From bureaucratic administration to effective intervention: Comparing early governmental responses to the COVID-19 virus across East Asian and western health systems

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Abstract
The outbreak of COVID-19 in early 2020 created dangerous public health conditions which pressured governments and health systems to respond in a rapid and effective manner. However, this type of rapid response required many governments to bypass standing bureaucratic structures of health sector administration and political governance to quickly take essential measures against a rapidly evolving public health threat. Each government’s particular configuration of governmental and health system decision-making created specific structural and functional challenges to these necessary centrally developed and coordinated strategies. Most East Asian governments (except Japan) succeeded relatively quickly in centralizing essential disease control and treatment initiatives in a timely manner. In contrast, a number of European countries, especially those with predominantly tax-based financing and politically managed health delivery systems, had greater difficulty in escaping bureaucratic governance and management constraints. Drawing on data about these governments’ early stage COVID-19 control experiences, this article suggests that structural changes will be necessary if low-performing governments are to better respond to a pandemic. This paper also summarizes other relatively successful strategies. By adopting such strategies, nations can help overcome structural bureaucratic and administrative obstacles in responding to further waves of COVID-19 or similar future pandemic events.

Keywords
COVID-19, governmental response, Health systems, comparative analysis, bureaucratic administration

Introduction
The Covid-19 virus has held up a mirror to every aspect of contemporary society. Particularly notable has been the spotlight it has directed onto the capacity of national governments and national health systems to act decisively to stem the virus’s impact on their populations and societies. The infection trajectory has placed a premium on rapid and effective national decision-making across a range of sectors including medical, economic, and social as well as political. It also has demanded sophisticated communication strategies to collect valid and confirmable data, to communicate clearly and effectively to multiple levels of governmental actors, and to explain to the citizenry what is being done and what isn’t being done, all in a comprehensive, independently verifiable, and trustworthy manner.

Yet as extensively documented in multiple political science sub-fields (public administration, public policy, comparative relations, international relations), the day-to-day operations of government departments, agencies, and offices - local, regional, or national - are typically shaped by quite different characteristics: they tend to be inherently insular, risk-adverse, self-serving, and only minimally responsive to outside political or social interventions.¹–⁵ In a word, they are

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bureaucracies. As Max Weber famously summarized this structural quandary at the turn of the 20th Century, governmental agencies are everywhere and necessarily “systems of rules and offices”: 

“it would be sheer illusion to think for a moment that continuous administrative work can be carried out in any field except by means of officials working in offices. ...For bureaucratic administration is...always, from a formal, technical point of view, the most rational type. ...The choice is only that between bureaucracy and dilettantism in the field of administration.”

Further, much has been written in the last several decades about the importance of moving beyond standard public bureaucracy to establishing effective management in the operation of national health care systems, especially in Western Europe. An important element of the needed managerial transformation, however, is to re-direct and/or blunt the frequently disruptive impact of a second, related, and often equally prominent health system characteristic: namely, direct political control over operational decision-making at hospital provider level. Starting from the 1980s, there is a substantial health policy literature from Western Europe that documents a series of dysfunctional institutional rigidities in politically-driven bureaucratic models of government ownership, regulation, and/or organization. In an era when the COVID-19 pandemic has highlighted the clinical treatment failures as well as the successes of non-clinical intervention across multiple developed countries, the powerful impact and consequences of politically-driven bureaucracy in the health sector deserves serious discussion.

This analysis examines the key lessons and main initial strategies of three developed Asian governments (Singapore, Japan, and Taiwan) as well as three major Western European ones (Italy, the United Kingdom, and Denmark). It is particularly focused on the point in early 2020 at which traditional bureaucratic decision-making, reflecting a complex mix of municipal and/or regional as well as national elements, was suddenly re-configured as targeted emergency national intervention. The article examines what appear to have been major barriers across these different Asian and European governments to the implementation of necessary strategies to control COVID-19. The article starts with an overview of early management strategies and their major objectives in response to the outbreak of COVID-19. The specific strategies of the six selected cases are then examined, followed by a synergistic comparative analysis that highlights the structural changes indicated for effective transformation of health systems, as well as other linked strategies. The article concludes with an emphasis on the importance of the capacity of central government to respond to pandemics such as COVID-19, a feature that has potential tensions with prominent multi-layered, participatory, and deliberative democratic procedures in many Western countries.

Materials and methods

We consolidated COVID-19 related confirmed cases, governmental responses, and policy outcomes of each country from reliable independent data resources, national independent and state media, professional news channels, and gray literature from governmental resources before June 2020. We also searched and monitored available academic research papers, commentaries, national independent and state media, professional news channels, and gray literature from governmental and independent think tank sources for COVID-19 related epidemiological, clinical, and health policy related reports and assessments that were before June 2020.

We selected three Eastern Asian countries/governments (Singapore, Taiwan, and Japan) and three Western European countries/governments (Italy, England, and Denmark) as case study to illustrate governmental early responses to COVID-19. These countries/governments had similar levels of economic development, as well as democratically constituted political systems. Table 1 shows the “Gross domestic product per capita based on purchasing power parity in 2019”, “Population in Thousands as of 2019”, “Geographic Areas in Square kilometers”, and “Thousands population per square kilometer” of each of the country we selected. Only Singapore is an outlier due to its smaller geographic area and higher per capita GDP. However, Singapore’s political, legal and governmental systems were originated from the United Kingdom’s Westminster system, and its public policies and health systems are comparable with those of western European countries.

