Ensuring the long-term sustainability of the Danish health-care system

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Laura X. Duffany

Denmark has one of the most comprehensive and well-funded public health-care systems in the world; however, internal communication issues, shortages of health-care professionals, and an emerging private sector threaten the long-term sustainability of the system. This article analyzes the current organizational structure, economic model, and patient demographics of the Danish universal health-care system and proposes a new, integrative model that efficiently prioritizes the quality of patient care.

Introduction

Fostering trustful collaboration in public health will make the world a safer and healthier place. The Danish universal health-care system is an excellent demonstration of this mentality, as all citizens have been entitled to publicly financed care since 1973 (Ministry of Health, 2017). Under this system, 84% of the country's health-care expenditure is publicly financed, while the remaining 16% is attributed to patient copayments (Tikkanen et al., 2020). The Danish health-care hierarchy is organized such that each level of the public system, whether municipal, regional, or national, focuses on its own internal tasks and resources. This separation leads to each level overlooking the bigger picture, thus jeopardizing the system's long-term sustainability. Because of Denmark's commitment to modern and equal access to health care (Ministry of Health, 2017), the Danish system sets a global standard for medical treatment; however, integrative refinements to the country's current education and staffing policies for physicians are necessary for Denmark to improve working conditions for health-care professionals and increase the efficiency of the public system overall.

Current economics

One of the unique aspects of Danish public health is the coordinated division of finances between the three levels of its hierarchy (national, regional, and municipal/local). Regional funding bridges the national and municipal levels of health care, as each of the five regions receives an annual national block grant as well as activity-based subsidies from the 98 municipalities (Tikkanen et al., 2020). Every year, the municipality subsidies are obliged by the Ministry of Health (MOH) to meet the regional budgets within a 1.5% margin (Schmidt et al., 2019), and their amounts vary depending on hospital activity in each region. Thus, the economics of the Danish health-care system are systemically linked: local patient groups and individual characteristics, including diagnoses, treatments, and demographics, affect the amount of national funding received for each region.

Given the efficient financial linkage between the health-care hierarchy, Denmark's gross public spending in health has consistently been comparable to that of the EU. For example, in 2019, the EU average of gross public spending in health care was 75%, while Denmark fared well at 83% (OECD, 2021). Therefore, prospective financial improvements for the Danish health-care system should focus on efficiently allocating resources within the public sector to sustain a happy and healthy workforce. Over the past decade, a rocky dynamic has developed between the public and private sectors of health care as public institutions lose their staff to higher-paying opportunities in private hospitals (Pederson, 2022). This loss of workers in the public sector has led to higher demand for private care and the corresponding insurance to cover it, threatening the overall financial health and sustainability of the public system.

Under the public insurance system, Danes are offered a choice between Group 1 or Group 2 health-care coverage. For a one-time fee of 215 Danish kroner (approximately $31), citizens can switch groups, provided they have had at least one year of enrollment in their current plan (City of Copenhagen, 2023). Group 1, chosen by 98% of the population, assigns a general practitioner (GP) to the patient and minimizes out-of-pocket copayments (Tikkanen et al., 2020). Meanwhile, Group 2 coverage, chosen by the remaining 2% of Danes, allows Danes the freedom to choose their own GP, although high copayments apply (International Student Insurance, 2023).

Regardless of which group option is chosen, access to hospitals and almost all forms of specialized care are granted only upon referral by GPs (Healthcare DENMARK, 2023). While the public system covers GP visits, hospital care (including inpatient prescription drugs), mental health services, and dentistry for children under age 18, private insurance is necessary for coverage of pharmaceutical drugs at the municipal level as well as adult dental care (Schmidt et al., 2019).

