healthy life expectancy calculated by the GBD study is based on its estimation of disability adjusted life years (DALYs) for Switzerland, which takes account of the evolution of disease prevalence and severity over time. The gain in healthy life years is estimated at 6.7 years for men and 3.8 years for women, meaning that about 85% of life years gained correspond to years in full health.

The GBD study estimates a 30% reduction of the age-adjusted overall DALYs disease burden between 1990 and 2019. The reduction of the disease burden was mainly due to a substantial decrease in the burden of cardiovascular diseases, injuries and, to a certain degree, cancers.

Figure 10 illustrates the ranking of the top 10 causes of death and of years of life lost in 2009 and 2019 by major disease groups, according to the GBD study. These 10 major disease groups included 97% of deaths and 94% of years of life lost in 2019. Cardiovascular diseases (in particular, ischaemic heart disease and stroke) and cancers dominated both deaths and years of life lost. While cardiovascular diseases ranked first as cause of death, cancer ranked first as cause of years of life lost, as cancers cause more deaths at younger ages. Furthermore, the relative burden of cardiovascular diseases decreased from 2009 to 2019, while the relative burden of cancers increased.

Figure 10: Top 10 causes of death and years of life lost by share of overall total, 2009 and 2019

TOP 10 CAUSES OF DEATH			TOP 10 CAUSES OF YEARS OF LIFE LOST		
	2009	2019	2009	2019	
Cardiovascular disease	36%	34%	35%	36%	Neoplasms (cancer)
Neoplasms (cancer)	28%	29%	27%	26%	Cardiovascular disease
Neurological disorders	9%	10%	6%	7%	Neurological disorders
Diabetes and kidney disease	5%	5%	5%	4%	Self-harm and interpersonal violence
Digestive disease	4%	4%	5%	4%	Digestive disease
Chronic respiratory disease	4%	4%	4%	4%	Chronic respiratory disease
Accidental injury	3%	4%	4%	4%	Diabetes and kidney disease
Respiratory infections and tuberculosis	3%	3%	3%	4%	Accidental injury
Self-harm and interpersonal violence	2%	2%	3%	3%	Other non-communicable diseases
Other non-communicable diseases	1%	1%	2%	2%	Respiratory infections and tuberculosis

Source: Global Burden of Disease Study 2019 [67].

Health status differs by socioeconomic status as illustrated by the substantially lower number of individuals reporting good or very good health status in the lowest income quintile (see Table 6). A recent study also found that the previously described contemporaneous expansion of life expectancy and healthy life expectancy does not apply to people with compulsory education only, with a flat instead of increasing trend in healthy life expectancy [68].