Results

Disease Outbreak and Early Management Strategies

In China, following nearly 2 months of uncertainty and delay, the Chinese central government took direct decision-making control away from provincial and municipal governing bureaucracies to impose strict disease control and management strategies from 20 January 2020. However, the COVID-19 virus had already spread to other eastern and southern Asian areas with close economic and social relations with China, then from Singapore to Italy then to England and multiple European countries in late January 2020. Figure 1 details the trend in the number of daily confirmed cases per 10,000,000 population between February and March 2020 for Singapore, Japan, UK and Italy.

These differing infection rates, trajectories, linked to the accompanying governmental centralized strategy timeline, point toward several tentative conclusions about the process of transmission of the virus, as well as the likely success of several essential governmental interventions to blunt that process. These interventions were taken in pursuit first and foremost of three main policy objectives.
Policy Focus #1: Stop “Super-Spreaders”

A critical initial effort by central governments in East Asia and Western Europe was to rapidly identify and contain highly infectious “super-spreaders,” even after the disease spread appeared to have been largely controlled. Examples from both South Korea and Italy highlighted the dramatic impact that one super-spreader could have on the size and speed of disease outbreak in the general population. In South Korea, the super-spreader was a 61 year old women who attended local religious events three times, each time with more than 1000 participants.15 The number of confirmed cases of South Korea escalated from below 28 reported on February 17th to 2337 as of February 28th (US EST.)16 In the Italian case, the “super-spreader” was a 38 year old man who directly infected 13 people and those 13 people subsequently spread the disease to a significant part of Northern Italy as well as to other countries in Europe.17 Subsequently, the number of confirmed cases in Italy escalated from 4 cases reported on February 20th to 655 cases by February 28th,16 increasing more than 120 times.

Policy Focus #2: Isolate Disease Clusters

Governments need effective real-time mechanisms to maintain awareness of within-household, community, and other closed-setting transmission. A 2020 WHO-China joint report showed that about 78%–85% of clusters transmission occurred within a family.18 The example of the Diamond Princess Cruise in Japan also illustrated that a closed community without adequate medical support will likely speed up the rate of infection.19 The spread of disease clusters within prisons, hospitals, and particularly long-term care facilities also illustrated this danger.18 For the United States, two events clearly illustrated the clusters’ effects on disease spread. First, in February, a biotech company hosted a national conference, and this event led to at least 100 infected individuals by mid-April. Moreover the participants also spread the virus to other states in the US, as well as Germany and Switzerland.20 In another example, a small city in Southern Georgia, Albany, had a major COVID-19 outbreak caused by large attendance at a funeral.21 In France, the annual gathering of the Christian Open Door Church between February 17th and 24th in Mulhouse was probably one of the key cluster events triggering further disease outbreaks.22 In

Table 1. Per capita GDP, population, and geographic areas of selected countries.

| Country | Gross Domestic Product per Capita Based on Purchasing Power Parity in 2019 | Population in Thousands as of 2019 | Geographic Areas in Square Kilometers | Thousands Population per Square Kilometer |
|---------|-------------------------------------------------|-----------------------------------|--------------------------------------|------------------------------------------|
| Singapore | 101,649 | 5704 | 724 | 7.88 |
| Taiwan | 59,398 | 23,817 | 32,260 | 0.74 |
| Japan | 44,585 | 126,264 | 377,976 | 0.33 |
| Denmark | 62,090 | 5,814 | 43,094 | 0.13 |
| Italy | 45,723 | 60,302 | 116,348 | 0.52 |
| UK | 49,932 | 66,836 | 248,532 | 0.27 |

Sources: https://data.worldbank.org

Figure 1. Daily New Confirmed Cases per 10,000,000 population. Note: * Not including cases on “Diamond Princess Cruise”.

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Spain, the government-sponsored International Women’s Day March on 11 March 2020 in Madrid directly spread COVID-19 both in Madrid and across broader areas of Spain.23

Policy Focus # 3: Ramp up mass testing and mobilize inpatient and intensive care resources

The early success in controlling COVID-19 in both South Korea24 and Germany25 demonstrated the role of mass-testing in controlling COVID-19. Conversely, the initial low testing capacity of the United States of America, and the extended Centers for Disease Control and Prevention (CDC)-created delay in making testing widely available, has been heavily criticized as a failure of disease control policy in the United States.26 Similarly, a pre-existing high capacity of inpatient resources, e.g. intensive care unit beds of Germany27 contributed to the low mortality rate for severe COVID-19 patients in that country. The mortality rate as a proportion of all COVID-19 cases in Germany was 3.2% as of April 2116, dramatically lower than the COVID-tied mortality rates for France, the United Kingdom, Italy, and Spain which were 17.28%, 13.53%, 13.20%, and 10.43%, respectively, over the same period.16