Enrollment in private voluntary health insurance (VHI) coverage has sparked political debate because of the potential for private corporations to introduce unequal access to care (Olejaz et al., 2012). Nevertheless, approximately 40% of Danes in 2012 carried additional insurance in 2012 to help cover medications and specialized or private care not paid for by their public insurance group (Olejaz et al., 2012). This growth in the private sector has occurred alongside declining conditions of the public system. An article in the local Copenhagen newspaper *Berlingske* reported that approximately 10% of the hospital beds in each of the three major hospitals of the Greater Copenhagen region[1] has been lost due to staff shortages over the past decade (Pederson, 2022). Pedersen went on to explain the situation by noting a staffing competition between the public and private sectors of health care, where qualified nurses in the public system were recruited for higher-paying jobs in the private sector. Evidently, better allocation of funds within the public health-care sector is necessary to mediate the competition from private institutions and sustain its current workforce.

Organizational structure

While the economics of the public system are systemically linked, internal organizational issues have prevented coordination between the three administrative levels of public Danish health care. Figure 1 shows these administrative levels, beginning with the MOH as the overarching administrative entity at the national level. The MOH is composed of six branches that are separately responsible for creating annual legislation within their respective areas (Healthcare DENMARK, 2023). Below the MOH, regional care is provided in the five geographic regions of Denmark, each with elected councils that coordinate the operations of general and specialized health-care services. In this way, each region owns, manages, and finances their own health-care facilities. At the local level, each of the 98 municipalities is responsible for disease prevention and health promotion through outpatient rehabilitation services, home care, health education services, dental treatment, and services for elderly people (Tikkanen et al., 2020). Coordination issues between the three levels of the health-care hierarchy overburden GPs at the regional level and compromise patient quality of care at the local level. Therefore, it is imperative that public collaboration between local, regional, and national health workers takes place to increase workplace efficiency and complement the previously discussed efforts to properly allocate public funds and ensure the long-term success of the system.

National administration

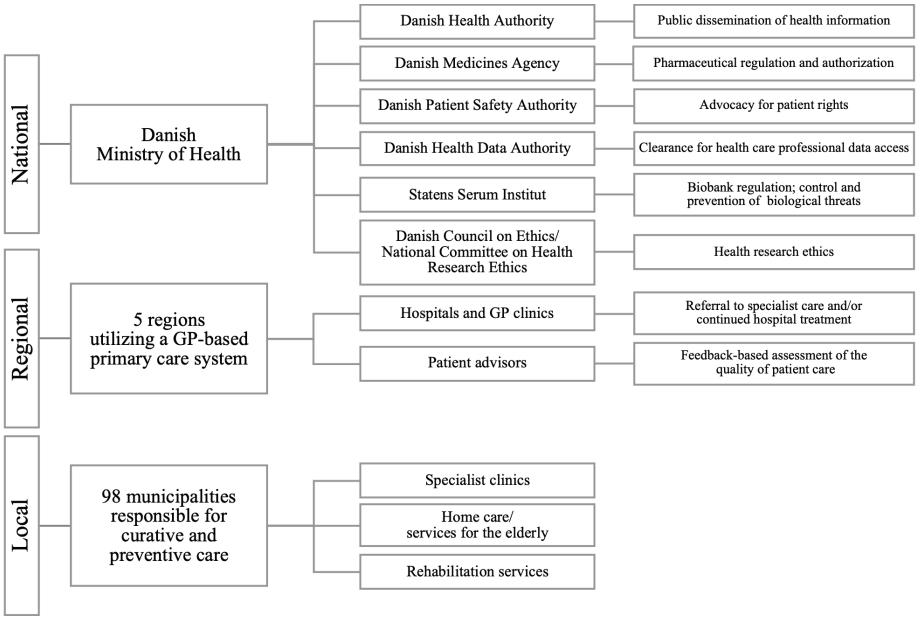
The MOH was not established as a governmental body until 2015. Since then, it has become a comprehensive source of information for the country's public health, with online informative reports[2] of the qualitative and quantitative considerations for passing annual legislation (Ministry of Health, 2017). Healthcare DENMARK (2023) is a gateway organization that coordinates international networking in the health-care and life sciences industries; its website is linked to the MOH site, reflecting the Danish commitment to transparency and global networking in health care. These administrative bodies collectively provide a summary of national goals, emphasizing the importance of safety, collaboration, and equality, while also providing citizens with updates on how the country is taking actionable steps to advance these principles.

