Lessons learned from the Baltic countries' response to the first wave of COVID-19

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ABSTRACT

The Baltic countries of Estonia, Latvia, and Lithuania shared a similar response to the first wave of the COVID-19 pandemic. Using the information available on the COVID-19 Health System Response Monitor platform, this article analyzed measures taken to prevent transmission, ensure capacity, provide essential services, finance the health system, and coordinate their governance approaches. All three countries used a highly centralized approach and implemented restrictive measures relatively early, with a state of emergency declared with fewer than 30 reported cases in each country. Due to initially low COVID-19 incidence, the countries built up their capacities for testing, contact tracing, and infrastructure, without a major stress test to the health system throughout the spring and summer of 2020, yet issues with accessing routine health care services had already started manifesting themselves. The countries in the Baltic region entered the pandemic with a precarious starting point, particularly due to smaller operational budgets and health workforce shortages, which may have contributed to their escalated response aiming to prevent transmission during the first wave. Subsequent waves, however, were much more damaging. This article focuses on early responses to the pandemic in the Baltic states highlighting measures taken to prevent virus transmission in the face of major uncertainties.

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1. Introduction

The Baltic states include the three countries of Estonia, Latvia, and Lithuania, which have populations between 1.3 and 2.8 million people. The population density of the Baltic countries is among the lowest in the EU, behind only Finland and Sweden, and residents of the countries are less likely to live in urban areas [1]. The Baltic states have faced past crises, including extensive societal, economic and political transformations of the 1990s and a devastating financial crisis in 2009, all putting health systems under a major strain [2].

In the last two decades, Estonia, Latvia and Lithuania have implemented health system reforms that generally focused on ensuring the stability of financing, strengthening of primary care provision and reducing reliance on hospital care [3–15]. In 2019, the Baltic states spent a substantially lower share of their GDP on health (6.7%–7%) than the EU average (10.2%). They also have a higher share of spending paid through out-of-pocket payments than the EU average (15.4%), ranging from 37% in Latvia, 32% in Lithuania, and 24% in Estonia [16].

All countries have a single-payer public financing system, with Estonia and Lithuania being funded largely through compulsory health insurance contributions while Latvia's national health service system is generally tax-based. The governance of the health system is highly centralized in all countries. All countries have lower rates of nurses per 1,000 population than the EU average, however Lithuania has a higher ratio of doctors (4.6 compared to 3.9 EU average) while Estonia and Latvia are both lower (3.5 and 3.3, respectively) [17–19]. Over the last two decades, all countries have decreased the number of hospital beds per population—between 2000 and 2019, Lithuania reduced this by 27%, Estonia by 36%, and Latvia by 39%, however in Lithuania the number of hospitals beds remained among the highest in the EU.

The first case of COVID-19 in each country was identified within a five-day period at the end of February and beginning of March 2020. Throughout the spring and summer of 2020, the Baltic states registered relatively lower incidence than most European countries. Until April 30th 2020, the three countries combined saw a total of 3,900 cases and 110 deaths recorded as COVID-19, out of the population of around 6 million people. In contrast, Denmark, with a population of about 5.8 million people, recorded over 9,000 cases and 443 deaths [20].

This article aims to analyze the responses of Estonia, Latvia, and Lithuania's health systems in the first wave of the COVID-19 pandemic between February and August 2020. The text highlights solutions from the Baltic region and draws lessons for policymakers that could be applied both in the ongoing global COVID-19 pandemic and other health system shocks during a period of high uncertainty.

2. Methods

This article builds on the methodology and content compiled in the Health System Response Monitor (HSRM), an online platform established in March 2020 and designed in response to the COVID-19 outbreak to collect and display up-to-date information on how countries, mainly in the WHO European Region, are responding to the COVID-19 crisis. The HSRM focuses primarily on the responses of health systems and is available at www.covid19healthsystem.org. The HSRM is a joint undertaking of the European Observatory on Health Systems and Policies, the WHO Regional Office for Europe, and the European Commission.

The HSRM collects information about six broad areas of the country response to COVID-19, and is structured broadly around the standard health system functions [21]. This includes regularly updated details about policy responses related to service delivery, physical infrastructure and workforce, financing, and governance, enabling broad comparisons across countries.