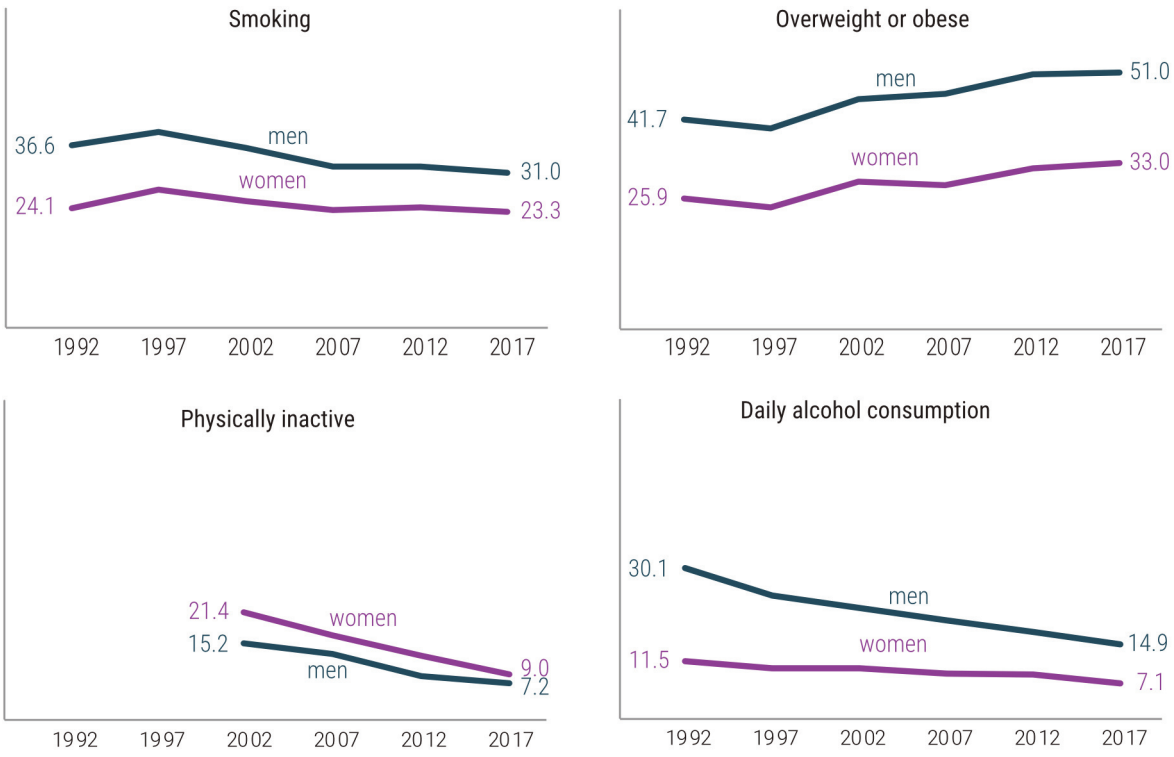
Beyond studies such as the GBD, Switzerland is severely lacking in population health data. Reliable diagnostic information is available only for patients with hospital inpatient treatment, and completely lacking for patients treated in ambulatory settings or nursing homes. The evolution of the prevalence of many important diseases such as dementia, low back pain and osteoarthritis is therefore largely unknown and has to be approximated with data from other countries. Furthermore, the full potential of the few available high quality health statistics cannot be fully exploited due to the administrative and technical difficulties of data linkage. A linkage of the causes of death statistic with the hospital inpatient treatment statistic would, for example, allow for an assessment of whether the introduction of new treatments increases patient survival. Switzerland also lacks the large-scale population cohort and biobank essential for high-quality research on the effects of genetic, behavioural, environmental and social risk factors.

This lack of population health data is a severe limitation for health care research, health monitoring and health care policy in Switzerland. In the context of COVID-19, this means that the epidemiology, progression and treatment of "long COVID" remain largely unknown and that policies aimed at improving outcomes and the efficiency of treatments operate largely in the dark.

7.2 Health behaviour

The evolution of health behaviours with major health impact paints a mixed picture, as Figure 11 shows. While alcohol consumption and physical inactivity have substantially decreased in the last decades, smoking rates remain consistently high. Moreover, excessive body weight (mostly due to unhealthy diets) has increased, with one in three women and one in two men overweight or obese in 2017. Thus, there is great potential for harm reduction by the promotion and adoption of healthier behaviours. The GBD study estimates that 34.6% of DALYs lost in Switzerland in 2019 are attributable to preventable risk factors [67].

Figure 11: Self-reported health behaviour in population aged 15+ years



Source: Swiss Health Surveys (FSO) [71].

Relatively high levels of vaccine scepticism were an important challenge in the second year of the COVID-19 pandemic. With only 70% of the population fully vaccinated at the end of 2021 [69], vaccination rates never reached the high levels of other European countries.

A recent survey on health literacy reveals that 49% of the population struggles to understand health information and how to navigate the health care system [70]. Health literacy is particularly low among individuals with poor knowledge of the local language and with lower socioeconomic status. Their difficulties are likely to increase with the increasing digitalisation of access to health care services [70]. The most efficient strategy to reduce the adverse consequences of insufficient health literacy is more adequate communication by service providers. Better access to translation services, which are currently not covered by SHI, may be particularly important in this regard.