There are six separate branches of the MOH that work on health-care legislation within specific sectors (see Fig. 1). The Health Authority is responsible for dissemination of public health information, while the Medicines Agency is responsible for managing pharmaceutical companies through the process of selling medicine in Denmark, clinical trials and medical device authorization included. The Patient Safety Authority advocates for patients' rights by implementing laws for the prevention of malpractice, while the Health Data Authority provides access to health data for professionals and administrators at both the regional and municipal levels. The Statens Serum Institut includes the country's biobank and is responsible for the surveillance, prevention, and control of infectious diseases, congenital disorders, and biological threats. The sixth branch of the MOH

[1]The three major hospitals mentioned in the article are Rigshospitalet, Bispebjerg, and Herlev-Gentofte.

[2]The collection from 2021 includes a report outlining the assessment by the Integrated Regulatory Review Service of the Danish nuclear safety and security that year, a report highlighting the country's promotion of personalized medicine, an agreement on the strategy for life science, and an informational packet for the proposed "super hospital programme."

Figure 1
Danish health-care hierarchy, respective branches, and main duties



Source: Healthcare DENMARK, 2023.

combines the Council on Ethics and the National Committee on Health Research Ethics; these agencies collaborate on ethical issues in health research, serving as an advisory board for parliament as well as a board of appeal for regional levels of health care. While the subdivisions of the MOH are relevant to each other, there is little overlapping of the agencies' operations.

A structural reform in 2007 introduced the fragmentation of Denmark's health-care system by centralizing the geographical and administrative units across the country. The number of Danish regions was reduced from 13 to 5 and the number of municipalities decreased from 271 to 98 (Ministry of the Interior and Housing, 2023). In the health-care sector, these changes were accompanied by a reduction from 40 public hospitals in 82 locations in 2007 to 21 public hospitals in 68 locations in 2016 (Christiansen & Vrangbæk, 2018). While centralization of the workforce was introduced as a solution for the geographic fragmentation, this shift created new challenges for Danish patients, including the increased distance travelled for care. With fewer public hospitals in operation, private hospitals were constructed to compensate, and the incentive increased for Danes to purchase VHI for coverage at these locations.

The negative impacts of the divided Danish health-care system are coupled with inefficient utilization of collected patient data by the Health Data Authority (Schmidt et al., 2019). Denmark has employed a unique personal identification system since 1968 that links each Dane to health-care, banking, and real estate records through a personal registration number (Sørensen et al., 2016). This setup is a good starting point to reflect on the systemic cooperation of the Danish health-care hierarchy because it reveals information regarding the Danish social determinants of health (i.e., socioeconomic status). However, there are blind spots in the system that compromise the quality of patient care received at every level. For example, the National Patient Registry does not capture previous GP diagnoses unless a patient has been referred to a hospital for treatment (Schmidt et al., 2019). In some cases, previous patient diseases might be identified only by prescription data or laboratory results, slowing down the process for referral to proper specialists. Optimized use of information collected by the Health Data Authority is necessary to streamline patient care throughout levels of the hierarchy and maximize workforce efficiency, discussed later as part of the concluding integrated proposal.

Regional health care

Regional Danish health care includes the primary care system throughout the five regions of the country. Under this model, GPs handle 90% of all medical cases and serve as patients' primary connection to the municipal (local) level of the health-care system through referrals to hospitals, psychiatric services, and specialized clinics as needed (Healthcare DENMARK, 2023). After referral, GPs are notified

through the national database about their patients' health-care journey, including any hospitalization events as well as their interactions with municipal specialists (Forde et al., 2017). Given GPs' comprehensive knowledge of their patients' lives, primary care specialists are essential to the Danish holistic approach to medical treatment. However, this system of heavy reliance on GPs leads to overwhelming caseloads for these practitioners and compromises the overall quality of patient care.