Although the HSRM serves as the primary source for this article, we have supplemented the content with other country materials and relevant/important key documents. This article does not aim to answer why some countries have responded better to the pandemic than others, but rather, to draw out interesting patterns, key contrasts, and innovative approaches in policy responses aimed at addressing common challenges across countries. Attributing any causal link between policy response and pandemic outcome presents a multitude of methodological challenges, so the analysis instead intends to describe and assess policy responses and draw out critical lessons. In turn, this can serve as a basis from which to begin discussions that eventually lead to an understanding of what seems to work, what does not work, and why. This analysis also presents some current gaps in policy knowledge that may open up areas for future research or provide a basis for further policy development.

3. Results

3.1. Early lockdown ensured limited initial spread

The Baltic countries were quick to respond to the threat of COVID-19. Within three weeks of the first reported case, all three countries had declared a state of emergency or started their national lockdowns with strong containment measures such as school closures and border controls (Table 1). In Lithuania, the declaration of the state of emergency came before the first reported case, which provided the country the capacity to initiate early coordination (e.g., form a cross-sectoral response committee) and use resources more flexibly (e.g., tap into reserve funds).

The Latvian timeline provides an example of the early action taken in the Baltic region. Already on January 22nd, 2020, the Latvian Center for Disease Prevention and Control (CDPC) called on health care institutions to take relevant actions in connection with the outbreak in China and follow interim guidance about preventing the spread of communicable diseases. At the end of January 2020, the Crisis Management Council, the State Operational Medical Commission, and the responsible institutions convened meetings about current issues related to COVID-19 and personal protective equipment (PPE). Meanwhile, the Emergency Medical Service (EMS) identified reserves of PPE for service providers and hospitals. On January 31st 2020, the CDPC in cooperation with the EMS sent information to medical institutions and professional associations about COVID-19.

Given the low rates of infections in all three countries in early 2020 (Fig. 1), providing advice to the general public and preventing transmission were at the center of the COVID-19 responses. National authorities in all three countries extensively communicated to the public about the pandemic and restrictive measures. At various stages, the communication channels included mass media, press conferences (daily at the height of the emergency situation), text messages, special telephone hotlines to relieve pressure of the emergency medical service numbers, and official government websites (including a dedicated government page for all COVID-19 news). All three countries brought on scientific experts in a range of fields, including epidemiology, infection control and public health, who played an active role in communicating existing knowledge to the public and in advising the government on possible impact of the disease, options of treatment and adoption of measures to control the infection.

To further support communication, all of the Baltic countries created interactive dashboards with up-to-date data about the reported COVID-19 incidence and mortality, tests performed, as well as data broken down by local area, gender, and age. Latvia and Lithuania both use an ArcGIS-based map, whereas Estonia's dashboard uses GitHub to manage the source code, which also allows users to comment on or request changes to the information. Estonia's dashboard was developed between 13 and 15 March 2020 during the 'Hack the Crisis' online hackathon organized by the startup community.

3.2. The Baltic countries rapidly ramped up testing but referral systems differed

Testing for COVID-19 in the Baltic countries changed over the course of the pandemic as capacities were adapted to rapidly increasing demand. All three countries opened and closed testing centers to quickly respond to changing situations, and operated testing locations away from other areas of service provision to reduce the risk of infection. All three countries ramped up their testing capacity by late April 2020, and have continued to offer more tests per their population than in many other EU countries. In March 2020, the weekly average number of tests conducted in

Table 1

Timing of the key restrictive measures in Estonia, Latvia, and Lithuania during the first wave.

	Estonia	Latvia	Lithuania
First case reported	February 27th 2020	March 2nd 2020	February 28th 2020
Beginning of state of emergency	March 12th 2020	March 12th 2020	February 26th 2020
End of state of emergency	May 17th 2020	June 9th 2020	Remains in place as of November 2021
Border controls introduced	February 25th 2020	March 13th 2020	March 14th 2020
Beginning of the first lockdown	Start: March 13th 2020	Start: March 13th 2020	Start: March 16th 2020 (start of quarantine regime)
End of the first lockdown	May 18th 2020	June 9th 2020	June 17th 2020
	The end was gradual (different dates for schools, public gatherings, public events, etc.)		(earlier relaxations for schools, health services, etc.)
Total number of COVID-19 cases registered at start of lockdown	27	17	9
Schools close	March 16th 2020	March 13th 2020	March 16th 2020