7.3 Recommendations

RECOMMENDATION 6A

Strengthen efforts for the reduction of major preventable risk factors, such as smoking and unhealthy diets. The promotion of all tobacco products should be banned. Tobacco taxation should be extended to all dependency-inducing tobacco products. The option of a further increase of tobacco taxation should be evaluated.

RECOMMENDATION 6B

Build a comprehensive epidemiological information base on the status and evolution of population health. This should include the systematic coding of major diseases in ambulatory care and the establishment of a large-scale cohort representative of the overall population.

RECOMMENDATION 6C

Facilitate better navigation and understanding of the health care system among individuals with lower health literacy. These efforts should focus on more adequate communication strategies by service providers and ensuring that SHI covers the cost of access to translation services.

8. DOMAIN 7
Environmental sustainability

8.1 Health care system environmental impact

In Switzerland, the health care sector makes a significant contribution to climate change through the emission of harmful greenhouse gases, which accounted for 6.7% of total emissions in 2014. In a recent report, the Swiss health care sector yielded the highest value of all 43 countries examined, apart from the US [72]. It should be noted that this comparison is significantly correlated with the size of the health care system and the level of GDP and can only make a limited statement on the carbon-related efficiency of services in the Swiss system [73]. Carbon dioxide accounts for around 80% of emissions, while methane and nitrous oxide account for around 10%. The amount emitted by the health care system is around one tonne/CO_2 per capita. This is more than double the amount emitted by countries that spend about the same proportion of GDP on health care, such as France and Sweden [72]. This comparison shows the potential to increase the efficiency of the Swiss health care system with respect to carbon emissions.

Only approximately 10% of estimated overall greenhouse gas emissions come directly from health care facilities or indirectly through energy consumption for electricity or heating (5%). The largest share is attributed to the health care supply chain, though the production, transportation and disposal of goods and services such as drugs, food, medical devices, hospital equipment and instruments (85%). This value is the second highest estimate of all compared countries and suggests that these high greenhouse gas emissions are mainly due to high material use.

Within the framework of a national research programme [74], scientific findings are currently being compiled on the efficient use of natural resources in Swiss hospitals. According to initial findings [75], one quarter of the ecological footprint comes from cooling and heating measures and a further quarter from medicines and medical products. Other factors include catering (15–20%), construction and infrastructure (15%), equipment and energy (15%) and waste and wastewater (5%). Due to the wide variation in the environmental impacts of different hospitals, there is substantial potential for improvement through the construction of energy-efficient buildings. The environmental footprint could be further reduced through fewer unnecessary interventions and the reduction of unnecessary pharmaceutical and food waste. The production of drugs has been shown to be the main contributor to greenhouse gas emissions [76].

At both federal and canton government levels, Switzerland lacks systematic data collection and monitoring of emissions from health care facilities. The statutory Air Pollution Control Ordinance, which regulates the emission of environmentally harmful substances, is an example of Swiss environmental protection policy that also, but not specifically, affects health care institutions [77]. An implementation guide has been created specifically for the health care sector for the environmentally sound disposal of medical waste and hazardous waste in particular [78].

Due to the flat-rate reimbursement of services in the inpatient sector, hospitals have an incentive to keep the costs of inputs, such as electricity, low. Since the use of facilities and buildings is also subject to flat-rate financing, hospitals also have the incentive to invest as sustainably and efficiently as possible.

In addition, there are numerous initiatives at the hospital level aimed at minimising ecological footprint. These include the placement of green bonds [79], the recycling of surgical instruments [80], the low-waste processing of pre-cooked and nitrogen vacuum-packed food using the MicroPast process [81], the elimination of the anaesthetic gas desflurane [82] and the efficient processing of medical devices [83].