Regional patient advisors protect patient legal rights, guiding Danes through any diagnosis, treatment, choice of hospital, access to treatment abroad, or complaint submissions (Healthcare DENMARK, 2023). They work closely with national officials in the Patient Safety Authority and thus are essential to the systemic efficiency of Danish public health care. However, recent patient complaints reveal that communication between levels of the Danish health-care hierarchy is lacking. A 2022 study utilized the Healthcare Complaints Analysis Tool to analyze a national sample of Danish compensation claims about emergency care, ultimately revealing that the patients experienced unacceptably long delays between receiving care by general practitioners and seeing a specialist (Morsø et al., 2022). As one patient explained,

> I was hit by a truck in high speed and my car suffered total damage. Shortly after the accident I was admitted to the hospital. A very superficial examination was performed and despite a swollen foot and leg and pain in my back and neck no further examinations were done…four months later I was told that I had a complicated fracture in my ankle and the doctor apologized that they hadn't found out earlier…I now have a permanent foot drop (Morsø et al., 2022, p. 274).

It is evident that the Danish health-care system requires reforms to expedite the referrals of severe cases and reduce the waiting time for diagnosis; these adaptations will ensure that quality of care is not compromised by preventable systemic delays. Specific suggestions for improving patient care are discussed as part of the proposal at the end of this article.

Local (municipal) clinics

Health care at the municipal level includes home care (i.e., nursing and rehabilitation services) accessible within all 98 municipalities of Denmark free of charge and without prescription by a doctor (Healthcare DENMARK, 2023). Professional recommendations for these municipality providers are issued by the national Health Authority for specific patient groups and health-care providers. In this way, municipal health care is a convergence point for all three sectors of Danish medicine. Regional GPs provide referrals to municipality (local) specialists, who follow national guidelines. Patients may provide feedback about their care to their regional patient advisor along the way; this information then flows upward to the national level, playing a role in the making of future health-care legislation. In theory, this is a healthy cycle, conducive to consistent and systemic forward thinking; however, the practical impacts of demographic inequalities for both physicians and patients in Denmark inhibit workforce collaboration and compromise the overall quality of patient care.

Demographic issues

Prominent demographic issues shed light on the social disparities that have an impact on the Danish health-care system. Denmark's aging population, physician shortage, and competition by the private sector jeopardize the sustainability of the public system. All these factors considered alongside the extended waiting time for patients between GP referral and specialist diagnosis point to the need for improvement at each level of the health-care hierarchy to optimize workforce collaboration and ensure proper allocation of resources.

Aging population

The Danish population has been trending older since the beginning of the twentieth century. The median age is 42, and 20% of Denmark's population is above the age of 65 (Statistics Denmark, 2022; World Bank, 2022). Danish statistics from 2018 show that hospital utilization steeply increases for individuals above the 45- to 49-year-old age group, with the highest number of hospitalizations occurring for individuals in the 70- to 74-year-old age group (Fig. 2). A study by Oksuzyan et al. (2020) showed a 42% increase in the projected total number of hospital days per year between 2013 and 2050, from 4.66 to 6.72 million days, with the largest change projected to occur for population groups aged 70 years and above. With fewer young adults contributing taxes to the system, there is less financing available for public services, including health care. With the aging population, it is notable that in 2015, 30% of all GPs were at least 60 years old and almost 60% at least 50 years old, so there are additional concerns for sustainability of the physician workforce, which affects the overall health-care system and patient quality of care. An increased volume of geriatric cases is associated with chronic disease and multimorbidity (Forde et al., 2017), underscoring the necessity for adjustments

in health-care organization so that elderly people can get the high-quality care they need without overburdening an already overworked and underfunded system.