Note: the definitions of state of emergency varied by country and countries had various emergency levels. This table reports dates as follows: Estonia's is a State of Emergency declared by The Government of the Republic, Latvia's is defined in the Law on Emergency Situation and State of Exception, and Lithuania's is the State of Emergency ('Ekstremalioji situacija (padėtis)'.
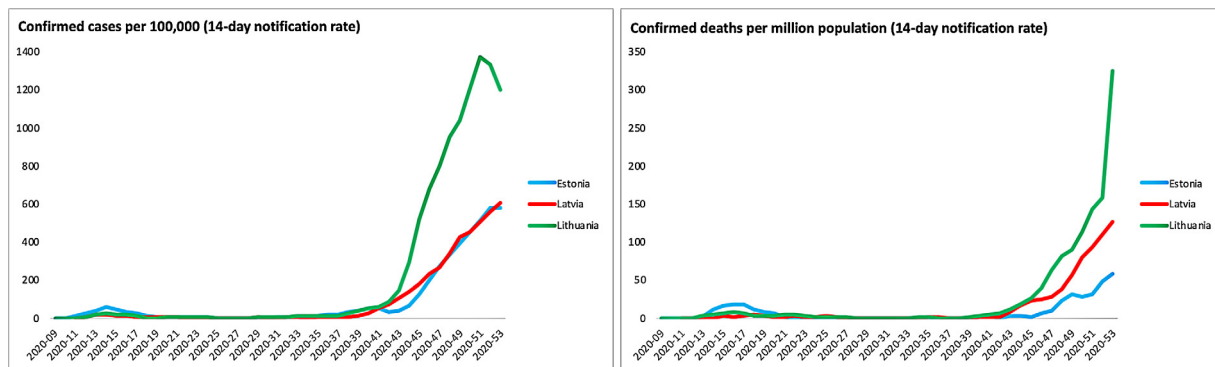

Fig. 1. Overview of COVID-19 cases and deaths in the Baltic countries.

Note: On 29 December 2020, the National Public Health center in Lithuania announced the registration of an additional 324 COVID-19 deaths that happened since the start of the pandemic but were previously not included in the daily figures. This increased total COVID-19 deaths in 2020 by 20% and caused a sharp rise in the last week of the year.

Source: ECDC [22]

Lithuania was 87 tests, in Latvia 178 tests and in Estonia 217 tests per 100,000 population. The number of tests increased in May 2020 to 535–1,700 tests and further in November 2020 to over 2,000 tests per 100,000 population in each country [22].

At the beginning, Latvia's Emergency Medical Service (EMS) provided testing while in parallel establishing mobile testing points (both publicly and privately operated). As the demand for testing increased, EMS teams only provided testing in severe cases, while milder cases were advised to use mobile testing locations. Staff on the COVID-19 hotline also assessed whether the caller was eligible for state-funded COVID-19 testing. The testing strategy was expanded in several steps (Fig. 2) but throughout the pandemic testing in Latvia could be requested as a self-referral and by general practitioners (GPs). Test results were quickly relayed to the Latvian center for Disease Prevention and Control (CDPC) to conduct contact tracing, and the agency also oversaw epidemiological monitoring, data analysis and publication of information.

In contrast, in Estonia only GPs could refer patients for testing during the first wave, and testing was organized through testing centers in cooperation with private providers. Patients not registered with a GP could call the family physician advisory line 1220, which provided contact information for regional on-call primary health care centers where patients could receive a referral for testing. Since mid-March 2020, two testing centers operated in Tallinn and Tartu, while other testing locations across the country opened and closed depending on needs. Once the GP determined a patient needed to be tested, they referred the patient for testing by submitting an electronic order to the lab, and a call center contacted the patient to schedule an appointment. This process was

supported by a digital referral system that was developed in mid-March 2020 to simplify the referral process. Initially, when testing capacity was limited, testing priority was given to older people and people with chronic conditions regardless of age, as well as hospitalized patients with COVID-19 symptoms. Even though Estonia was one of the fastest to roll out testing among OECD countries, capacity still did not meet the demand at certain points in time [23].

In Lithuania, suspected cases (according to case definition) were initially tested in isolation rooms in emergency care and hospitalized. From March 13th 2020, the COVID-19 hotline 1808 became operational to serve as the first contact point for accessing the testing, based on a set algorithm. Starting from March 16th 2020, the collection of swabs for COVID-19 was launched through mobile COVID-19 units. Later, those with acute signs of upper respiratory tract infections were asked to stay at home and consult the hotline 1808 or contact the GP for a teleconsultation to obtain the appointment for testing. While Lithuania lacked testing materials as well as laboratories to execute the tests at the beginning of the pandemic, the capacity was scaled up by April 2020, starting from expansion of public labs and later supported by private ones. From May 2020 onwards, municipalities with higher rates of COVID-19 transmission regularly scaled up population testing to cover case finding in specific groups, for example health and social care workers, teachers, hospitalized patients and residents of care homes, as well as random testing among members of the public.