8.2 Environmental risks to health

Switzerland, like most countries, is affected by the environmental changes caused by climate change and other factors. These have an impact on health both directly, such as in the form of higher temperatures, and indirectly, such as through shifts in biodiversity.

The more favourable climate for various insects can, for example, lead to higher risk of the spread of vector-borne infectious diseases such as chikungunya or dengue fever. The invasive occurrence of alien plants, also supported by the increasing mobility of people [84], leads to an increase in the risk of allergic reactions [85]. The federal government has responded to this risk with a decree for combating invasive plants.

Switzerland has a high proportion of older and multimorbid people, which may be interpreted as the result of a high-quality health care system. However, these groups are also characterised by high vulnerability to climate change-induced occurrences such as more frequent heat waves. During the heat wave of 2003, for instance, an additional mortality rate of 7% was estimated from June to August [86]. Various cantons have since implemented early-warning systems [84].

In addition, Switzerland's topographical conditions, with many settlements in mountainous areas, poses a higher risk of extreme environmental events such as floods, debris flows and landslides. The greater risk of these events is caused, among other things, by the thawing of permafrost due to climate change.

The Federal Council has included the influence of environmental factors on health as one of eight goals in the *Health Strategy 2030*, which serves as the basis for health policy measures over the next ten years [87]. In addition to a reduction in health-related risks, this includes the preservation and promotion of nature and landscape qualities in the spirit of health promotion. The cantons, responsible for the implementation of the health care system, recognise the influence of the environment on health [88], but have yet to comprehensively anchor these principles in policies. The Federal Council has drawn up an action plan focusing on the effects of climate change, including its health impacts. The plan identifies the need for action with regard to the threat of increased heat, poor air quality and the spread of harmful organisms, diseases and alien species [89].

In addition to government actions, civil society movements, such as Climate Seniors, have filed a lawsuit against the Federal Council due to the health impacts of climate change [90].

8.3 Recommendations

RECOMMENDATION 7A

Achieve greater awareness of the carbon footprint of the health care sector through the **systematic collection and monitoring of data of the greenhouse gas emissions caused by health care institutions.**

RECOMMENDATION 7B

Implement policies encouraging the efficient use of resources in health care, including the use of financial incentives.

9. CASE STUDY 1

Role of public-private partnerships in a time of crisis

Context

Due to the governing principle of federalism, the Swiss health system is highly decentralised. Under the governing principle of subsidiarity, nothing that can be done at a lower political level should be done at a higher level. Hence, public actors on lower state levels bear significant responsibilities.

The vast majority of service providers are either privately or publicly owned companies. They need to be business-minded in sectors with managed competition, such as the health care system.

In Switzerland, both public and private actors identify strongly with their own region, which is often identical with the canton. Additionally, being a small country, an informal exchange in existing personal networks helps in the coordination of care, the deployment of information and best practice.

These ingredients are the basis for good cooperation between private and public actors. In times of crisis, where the way forward is unclear, local approaches can ensure creativity, flexibility and responsibility for implementation.

Goal

This case study examines how an entrepreneurial service delivery combined with decentralised governance allows for innovation, flexibility and, therefore, immediate response to shocks. It shows that public-private partnerships with shared responsibilities between the state and market-oriented service providers are an effective setup to secure service provision in health care, both in normal times and especially in times of crisis, such as the COVID-19 pandemic.

Relevant Domains

Domain 1: Governance

Domain 5: Service delivery

The Case

Examples from the COVID-19 pandemic which illustrate the effectiveness of public-private partnerships:

Coordination of inpatient care: In the first wave (spring 2020), the national government prohibited elective treatments in order to secure inpatient care for critical COVID cases. However, this rigid approach led to high revenue losses for hospitals. To avoid another harsh intervention by the state and, at the same time, to secure the provision of inpatient care in the region of Zurich (whole canton and adjacent areas with hospitals), both public- and privately-owned hospitals agreed to coordinate inpatient capacity (with a focus on ICU) in future times of shortage. They agreed on the officially reported number of patients as key for the distribution of COVID cases. During the second wave (winter 20/21), this agreement successfully came into practice. Twice daily, hospitals coordinated patients via videocall. The health department of the canton and the ambulance service took part in these videocalls but did not take a leading role; rather, they supported where needed and had the power to impose individual sanctions.