Physician burnout and competition within the private sector

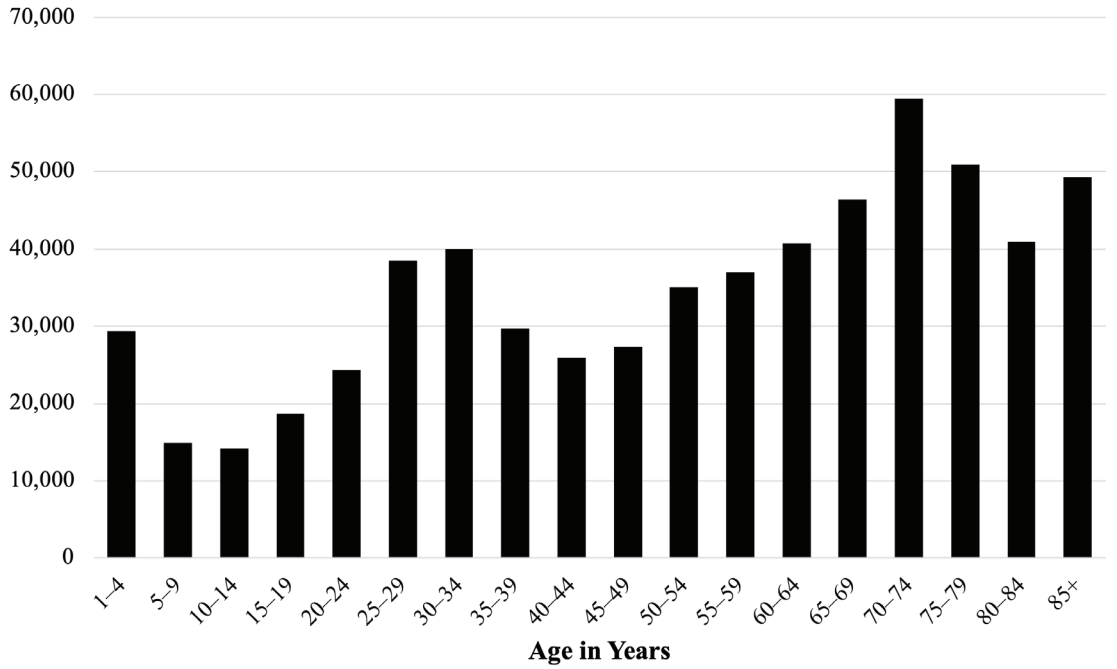
Every year, the Danish Immigration Service and the Agency for International Recruitment and Integration release information about Danish industries that are underserved. As part of this information, the Positive List identifies professions experiencing a shortage of qualified professionals in the country. As of July 2022, the health-care roles of medical doctor, nurse, midwife, dentist, and occupational therapist are on the list, revealing an overworked physician workforce (New to Denmark, 2022). A survey conducted by Møller et al. (2022) showed that more than 80% (n = 70) of vascular surgeons and vascular surgical technicians suffered from burnout, of whom 28% (n = 24) suffered from "moderate to severe personal burnout" (Møller, et. al., 2022). Although this study was specifically focused on the vascular surgery specialty, it can be inferred from the long waiting time between GP care, referral to specialists, and diagnosis that these data are similar across other specializations.

The incidence and intensity of burnout are negatively reflected in the data, suggesting poor physician engagement with patient care trajectory. In a 2009 survey of patient experience, almost 20% of participants found that their GP had been poorly informed by the hospital of their condition(s), and 17% ranked the hospital–municipality coordination as bad or very bad (Pedersen et al., 2011). This early lack of coordination between public health-care workers in the 2000s has become further complicated by the recent competition posed by private providers in the 2010s. Peter Huntley from Medicoindustrien, a Danish medical technology industry association, shared the point that private and public health-care providers have separate databases; therefore, it is difficult for patients to receive coordinated care between both systems (personal communication, August 15, 2022). This systemic delay of patient data combined with a shortage of physicians compromises the quality of care through the public system. Given that in 2015, 30% of all GPs were at least 60 years old and almost 60% at least 50 years old (Forde et al., 2017), there are additional concerns with sustainability of the physician workforce, which suggests that the Danish public system risks collapse under its own weight of an aging population, physician shortage, and the competitiveness of the private sector.