All three countries covered the costs of testing for those meeting the defined testing criteria. All countries aimed to provide test results within two days of taking the test to both the patient and

At the beginning of the pandemic, state-funded testing was provided for 1) individuals who had symptoms (cough, high body temperature, shortness of breath without any other explanation for clinical manifestations) or 2) individuals had been abroad or had been in close contact with COVID-19 patient (persons identified by the CDPC Prevention and Control and classified as COVID-19 Infectious Patient Contact).

As testing capacity expanded, Latvia set three additional priority groups, including 1) employees of certain professions who develop symptoms of acute respiratory illness; health care professionals involved in patient care; pharmacists and pharmacist assistants; emergency services officers; police officers, firefighters, border guards, customs officers, etc.; staff of social care institutions and shelters, 2) certain hospitalized patient groups, including all patients with pneumonia admitted to the hospital and those with severe acute respiratory infections, and 3) certain groups of patients with a very high risk of transmission and complication of infection, e.g. recipients of social care (older people with chronic illnesses).

From June 10th to June 30th 2020, everyone in Latvia had the opportunity to take a state-paid COVID-19 testing irrespective of symptoms.

Fig. 2. The expansion of the national test strategy in Latvia.

Table 2
Responsibilities for COVID-19 emergency response.

	Estonia	Latvia	Lithuania
Head of country emergency response	Prime Minister	Prime Minister	Minister of Health
Authority for emergency response	Government Committee on the emergency situation (operational from 13 March – 17 May)	Governmental Crisis Management Council Interinstitutional coordination group (created on July 10th, 2020)	State Emergency Situations center
Authority for health system response	The Health Board	National Commission for Operational Medicine (NCOM)	Ministry of Health
COVID-19 Scientific Advisors	• Two professors from University of Tartu • Two doctors from regional hospitals • A representative of National Institute of Health Development	• Chief epidemiologist at the MoH • Epidemiologists working at the CDPC • Epidemiologists working in the university hospitals	• Chief epidemiologist at the MoH • Hospital representatives • University representatives • Ministry of Health representatives • National Public Health Center

contact tracing authority in case of a positive test result. From March 23rd 2020, patients in Lithuania could check their test results for COVID-19 online in their eHealth record, and in Estonia individual testing results were displayed via its patient portal (digilugu.ee). In case of a positive test result, the Estonian Health Board (the agency responsible for the surveillance of communicable diseases among other functions in health care, health protection, and enforcement) contacted individuals within two days in order to give further instructions and to identify their contacts.

3.3. Countries used largely a centralized approach to governance

Estonia, Latvia, and Lithuania quickly mobilized decision-making authorities for both the health system and broader governmental response. In Estonia and Latvia, the Prime Minister led the country-wide emergency response, while in Lithuania the Minister of Health fulfilled this role (Table 2). The chair of the health system response was the head of the Health Board, an agency responsible for health emergencies among other tasks in Estonia, the Minister of Health in Lithuania, and the National Commission for Operational Medicine in Latvia. All countries had centralized authorities for managing the emergency response, with broad representation. Estonia and Latvia formed new coordination groups with more targeted membership, however Estonia's was active during the emergency situation in the spring while Latvia's was initiated in the summer. Fig. 3 offers a further glimpse into the distribution of functions between ministries in Estonia. To further coordinate the implementation of orders of the emergency situation in local

governments, Estonia formed four geographical regions during the state of emergency whose leaders were appointed to the national emergency body. In addition to the centralized governance structures, municipalities and designated hospitals also played a key role in the pandemic response in Latvia and Lithuania.

3.4. Governments moved from decentralized to centralized procurement in light of shortages of PPE

As part of the preparedness effort undertaken in the Baltic countries, all governments assessed their supplies of hospital beds (including ICU beds), medical equipment (e.g., ventilators), PPE, pharmaceuticals, and laboratory capacity. In part due to the low numbers of cases, the main concern for physical infrastructure was thus not related to capacities for treatment but rather shortages of PPE to protect health workers and vulnerable groups in particular. The emergency situation revealed shortages in government stockpiles of medical reserves of PPE. In all Baltic states prior to the pandemic, each health care provider was responsible for ensuring their own supplies of PPE, although each country maintains reserves at the national level as well.