Examining Strategies for COVID-19 Control

Given the clinical and epidemiological features of COVID-19 (e.g. estimated R0, incubation period, asymptomatic infectious individual, and longer recover time needed in ICU than pneumonia),28 and the effective policy responses summarized above, two key disease control strategies appeared to be effective for early stage disease control. First, utilizing social distancing to prevent potential super-spreader and clustering infections; and second, mobilizing resources to implement mass testing to identify infectious individuals and implement contact tracing in a timely manner. At the same time, it also was essential to mobilize healthcare resources to increase healthcare provision capacities, e.g. intensive care unit capacity, to be able to treat patients with severe cases. Successful implementation of the COVID-19 controls strategies detailed above, however, required an effective governmental structure to put in place effective and coordinated measures quickly, and to do so in a coordinated manner at local and regional as well as national level. Moreover, rapid implementation of measures that required the entire society’s behavior to change, e.g. social distancing and the usage of masks, are most effective through nationally centralized and coordinated efforts, which in turn required effective national governmental level executive responsibility. The implementation of mass-testing for COVID-19 and quick mobilization of intensive care unit capacity necessitated strong central government steering to overcome traditionally fragmented and/or bureaucratic organization in many healthcare financing and provision systems. Comparative analysis of dates between the first confirmed COVID-19 case and the introduction of a centrally designed and coordinated response strategy are presented in Table 2. In the next section, we will examine three Asian countries and three Western European countries as case study examples to illustrate the intrinsic association between health system structure and governmental responses to pandemic.

Three East Asian Cases

Three short case examples from Singapore, Taiwan, and Japan highlight the rapid uptake of national government action in developed East Asian countries once their outbreak began.

Singapore: Singapore is a small island landmass at the tip of Malaysia, with a population of 5.6 million, of which nearly 80% are ethnic Chinese. It has an elected national parliament, a prime minister and cabinet, and generally follows the Westminster system of government. The government is considered by international observers to be efficient and effective, and Singapore is often ranked by Transparency International among the top countries in the world jointly with Denmark and New Zealand for lack of government corruption.29

Singapore’s health care system is funded by a mandatory state-run medical savings account system. Both private and public hospitals compete for individual patient customers, with procedure prices posted by law for every hospital on the Ministry of Health’s website. Public hospitals in Singapore were re-structured in 1985 as semi-autonomous institutions with a substantial degree of internal management discretion.30

Singapore’s government responded rapidly to the initial spread of COVID-19 in China as early as January 314 before its first confirmed community disease transmission (4 February 2020). Specific centralized strategies included border control, strict quarantine and contact tracing policies, and direct and consistent information to the general public.31

Taiwan: Taiwan has a population of nearly 24 million living on an island in the East China Sea. It is governed by a Presidential system of government supported by an elected Congress. Local governments include six special municipalities, 13 counties and three autonomous municipalities. Taiwan’s health care system is funded by a mandatory government-run social health insurance system. Hospitals are both public and private, with public hospitals operating only 32% of total beds.32 Patients have the right to choose their hospital for care.33

Public hospitals in Taiwan did not face capacity limits due to COVID-19 patients, reflecting early strong governmental intervention, especially in contact-tracing and testing.34 A critical factor in the performance of the Taiwanese health system was strong controls from the Ministry of Health and
Welfare on all hospitals in Taiwan. The Ministry had the authority to designate any hospital (private or public) as a responding hospital and to expatriate hospital beds, medical resources, and personnel by the mandate of Communicable Disease Control Act \(^{35}\) and Regulations Governing Operation of the Communicable Disease \(^{36}\). Accordingly, prior to the COVID-19 outbreak, a Communicable Disease Control Medical Network was established as a part of pandemic preparedness infrastructure. Testing, screening, and treatment protocols had been determined by the Central Epidemic Command Center (CECC, a special task force placed above all ministries to coordinate disease control strategies within the central government), which was established on 20 January 2020 in the case of the COVID-19 outbreak.\(^{37}\)

**Japan**: Japan had a population of 126.5 million as of 2018, and Tokyo has among the world’s highest population density. There are 47 prefectural entities under the national bureaucratic administration. Though each prefecture’s chief executive is directly elected and manages local police and school systems, the Japanese central government still controls local budget and tax decisions. The Japanese healthcare system is funded by mandatory central-government-managed social health funds. About 42% of overall healthcare expenditure is subsidized by tax funds.\(^{38}\) Though hospital services are provided by both public and private providers, reimbursement is the same for both types of hospitals in accordance with a strictly regulated fee schedule.\(^{39}\)

Although the first confirmed community disease transmission within Japan’s territory occurred on February 20\(^{35}\), the Diamond Princess Cruise ship that was quarantined in waters off Yokohama (beginning February 3\(^{35}\)) was the first hotspot of disease cluster in Japan. A total of more than 700

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**Table 2. First confirmed case and centralized strategy for different countries.**

| Country    | First confirmed case in the country | First confirmed community transmission case\(^*\) | Centralized Strategy Date | Number of Days between first case and centralized strategy | Events representing centralized action |
|------------|-------------------------------------|-----------------------------------------------|---------------------------|----------------------------------------------------------|--------------------------------------|
| Singapore  | 23 January 2020                     | 4 Feb 2020                                    | 31 January 2020           | 8                                                        | All visitors who had been in China for the last 14 days cannot enter Singapore, in addition to other strategies |
| South Korea| 20 January 2020                     | 24 January 2020                               | 4 Feb 2020                | 15                                                       | Ban all foreign travelers from Hubei province |
| Taiwan     | 21 January 2020                     | 2 Feb 2020                                    | 20 January 2020           | Centralized before first case                             | Establish “center epidemic command center” (CECC) |
| Japan      | Between Jan 10th and 15th            | 20 Feb 2020                                   | 25 Feb 2020               | About 40 days                                            | State of emergency and stay at home order for some prefectures |
| France     | 24 January 2020                     | 30 January 2020                               | 12 March 2020             | 48                                                       | President macron announced all schools all universities close from Monday March 16\(^{39}\) |
| Germany    | 27 January 2020                     | Around 26 Feb 2020                            | 16 March 2020             | 48                                                       | German ministry of Transportation stopped all flights from Iran and China on 16 March 2020, under the pressure of public |
| Italy      | 30 January 2020                     | 20 Feb 2020 or earlier                        | 9 March 2020              | 39                                                       | Prime minister Giuseppe Conte extended the emergency coronavirus measures to include travel restriction and public gathering ban to the entire country |
| UK         | 31 January 2020                     | 28 Feb 2020 or earlier                        | 3 March 2020              | 32                                                       | Prime minister Boris Johnson unveiled the coronavirus action plan |
| Spain      | 31 January 2020                     | Around 25 Feb 2020                            | 13 March 2020             | 42                                                       | Prime minister Sánchez announced a declaration of a nationwide state of Alarm |
| Denmark    | 27 February 2020                    | 1 March 2020                                  | 12 March 2020             | 14                                                       | Close borders with EU countries |