Geographic disparities in GP distribution

In Denmark, there are about 3500 GPs for a total population of nearly 6 million citizens, leaving each

Figure 2
Total Danish hospital patients, by age group, 2018



Source: Statistics Denmark, 2018.

GP with an average of 1700 patients (OECD, 2021). Because hospital admittance and most specialty clinics require GP referral, it is a long process for Danes to get access to the care they need. This situation has negative implications for Danish health care overall because combining the extra strain on GPs with the understaffing of municipal health-care providers increases the probability of system collapse. Many GPs across the country have stopped accepting new patients; as seen in Figure 3, this tendency varies by geographic region. The result of this disparity is long travel time for patients outside of their hometown regions for access to primary care. Reforms must take place to ensure that public health workers are provided with the means necessary to continue positively contributing to the system.

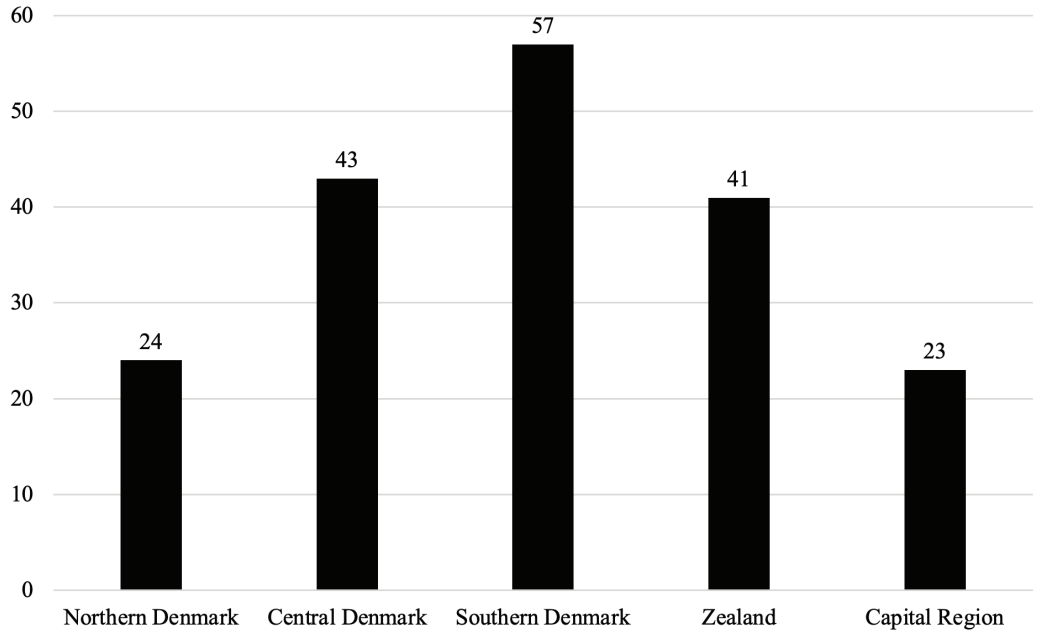
Proposal for an integrated system

The organizational issues of the Danish public health-care system combined with the emerging private sector, an aging population, and physician burnout all point toward the need for significant improvements. A study conducted by the EU and the European Observatory on Health Systems and Policies found that approximately 70% of Danish adults reported being in good health; this proportion is close to the EU average (OECD, 2021). However, there was an evident discrepancy between individuals in different socioeconomic backgrounds: 81% of individuals in the highest income quintile reported being in good health, while only 62% of individuals in the lowest reported the same (OECD, 2021). To optimize the efficiency and quality of care for all individuals, systemic integration is necessary, which requires an open loop of communication between all three levels of the health-care hierarchy. With the implementation of staffing interventions as well as an updated compensation model for physicians educated in Denmark, the system can minimize waiting time for regional and municipal patients under the national guidelines and ensure high quality of patient care.