With increasing shortages of PPE and previously negotiated contracts between hospitals and private companies proving insufficient, the Baltic states delegated the responsibility for purchasing PPE to different agencies within their governments. In Latvia, initially the EMS oversaw buying and providing PPE for health care institutions. Next, the NHS took over this process and even later, the Ministry of Defense was appointed as the agency responsible

In Estonia, the Prime Minister served as the head of the emergency situation and delegated specific tasks to ministries in the government. The Minister of Public Administration was appointed to ensure the availability of disinfection and PPE outside the health care and social welfare system, and was assisted by the State Shared Service Centre to conduct centralized procurements. The Health Board was responsible for the acquisition of means of disinfection and PPE for health care services. The Scientific Advisory Board was formed to provide expert information to the Government Committee during and after the state of emergency. The Ministry of Economic Affairs and Communications was appointed as the organizer for the transmission of SMS alerts in the beginning of state of emergency.

After the emergency situation ended, various ministries were also actively involved in planning Estonia's exit strategy. The Ministry of Economic Affairs and Communications was responsible for preparing an economic recovery action plan for the implementation of the exit strategy in May 2020, involving stakeholders and specifying economic indicators. The Ministry of Social Affairs, the responsible ministry also for health, drew up a health system preparedness plan to deal with any new outbreaks of COVID-19, which included the development of an early detection and contact tracing system. The Ministry of Foreign Affairs, in co-operation with partner countries and stakeholders, was responsible to draw up an action plan for the free movement of goods and people. The Ministry of Economic Affairs and Communications in cooperation with the Ministry of Social Affairs was authorized to decide on airline traffic operations based on the state of public health and the incidence of COVID-19 in Estonia and other countries.

Fig. 3. The responsibilities of ministries responding to COVID-19 in Estonia.

for the purchase and transport of PPE and disinfectants. In Estonia, the Health Board managed the emergency stock for PPE. During the pandemic, the Minister of Public Administration initiated a central procurement, storage, and distribution process to ensure sufficient levels of PPE. Many hospitals continued to procure their own PPEs, and regional hospitals conducted larger procurements to also ensure sufficient stock and procure PPE for other healthcare providers and nursing homes. In preparation for the second wave, the State Support Services center (under the Minister of Public Administration) issued a centralized open tender for state institutions and private healthcare providers. In this tender, the Health Board and the Social Security Agency acted on behalf of private health services providers (e.g., family physicians, dentists, etc.) and private social service providers respectively. In Lithuania, central authorities organized supplies until early June 2020, after which the responsibility was transferred to the owners of health care providers (i.e. largely municipalities). At the national level, the government set a target to accumulate a three-month reserve of PPE.

Aside from changing responsibilities for central procurement, each of the Baltic states developed additional solutions and creative initiatives to produce PPE. In all three countries, some hospitals made their own PPE. Estonia and Lithuania also requested private sector companies to reorganize their standard work operations to help maintain supplies including disinfectants, medical masks, and protective aprons. As part of the effort, the Latvian NHS organized a special cargo delivery in March carried by the national airline AirBaltic. An agreement of a major shipment of PPE in Estonia was facilitated by communications with ambassadors. Similarly, the Lithuanian ambassador to China was involved in sourcing several purchases of PPE.

3.5. Health care providers received financial support for revenue shortfalls, new expenses, and staff wages

All countries dedicated funds from the central budget to the health system to support the emergency situation. This provided funding for PPE, extra salary payment for health care workers, compensation for lost revenues due to postponement of non-urgent care, and for adopting measures of infection control. All countries covered the costs of medical treatment for COVID-19 patients and testing for those meeting the criteria. Payment mechanisms had to be adapted due to reduced activity or non-urgent services, as an example from Lithuania shows in Fig. 4.