\(^*\)Community Spread is defined as: “Community spread means spread of an illness for which the source of infection is unknown.” by the United States CDC at [https://www.cdc.gov/media/releases/2020/s0226-Covid-19-spread.html](https://www.cdc.gov/media/releases/2020/s0226-Covid-19-spread.html); [https://www.nytimes.com/2020/02/26/world/asia/coronavirus-news.html](https://www.nytimes.com/2020/02/26/world/asia/coronavirus-news.html); [https://www.washingtonpost.com/world/asia_pacific/2020-coronavirus-pandemic-in-Singapore](https://www.washingtonpost.com/world/asia_pacific/2020-coronavirus-pandemic-in-Singapore#cite_note-126); [https://en.wikipedia.org/wiki/COVID-19_pandemic_in_Japan](https://en.wikipedia.org/wiki/COVID-19_pandemic_in_Japan); [https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_Denmark](https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_Denmark); [https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_the_United_Kingdom](https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_the_United_Kingdom); [https://en.wikipedia.org/wiki/2020_coronavirus_pandemic_in_Spain#First_cases_(January%E2%80%93February); [https://www.medscape.com/viewarticle/9325_February](https://www.medscape.com/viewarticle/9325_February); [https://www.moh.gov.sg/](https://www.moh.gov.sg/).
people out of 3711 passengers and crew members on board were ultimately infected, following the first confirmed case diagnosed on February 1st. Slow reactions to this situation, attributed to economic and political concerns of the Japanese central government, as well as insufficient professional handling of infectious control, were criticized domestically.

During the initial period of disease spread, the central government/prefecture relationship as well as the structure of Japan’s bureaucratic administrative system were reflected in several pivotal policy and implementation conflicts. At least one prefecture and several cities rejected Prime Minister Abe’s call to close all schools on February 27th, and he eventually abandoned the policy due to resistance from local governments and residences. However, Japan’s Covid-19 virus and disease control had been thus far successful overall. Per 100,000 people, infectious and mortality rates of Japan had been far less than European countries, and only about one-eighthieth that of the UK. Though the Japanese central government did not have as much executive power as do other Asian counterparts, the Japanese culture of self-disciplined behavior and peer pressure, the flexible private provider system that allowed for comprehensive contact tracing, and trustworthy centralized information delivery to the citizen, all contributed to the relative success of the disease control process in Japan.

Three Western European Cases

The trajectory of pandemic management in larger Western European countries created a rather substantial contrast to that of East Asia. While small, centrally-accountable health systems like those in Norway and Denmark saw relatively successful national imposition of disease control management, larger countries with regionalized health systems like Italy, Spain and Sweden – despite having similarly structured, publicly operated and tax-funded health systems – did not fare as well. This section reviews government experience with COVID-19 control for three differently sized and structured, publicly operated Western European countries: Italy, England, and Denmark.

Italy: The health system in Italy is operated by 20 regions, each with an elected political leadership, with services delivered by a system of local level authorities (ASLs). The national government plays a complex supervisory and funding role, both providing a considerable share of regional funding (most of the remaining funding is raised by widely varying regional income taxes), and creating a range of service mandates and cost containment ceilings. In wealthier, industrialized regions in the north like Lombardy and Veneto, up to 30% of health services are delivered privately. Publicly operated hospitals in some Northern regions (Lombardy, Tuscany, Veneto) have since 1992 been given some degree of semi-autonomy in their internal management.

The health care system in Lombardy (and later Veneto) was rapidly overwhelmed by COVID-19 cases. Personal protective equipment (PPE) for medical staff, as well as ventilators for critically ill patients, were all but impossible to find. The Italian national government asked both the European Union and Germany to send additional PPE and ventilators on an emergency basis, but was turned down by both. Although the Lombardy regional government had refused to do so, the national government in Rome then imposed a highly restrictive lockdown on all Lombardy Province on March 8th, which – after a notable organizational delay – was enforced by the national Carabinieri.

England: England has the largest of the four devolved health care systems within the United Kingdom (UK). England’s centralized National Health Service (NHS) provides curative and public health services to its 56 million inhabitants (out of 66 million in the four countries that make up the entire UK). The English NHS is tax-funded through general revenues, with the supporting individual and corporate tax levels, the annual NHS budget, and the broad operating and management principles employed within the English NHS, all determined by the UK Parliament. Private medical insurance, counting both individual and employer purchased policies, covered approximately 13% of the English population in 2006. Many NHS public hospitals have been given a degree of semi-autonomous institutional level decision-making in the form first of NHS Trusts, and then from 2004 as NHS Foundation Trusts.