Addressing the physician shortage

An initial area for opportunity involves the medical education system. A news report in *The Local* ("Why many people…," 2022) cited increased admissions at university medicine programs in Denmark, which is expected to lead to a 65% increase in the number of doctors by 2045. This increase in prospective health-care workers can be capitalized on by introducing financial incentives for Danish medical students intending to stay in-country following their education. For example, as part of this initiative, newly graduated physicians should owe one year of public medical service in Denmark for each year of their medical education, which is free under the Danish welfare state (Tikkanen et al., 2020); those who do

Figure 3
Percentage of Danish GPS accepting new patients, divided by region



Source: OECD, 2021.

not agree to stay in Denmark must pay back the cost of their education. Denmark might consider drawing from the strategy of the US National Health Service Corps, which offers a loan repayment plan that covers all medical school tuition fees for students who commit to a career in primary care for rural and underserved American communities (National Health Service Corps, 2022). Retention bonuses also might be considered as part of the deal, where a bonus is paid to medical school graduates who begin work at a public hospital or clinic after their schooling.

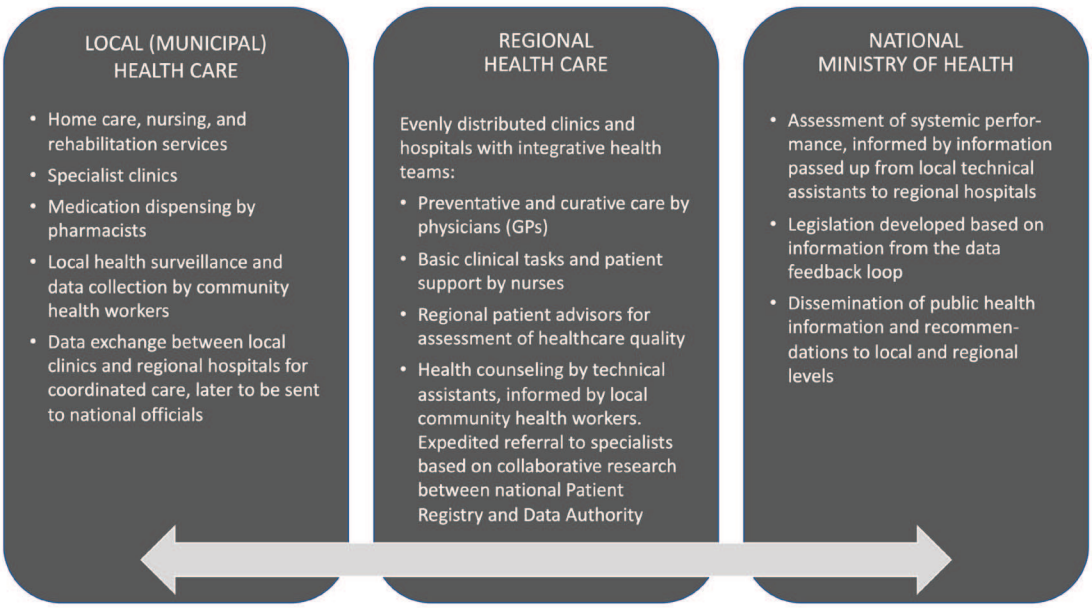
As part of the implementation process of this education repayment program, medical schools should encourage the alignment of Danish identity with the theory behind longitudinal primary care theory. An already existing "unwritten social contract" (Danish Customs and Tax Administration, 2018) emphasizes the importance of collective well-being; therefore, there is underlying plausibility for this solution as Danish medical graduates are likely to desire to give back to the system that raised them. This initiative will increase the number of young health workers in-country amid the aging population and shortage of public practitioners, leading to improvement of the working conditions at regional health-care clinics. With higher retention of the recent graduating classes of medical students, the recent controversy over public and private sectors of health care can also be addressed. An influx of physicians to the public sector will cause the demand for the private sector to decrease, forcing private health providers to return to focusing primarily on elective care. In this way, physicians who wish to work in other areas of health care must return to public care centers to do so.