Logistics: In the areas most relevant to cantons, such as testing, contact tracing and vaccination, the cantons cooperated intensively with private partners. When new infrastructure had to be created, most cantons contracted private companies for joint task fulfilment or for the purpose of outsourcing the task area [11]. For example, a municipality with a population of 36,000 requested logistic support from the organiser of Zurich's Street Parade (which for obvious reasons did not take place at that time) to set up and run a vaccination unit. Gradually, at the request of the canton, other tasks were added. The organiser's team set up the vaccination village in Zurich's main railway

station and a vaccination pop-up in a shopping centre, and was on the road with the vaccination bus that toured the canton of Zurich.

Epidemiological and social surveillance: The Swiss School of Public Health (SSPH+), which assembles the inter-university faculty of public health sciences affiliated with twelve Swiss universities, initiated "Corona Immunitas". This public-private funded initiative examines how many people have become infected with the novel Corona virus SARS-CoV-2 and to what extent a past infection protects against re-infection (see study protocol by West, et al. [91]). Another public-private initiative is the "COVID-19 Social Monitor" run by the ZHAW Zurich University of Applied Sciences and the University of Zurich (financially supported by the Swiss Federal Office of Public Health (FOPH) and Health Promotion Switzerland) which, since the beginning of the pandemic, has been collecting data on an ongoing basis on wellbeing, physical and mental health, health related behaviour and the employment situation of the country's population (https://covid19.ctu.unibe.ch), [92, 93].

Analysis

These examples show a wide range of circumstances in which public-private partnerships foster innovative approaches that are developed quickly and flexibly and the mobilisation of additional resources in times of crisis. These approaches are often initiated by the state, but private actors frequently take the first step. In Switzerland, many private service providers feel a responsibility to participate in securing service provision even though it is not part of their mandate. However, unfortunately, some private service providers display exaggerated business-mindedness, even in times of crisis. This can lead to excess capacity, excessive prices or even (although rarely) insufficient quality.

Thus, the involvement of the state (at national, cantonal or municipal levels, depending on the task) is necessary. The state can facilitate by financing services, overseeing the process, or even taking the initiating role. It is usual for the state to take a guardianship role, and to intervene where necessary. However, the participation of the state is, in itself, usually sufficient to ensure appropriate behaviour from all actors involved.

It is challenging for responsible state actors to find the right balance between trust and intervention, and few best practice examples exist to provide guidance. Opportunities which arise to build partnerships should be used to create common ground and mutual trust, and experience with managing these relationships will grow over time.

Lessons/recommendations

- Build on the skills and resources of private service providers and other private actors, such as experts or key interest groups. They should be encouraged and supported as much as possible in normal times so that public-private partnerships are established once bigger challenges arise in times of crisis.
- Start an open debate with the bigger private service providers and provider associations to better understand their perceptions of their responsibilities to the secure provision of services. Their business models should be balanced with active roles in securing service provision, especially in an SHI environment.

Limitations

Switzerland's experience with public-private partnerships during the pandemic is context specific. Extrapolation to other countries with an NHS or otherwise centralised health system setup may not be straightforward.

10. CASE STUDY 2

Direct democracy as a means of de-radicalisation in a time of crisis

Context

The COVID-19 pandemic forced governments worldwide to take effective measures to contain contagion. Democracies faced the additional dilemma of balancing the interests of different fundamental rights – the protection of life and health, on the one hand, and the protection of individual liberties, on the other. Quick action was also required, which put democratic procedures under (time) pressure [94].

Switzerland is a very consensus-oriented nation. Probably its most sophisticated form, direct democracy, gives Swiss citizens and various interest groups a platform for intervention and decision-making at all three state levels.