The English NHS struggled from early March 2020 to deal with what became Europe’s worst COVID-19 epidemic. As in Italy, the supply of PPE early on in the epidemic was seriously inadequate, as was the number of ICU rooms and ventilators. Three 1000-bed so-called “Nightingale” hospitals were rapidly assembled inside convention centers in England’s large cities, intended to relieve regular NHS hospitals of the virus overload, however they were hardly if ever used. The English NHS contracted all private hospital beds in the country in March – again with the intention stated to handle the patient overload – however most of these beds were never utilized for either Covid-19 or non-COVID patients despite overflow conditions and all elective procedures being cancelled in NHS-operated facilities. As Osipovic et al. (2019) concluded of the NHS’s centralized structure of decision-making just before the pandemic began, “In spite of years of marketisation reforms, the hierarchical mode of command and control in the NHS has been remarkably resilient.”

The Nuffield Trust, an independent think tank in London, estimated in June 2020 that NHS hospitals would only slowly be able to return to normal service delivery once the epidemic had receded. The Trust estimated that regular surgery would require COVID-19 testing prior to any patient being operated on, and that, by 2021, hospital waiting lists would expand from the 4.6 million patients prior to the onset of the epidemic to some
Public health decisions for England during this period were made almost exclusively by the UK central government. The initial response strategy of the United Kingdom government was “keep calm and carry on” with the hope of “herd immunity.” England did not close down international flight arrivals throughout this entire period. Flights from France and Spain continued well after it had been recognized that those countries were a major source of infection, a causal chain which was subsequently proven by genomic research at UK universities showing that nearly 2/3 of all COVID-19 infections in the UK originated in these two countries. A “stay-at-home order” was introduced in England by the UK government on March 23rd, however there were continued concerns about how it was enforced - eventually by the National Police throughout this period. Widespread public testing for COVID-19 was not put in place until May, 3 months after the onset of the pandemic, and on June 18th the UK government announced that its commissioned contact tracing app for cellphones had failed and could not be put into service.

*Low Reliance on direct governmental health care services*, *Lower reliance on direct political management of health institutions*, *Minimize traditional bureaucratic rigidity and sluggishness in information delivery*, *Administrative ability to leverage new technologies and the capacities of private institutions*, *Sufficient governmental executive authority*, *Administrative ability to leverage new technologies and the capacities of private institutions*, *Low Reliance on direct governmental health financing scheme*.  

**Denmark**: Denmark has a population of 5.4 million inhabitants, concentrated in two large cities, and located on a geographically small landmass. In 2002, the Danish national government considerably strengthened national control over its tax-funded, publicly operated health system, by combining the existing 12 regional elected governments that largely funded and operated the country’s hospitals into five larger regions, which, while still elected, no longer had the power to tax. In 2012, the national government imposed a further set of reforms on municipal governments, requiring them to a) fund 20% of hospital outpatient and inpatient services tied to elderly citizens, b) negotiate agreements with regional governments to ensure most cost-effective handling of chronically ill elderly patients, and c) establish municipal facilities to monitor chronically ill elderly so as to reduce their visits to hospital Accident and Emergency rooms.  

The Danish national government has primary responsibility for public health. The newly elected Social Democratic led coalition took strong action early before Europe’s epidemic gained momentum. It closed the country’s borders on March 12th, at a time when the EU Commission in Brussels was trying to prevent any border closures. The Danish government also closed schools on March 14th, and locked down the country’s bars and restaurants on March 18th. Denmark’s hospitals were never overwhelmed by COVID-19 patients, and the death toll from the virus totaled a low 551 as of 21 May 2020. Schools were re-opened in early May, and bars and restaurants were re-opened on May 11th. Norway and Denmark allowed cross-border travel as of June 15th, however Denmark has kept its border with most of Sweden (excepting the adjacent Malmo region, which re-opened on June 27th) closed due to much higher infection rates still prevalent particularly in the Stockholm Region.

**Discussion**

**Structural Change from Bureaucracy to Effective National Disease Control**

This brief review of different Eastern Asian and Western European experiences in implementing effective COVID-19 control strategies suggests several likely factors that could help explain observed differences in performance and outcomes. Certainly, national size and existing governmental structure played a noticeable role: governments that had the most effective strategies were smaller, more centralized governments like Singapore and Taiwan, also Denmark in Western Europe. Singapore and Taiwan also had a relatively high level of national government executive power, enabling them to shift rapidly to centralized disease control and mitigation strategies and to require changes in residents’ behaviors, as well as to re-direct health system policy and daily operational activities. Conversely, geographically larger countries like Italy and England, despite centralized national governmental structures for heath financing and services (regional councils played a relatively less important policy-making role in both countries even for social and long-term care services), appeared to have had considerably more difficulty in moving rapidly and efficiently beyond established bureaucratic boundaries and procedures.

A second, closely related factor in determining successful outcomes appeared to be the management structure of a government’s publicly operated hospitals, and the scale of its private hospital sector. In Singapore, public hospitals were independently managed by the Singapore government-owned corporations, enabling hospital management to move rapidly to re-configure and to expand inpatient and ICU facilities.

| Table 3. Summary of structural changes and other suggestions needed. |
|---------------------------------------------------------------|
| **Structural Changes**                                       |
| * Sufficient governmental executive authority                |
| * Lower reliance on direct political management of health institutions |
| * Low Reliance on direct governmental health financing scheme |
| **Other Suggestions**                                        |
| * Medical expertise to guide central government decisions    |
| * Administrative ability to leverage new technologies and the capacities of private institutions |
| * Minimize traditional bureaucratic rigidity and sluggishness in information delivery |
Similarly, in Taiwan, competition for patients - and their attached social-insurance-funded revenues - between public and private hospitals seemed to be a factor in creating more nimble, innovative and responsive hospital administrators in both provider sectors. Yet England’s officially quasi-autonomous Foundation Trusts – tied as they are to the top-down NHS – had considerable difficulty in meeting the clinical demands that COVID-19 created.