Addressing geographic barriers and organizational issues

The proposed focus on retaining recently graduated medical students should be accompanied by the prioritization of social equality in the context of health-care accessibility. Telemedicine is a favorable prospect for efficient regional access to referrals, especially in cases where patients have a good idea of which specialist is required for their diagnosis. This approach will save time and resources for both providers and patients, addressing the challenges faced by Danes who must travel long distances to gain access to GPs and streamlining the efficiency of care. Along with telemedicine, a more cooperative and integrated network for health care is necessary for quality treatment, true forward thinking, and better allotment of resources.

An option to further reduce the wait time for patients is the assembly of interdisciplinary health-care teams to coordinate patient care through various levels of the system. Denmark might consider mirroring the primary care systems in countries such as Costa Rica, where cooperative health-care teams with com-

Figure 4
Integrative system proposal for Danish health care



Note: Modeled after the Costa Rican system, as discussed in Pesec et al., 2017.

munity agents increase engagement between patients and physicians while maximizing workforce efficiency. Costa Rica's basic integrated health-care teams (*Equipo Básico de Atención Integral en Salud*) consist of a physician for curative and preventative care; a nurse for basic clinical tasks and health counseling; a technical assistant for health promotion activities, disease prevention, epidemiological data collection, risk factors, and specialist referrals; a medical clerk for patient intake, data management, and population health surveillance; and a pharmacist for dispensing prescribed medications (Pesec et al., 2017). The implementation of these teams has enabled a system for integrative feedback among Costa Rican health- care workers to proactively address all citizens' needs (Pesec et al., 2017). Denmark would benefit from this sort of quality coordination between its levels of health care; Figure 4 shows a model of what Danish health care might look like under such a system.

The National Patient Registry should work closer with the Health Data Authority officials and the regional patient advisors to administer a comprehensive, dynamic health report for each patient seen by a GP. These reports should be shared with any specialists to whom the patient is referred and be complete, with all medical history, complaints, and diagnoses. Likewise, any information from follow-up treatment or additional hospital visits should be continuously compiled in the patient's report until the patient is no longer living. This database can then be used for regional research and development. Statistical analysis of patient demographics and incidence of conditions can help predict needs for referrals to specialists, hence reducing in-office wait time for patients. Using these data, the MOH can continue to provide recommendations for regional and municipal care, inviting physicians and nurses into conversations regarding future legislation. This inclusiveness will go a long way in terms of making health-care workers feel appreciated under the public health system, thereby encouraging them to further contribute their services.

Conclusion

The Danish health-care system strives to provide high-quality care to all its patients, but without systemically efficient solutions, the country will struggle to truly thrive as a role model for other global healthcare structures. This study of the Danish health-care system finds that its current fragmentation has consequential effects that compromise its efficiency and sustainability. A demonstrated lack of cooperation between the workforce of the health-care hierarchy has reduced the quality of patient care and shed light on its organizational flaws. This proposal of an integrated health-care system takes into consideration the negative impacts of the separation of the health units at the municipal, regional, and national levels; the aging population; and the lack of employees in the workforce of the public health system. Increasing the use of telemedicine, prioritizing the retention of recently graduated Danish medical students, and optimizing the usage of collected health data are solutions with potential for ensuring long-term sustainability of the health-care system. While the metrics of success for these solutions are only observed in the long term, their implementation will open clearer and more efficient lines of communication within the health-care hierarchy, fostering a healthier, more forward-thinking culture in the system that will become quickly evident in the short term.

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