Goal

This case study examines how much direct democracy is possible in times of crisis, and whether it may even be a means of de-radicalisation.

Relevant Domains

Domain 1: Governance

The Case

The COVID-19 pandemic challenged Switzerland's democracy as a whole:

1. National parliament "dissolved" itself (i.e., interruption for an indefinite period of the current parliamentary session) on 15 March 2020, one day before the first lockdown started.
2. Some days later, the Federal Council (national government) decided not to hold the federal referendum that had been ordered for 17 May 2020.
3. The Federal Council acted on the basis of emergency legislation

After this difficult start, the processes of direct democracy regained power. Coalitions of sceptics (COVID-19 sceptics and opponents of the pandemic measures) were formed, such as the Die Freunde der Verfassung (Friends of the Constitution) and the Freiheitstrychler (Cowbell Ringers for Freedom). By organising demonstrations, they soon found an audience and gained media attention. With professional offices and the help of motivated supporters, they became successful fundraisers. Die Freunde der Verfassung, in particular, played an important role during the COVID-19 pandemic. Founded in July 2020, it gained over 25,000 members and orchestrated resistance to Switzerland's official COVID-19 policy. On two occasions, it successfully collected the necessary number of certified signatures (50,000) in a very short period of time to hold a referendum against COVID-19 legislation. Consequently, Switzerland's citizens were called to the polls and demonstrated their clear support for the intensely debated national COVID-19 law in two referenda, in June and November 2021. Die Freunde der Verfassung then made headlines with regard to internal disputes. Due to major differences over content, the entire board of the association resigned in January 2022. This is not the only sceptic group to have disbanded. Other protest organisations have also split or disappeared without a trace.

Political analysts conclude that democracy, and direct democracy in particular, have not suffered. "The direct democratic institutions were able to demonstrate one of their most important functions in the Swiss political system in the Covid [sic] crisis as well: the integration of the opposition. In fact, a classic argument in Swiss political science according to Kriesi and Wisler (1996) is that direct democratic institutions in this country contribute to the de-radicalisation of protest movements" [94, translation ZHAW]. Overall, the politicisation of the population took place, and the crisis mobilised voters, resulting in the legitimisation of government actions and the diffusion of conflicts, which ultimately fizzled out [95].

Analysis

Switzerland was the only country in the world where the population had the opportunity to vote on COVID-19 legislation [94]. One might assume that the case of Switzerland is too specific and that no general insights can be drawn. Or, as ambassador Dahinden [96] pointed out in a speech, "Swiss direct democracy is not an export product. It has developed incrementally and is linked to specific historical experiences and lessons learned. But learning from the Swiss experience by dialogue can be useful to others." He believes that integrating citizens into the decision-making process is important and that there are many forms and instruments to do that. So, what might such forms and instruments be?

Demonstrations in public places are perhaps the most basic form of citizen involvement in discussions. In times of crisis, this form should be encouraged rather than restricted; in a pandemic, however, this form is, for obvious reasons, not ideal.

Government officials and politicians could and should take part in panel discussions. The opinions, frustrations and fears of citizens need an audience. If deemed necessary, an official response may help, even in moments of uncertainty.

In addition, in representative democracies, consultative referenda can be an adequate form of integrating the opposition. These need not to be at the national level or linked to fundamental questions regarding the country's future direction in general (such as Brexit). Rather, a formal response by voters on questions with a regional or local focus might be worthwhile, especially in times of crisis.

Lessons/recommendations

- Be vigilant for possibilities to involve citizens in dialogue and in the search for applied solutions, especially at regional and local levels.
- Regarding direct democratic instruments, question the claim that only the national level counts. Consultative referenda as a means of de-radicalisation may be more appropriate at regional or local levels.

Limitations

The constructive use of direct democratic instruments is complex and requires practice in order to generate constructive debate. However, with experience, this approach can generate useful results.

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