A third, less obvious but potentially important contribution may be the structure of health system financing. Two of the East Asian health systems were funded through social health insurance (Taiwan and Japan), based on contributions made directly by employers and employees (as well as contributions from the government, in Taiwan’s case), while the third - Singapore’s - system was funded by individually funded medical savings accounts in combination with a complex system of embedded government subsidies to public sector (but not directly publicly managed) hospitals. Conversely, all three of the larger Western European countries had tax-funded health care systems, nationally funded in the UK, also Denmark), while predominantly regionally funded in Italy (Italy’s public financing covered 75.8% of the healthcare expenditure in 2014). One potential avenue of investigation could be to examine the likely inflexibility of tax-funded administrative structures – e.g. public bureaucracies - in the face of rapidly changing national priorities and needs. Indeed, major difficulties in Italy and England in procuring suddenly necessary medical supplies (personal protective equipment and lifesaving drugs) pointed toward frozen bureaucratic budget allocations and procedures that could not respond rapidly or effectively.

Other Policy Changes Needed to Transform Traditional Bureaucracy into Effective National Disease Control

In addition to the overall structural health system dilemmas mentioned above, this initial policy examination points toward several additional factors in reducing bureaucratic inertia and implementing quick disease outbreak response. First, strong medical expertise at the national level which could directly guide central government decisions. Second, the administrative ability to leverage new technologies and the capacities of private institutions to provide mass testing and surveillance. For example, South Korea established relatively successful disease control by utilizing high-technologies for mass-testing and contact tracing. Quite differently, the United States CDC’s testing capacity was still very limited in February and the testing kits it developed had serious technical flaws. The testing capacity in the US increased dramatically once CDC allowed private companies to provide testing technologies and capacities in early March. It would thus appear that national governments needed to have the skills and legal capacity to mobilize both public and private resources in advance to be able to provide expansive testing, community-based surveillance and contact-tracing going forward.

Third, it appears essential to minimize traditional bureaucratic rigidity and sluggishness in information delivery, instead sending real-time, scientifically validated public health information to directly steer sanitization and self-prevention efforts among lower-level governments and also the general population. Singapore’s national government, for example, was highly effective in steering the general population toward self-protection. The Prime Minister of Singapore held direct television press conferences as early as February when the pandemic was breaking out, seeking to promote healthy behaviors. Similarly, as early as February, the Japanese national government officially announced a “Coronavirus Basic Prevention Strategy” to the general public. In Taiwan, the CECC held daily press briefings so as to communicate effectively with mass media and the general public. These strategies sought to maintain the regular operation of the economy, while at the same time using the best available scientific and evidence based practice to prevent further disease outbreaks. Table 3 summarizes structural changes and other suggestions we recommend drawn from the case analysis and discussions.

Conclusion

Infectious disease experts are concerned that COVID-19 variants and other currently unknown infectious diseases could become a significant challenge for western countries in the near future. Though Singapore and Taiwan had started their centralized disease management initiatives at early stages and had successfully controlled disease outbreaks at the time of initial writing (6 July 2020), both countries (and other countries as well) remained concerned about renewed challenges tied to further waves and variants. Though many of the Western European countries have introduced national vaccination rollout processes, the potential impact of new COVID-19 variants on Western health care systems remains uncertain.

In order to successfully meet coming challenges, governments could benefit from improved application of tested disease containment and related health policies discussed above. A key factor in whether a government successfully contained initial disease spread in early 2020 was how flexible it was in bypassing its standing health sector bureaucracy and in quickly shifting to a well-informed central disease containment approach. Summarizing these early 2020 COVID-19 experiences, the most effective efforts appeared to be those of central governments that could summon strong
and efficient executive power in combination with more flexible health financing and provision arrangements.

To be certain, a range of other factors (governmental and societal) also influenced the different infectious rates and mortality rates of COVID-19 observed in different areas, e.g. governmental and population acceptance of social distancing, attitudes towards mask usage, the role of medical worker unions, and - importantly - the leadership role of hospital executives and healthcare professionals. However the cases above (with the exception of Denmark) appear to suggest that key limiting factors in the capacity of central governments to respond effectively to the pandemic may well include the extent of reliance on a political/bureaucratic approach to hospital ownership and management combined with funding reliance primarily on tax-generated revenues and publicly administered provider budgets.

This conclusion will sit uncomfortably with those who prefer policy and management in the health sector to be determined in a systematic and deliberative fashion, by multiple levels of officially consecrated institutions and political actors. In practice, many countries also associate this “normal governance” with precisely the lugubrious bureaucratic inertia and inflicting that Weber, Lipsky, Pressman and Wildavsky among many other social scientists have described as standard procedure in Western European and Northern American government. However, the exigencies of the virus – the mirror that the virus has held up to the structure of government – implies that rapid, consistent, and transparent decision-making was essential to reduce deaths and to preserve national economic activity. How effectively societies square this difficult policy circle with their traditional approach to health sector management and funding may influence how successful they are in dealing with the future infectious disease challenges.

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References
1. Crozier M. The bureaucratic phenomenon. Chicago: University of Chicago Press; 1964.
2. Hood C. A Public Management for All Seasons? Public Administration. 1991;69(1):3–19.
3. Lipsky M. Street Level Bureaucracy Dilemmas of the Individual in Public Services. Russell Sage Foundation; 1980.
4. Osborne D and Gaebler T. Reinventing government: how the entrepreneurial spirit is transforming the public sector. Addison-Wesley Pub. Co. Reading, Mass.; 1992.
5. Pressman J and Wildavsky A. Implementation. Berkeley: University of California Press; 1973.
6. Weber M. The theory of social and economic organization. 337. Glencoe, Ill: Free Press; 1957.
7. Saltman RB and Vonotter C. Planned Markets and Public Competition: Strategic Reform in Northern European Health Systems. Buckingham, UK: Open University Press; 1992.
8. Le Grand J and Bartlett W. Quasi-markets and social policy. In: Houndmills, Basingstoke, Hampshire: Macmillan Press; 1993.
9. Pollitt C. Justification by Works or by Faith? Evaluating the New Public Management. Evaluation. 1995; 1(2):133–154.
10. Hsiang S, Allen D, Annan-Phan S, et al. The effect of large-scale anti-contagion policies on the COVID-19 pandemic. Nature 2020;584, 262, 267.
11. Silverstein G. Singapore: the exception that proves rules matter. In: Rule by law: the politics of courts in authoritarian regimes. 2008:73–101.
12. Saltman RB, Yeh MJ and Liu Y. Can Asia provide models for tax-based European health systems? A comparative study of Singapore and Sweden. Health Econ Policy L 2020;17, 1–18.
13. Liu Y and Saltman RB. Policy Lessons From Early Reactions to the COVID-19 Virus in China. Am J Public Health 2020:110, e1–e4.
14. JHU. Maps and Trends Hubei Timeline. Johns Hopkins University. https://coronavirus.jhu.edu/data/hubei-timeline. 2020. Accessed April 28, 2020.
15. BOROWIEC S. How South Korea’s Coronavirus Outbreak Got so Quickly out of Control. Times. https://time.com/5789596/south-korea-coronavirus-outbreak/. 2020. Accessed May 4, 2020.
16. Editor. COVID-19 Global Pandemic Real-time Report. DXY. https://ncov.dxy.cn/ncovh5/view/en_pneumonia?from=dxy&source=&link=&share=. 2020. Accessed April 19, 2020.
17. The Guardian. Coronavirus: inquiry opens into hospitals at centre of Italy outbreak. The Guardian. https://www.theguardian.com/world/2020/feb/26/coronavirus-inquiry-opens-into-hospitals-at-centre-of-italy-outbreak. 2020. Accessed February 28, 2020.
18. WHO. Report of the WHO-China Joint Mission on Coronavirus Disease 2019 (COVID-19). 2020.
19. Mizumoto K, Kagaya K, Zarebski A, et al. Estimating the asymptomatic proportion of coronavirus disease 2019 (COVID-19) cases on board the Diamond Princess cruise ship, Yokohama, Japan, 2020. Euro Surveill. 2020;25(10).
20. Dyer C. How super-spreader drug company started COVID-19 cluster that has TRIPLED to infect 100 people across SIX states in one month after ill-timed conference. DailyMail. https://www.dailymail.co.uk/news/article-8214607/Major-drug-company-unwittingly-super-spreader-executives-took-infected-99-people.html. 2020. Accessed May 4, 2020.
21. Willis H and Williams V. A funeral is thought to have sparked a covid-19 outbreak in Albany, Ga. — and led to many more
funerals, 2020 and led to many more funerals. Washingtonpost. https://www.washingtonpost.com/politics/a-funeral-sparked-a-covid-19-outbreak-and-led-to-many-more-funerals/2020/04/03/546fa0cc-74e6-11ea-87da-77a8136c1a6d_story.html. Accessed May 4, 2020.

22. McAuley J. How a prayer meeting at a French megachurch may have led to scores of coronavirus deaths. Washingtonpost. https://www.washingtonpost.com/world/europe/how-a-prayer-meeting-at-a-french-megachurch-may-have-led-to-scores-of-coronavirus-deaths/2020/04/01/fe478ca0-7396-11ea-ad9b-254ec99993bc_story.html. Accessed May 4, 2020.

23. Jones S. How coronavirus took just weeks to overwhelm Spain. Theguardian. https://www.theguardian.com/world/2020/mar/25/how-spain-sat-on-its-hands-as-coronavirus-took-hold. 2020. Accessed May 4, 2020.

24. Thompson D. What's behind South Korea's COVID-19 Exceptionalism? Theatlantic. https://www.theatlantic.com/ideas/archive/2020/05/whats-south-koreas-secret/611215/. 2020. Accessed May 14, 2020.

25. Bennhold K. A German Exception? Why the Country's Coronavirus Death Rate Is Low. https://www.nytimes.com/2020/04/04/world/europe/germany-coronavirus-death-rate.html. 2020. Accessed April 21, 2020.

26. Shear MD, Goodnough A, Kaplan S, et al. The Lost Month: How a Failure to Test Blinded the US to Covid-19. Nytimes. https://www.nytimes.com/2020/03/28/us/testing-coronavirus-pandemic.html. Updated April 1, 2020. Accessed May 14, 2020.

27. Cascella M, Rajnik M, Cuomo A, et al. Features, Evaluation and Treatment Coronavirus (COVID-19). In: StatPearls. Treasure Island (FL)2020.

28. Editor. Transparency International. https://www.transparency.org/en/countries/singapore#. 2020. Accessed June 24, 2020.

29. Lim MK. Health care systems in transition. II. Singapore, Part I. An overview of health care systems in Singapore. J Public Health Med 1998;20(1):16–22.

30. Ng Y, Li Z, Chua YX, et al. Evaluation of the Effectiveness of Surveillance and Containment Measures for the First 100 Patients with COVID-19 in Singapore - January 2-February 29, 2020. MMWR Morb Mortal Wkly Rep 2020;69(11):307–311.

31. Medical service capacity in 2018. Department of Statistics, Ministry of Health and Welfare. https://dep.mohw.gov.tw/DO/ lp-4487-113.html. Accessed June 2 2020.

32. Cheng TM. Reflections on the 20th anniversary of Taiwan’s single-payer National Health Insurance System. Health Aff (Millwood) 2015;34(3):502–510.

33. Wang CJ, Ng CY and Brook RH. Response to COVID-19 in Taiwan: Big Data Analytics, New Technology, and Proactive Testing. JAMA 2020;323, 1341.

34. Communicable Disease Control Act. Laws & Regulations Database, Ministry of Justice, Taiwan. https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=L0050001. Accessed June 2, 2020.

35. Regulations Governing Operation of the Communicable Disease. Laws & Regulations Database, Ministry of Justice, Taiwan. https://law.moj.gov.tw/ENG/LawClass/LawAll.aspx?pcode=L0050014. Accessed June 2, 2020.

36. Lin C, Braund WE, Auerbach J, et al. Policy Decisions and Use of Information Technology to Fight COVID-19. Taiwan Emerg Infect Dis 2020;26(7):1506–1512.

37. Matsuda R. International Healthcare System Profile: Japan. Commonwealth Fund. https://www.commonwealthfund.org/international-health-policy-center/countries/japan. 2020. Accessed June 24, 2020.

38. Ikegami N and Campbell JC. Medical care in Japan. N Engl J Med 1995;333(19):1295–1299.

39. Mallapaty S. What’s behind South Korea’s COVID-19 Exceptionalism? Nature. https://www.nature.com/articles/d41586-020-00885-w. 2020. Accessed June 24, 2020.

40. Kingston J. Japan’s response to the coronavirus is a slow-motion train wreck. Washingtonpost. https://www.washingtonpost.com/opinions/2020/02/21/japans-response-coronavirus-is-slow-motion-train-wreck/. 2020. Accessed June 24, 2020.

41. Swift R. ‘Bureaucrats were in charge’: Japanese doctor blasts ship quarantine. Reuters. https://www.reuters.com/article/us-china-health-japan-doctor/bureaucrats-were-in-charge-japanese-doctor-blasts-ship-quarantine-idUSKBN20D1MF. 2020. Accessed June 24, 2020.

42. Swift R. Japan plays down criticism of coronavirus cruise ship handling. Reuters. https://www.reuters.com/article/us-china-health-japan-experts/japan-plays-down-criticism-of-coronavirus-cruise-ship-handling-idUSKCN2010XW. 2020. Accessed July 8, 2020.

43. Kim CR and Park J. Japan PM triggers uproar with call to close all schools as Hokkaido declares coronavirus emergency. Reuters. https://www.reuters.com/article/us-china-health-japan-pm-triggers-uproar-with-call-to-close-all-schools-as-hokkaido-declares-coronavirus-emergency-idUSKCN20M0AM. 2020. Accessed June 24, 2020.

44. Saito T. COVID-19? Nature. https://www.nature.com/articles/d41586-020-00885-w. 2020. Accessed June 24, 2020.

45. Kopp R. How the coronavirus widens a cultural divide. Japan times. https://www.japantimes.co.jp/community/2020/05/11/how-tos/coronavirus-cultural-divide-japan/. 2020. Accessed June 24, 2020.

46. Ferrer F, de Belvis AG, Valerio L, et al. Italy: health system exceptionalism? Theatlantic. https://www.theatlantic.com/ideas/archive/2020/05/how-spain-sat-on-its-hands-as-coronavirus-took-hold .

47. Ferre F, de Belvis AG, Valerio L, et al. Italy: health system exceptionalism? Theatlantic. https://www.theatlantic.com/ideas/archive/2020/05/how-spain-sat-on-its-hands-as-coronavirus-took-hold .

48. Pinkoski N. Europe’s Reckoning. Washington Examiner. https://www.washingtonexaminer.com/opinion/europes-reckoning. 2020. Accessed April 30, 2020.
78. Abdi Z, Lega F, Ebeid N, et al. Role of hospital leadership in combating the COVID-19 pandemic. *Health Serv Manage Res* 2022;35(1):2–6.

79. Lega F and Palumbo R. Leading through the 'new normality' of health care. *Health Serv Manage Res*. 2021;34(1):47–52.

80. Saltman RB, Durán A and Dubois HFW. *Governing Public Hospitals: Reform strategies and the movement towards institutional autonomy*. World Health Organization on behalf of the European Observatory on Health Systems and Policies. 2011.

81. Weber M, Henderson AM and Parsons T. *The theory of social and economic organization*. 1st American ed. New York: Oxford University Press; 1947.