Existing shortages of nurses in all countries and doctors in Latvia before the pandemic created some concern about whether the countries had sufficient workforce capacity at the beginning of the outbreak, prompting some policy responses. Latvia allowed overtime up to 60 hours per week and in return introduced a 20–50% salary bonus for doctors, health professionals, health workers and pharmacists combating COVID-19 for the three months (March-May 2020). Estonia also increased salaries (1.5 or 2 times) for the same months for medical professionals in contact with COVID-19 patients. Lithuania raised salaries for physicians, nurses and ambulance staff fighting COVID-19 by 60–100% during the quarantine regime. Estonia and Lithuania also increased permanent salaries of health professionals; however, these salary increases had been approved prior to the pandemic and brought forward. In Estonia, a non-governmental organization set up a database of inactive health workers who could volunteer in a case of need, and hospitals worked together to reassign staff with COVID-19 training. Lithuania reassigned health workforce to another health care facility in the same area in case of need, for example if staff became infected and had to self-isolate. In May 2020, the incidence of COVID-19 among health care professionals in Lithuania reached 20% of all persons infected.

3.6. The provision of certain routine health services came under more strain than COVID-19 service provision

The postponement or cancelation of non-urgent care affected the Baltic countries, and all three countries altered service provision for routine hospital and ambulatory care resulting in a lower volume of health services delivered. Lithuania, for example, had 60,000 hospitalizations during the lockdown period, compared to 150,000 in the same time period in 2019, which represents a decrease of 60%. The lockdown measures in Lithuania were accompanied by postponement of scheduled operations and hospitalizations for diagnostic and therapeutic services, as well as dental services and rehabilitation. In Latvia, routine services including day care, day surgery services and ambulatory services, were partially restricted in public and private health facilities until the end of the emergency situation, with elective surgeries canceled. Estonia introduced a regulation to postpone elective and non-emergency care, however the majority of providers continued to provide remote and face-to-face consultations. The North Estonian Medical Center, one of the two biggest hospitals in Estonia, and some other

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In March 2020, the National Health Insurance Fund (NHIF) in Lithuania compensated secondary care providers for revenue shortfalls resulting from the interruption of usual activities during the pandemic. Provider payments from March 1st 2020 until the end of quarantine regime were based on a monthly (i.e. 1/12) share of an estimated annual volume when fewer services have been provided (or by the actual volume if the number of provided services exceeded the estimations). This rule covered hospitalizations (including day care and day surgery), consultations with specialists, emergency care, nursing and palliative care. In addition, from April 1st 2020, the NHIF established new payments for specialist outpatient digital consultations. Primary care providers continued to receive per capita financing (the bulk of their financing).

Although officially the quarantine regime was lifted on June 17th 2020, the Ministry of Health encouraged providers to resume planned services from May 2020, as the number of newly detected COVID-19 cases started to reduce, while pressures on delivering non-COVID services mounted. As a result, reimbursements based on 1/12 rule for June were only applied to those providers that resumed planned services by June 8th 2020. This would mean that providers that did not resume services would be paid based on factual number of services, which was likely to be well below the planned amount. As of June 8th, 85% of hospitals and 70% of municipal ambulatory care providers resumed planned services, but to a various degree. In July and August 2020, 1/12 payment was conditional on hospitals providing at least 70% and ambulatory care providers reaching 80% of planned services.

While in theory the budget for provider reimbursement has been allocated from a number of various sources (including state reserves and EU structural funds), in practice some providers still reported delays with receiving reimbursements for COVID-19 related expenses in August 2020.

Fig. 4. Provider compensations for revenue shortfalls in Lithuania during the COVID-19 pandemic. [7–13].

hospitals continued to provide some elective and non-COVID-19 services face-to-face. The hospital reported that due to the rapid response to COVID-19 at the beginning of the emergency, it was able to rearrange their service provision to remote appointments.

The Baltic countries took different approaches to routine immunizations, preventative screenings and reopening care. Latvia and Lithuania continued the vaccination of infants. Estonia usually performs some childhood vaccinations at schools, but due to school closure during lockdown, the vaccination program was halted. Regular vaccination still continued at the Estonian PHC centers. Lithuania continued childhood vaccinations but suspended cancer and cardiovascular screening programs. In Latvia, some GPs stopped vaccinations at the beginning of the emergency situation, as planned care stopped completely and there was no clear guidance on vaccinations. However, the State Council of Immunization of Latvia quickly issued recommendations to continue vaccinations. From early May 2020, all three countries began reopening routine health services. In Lithuania, service provision could only resume when the National Public Health center (NPHC, the main agency responsible for operationalizing COVID-19 response on behalf of the Ministry of Health) approved provider plans to ensure infection control, patient and medical safety, which caused some delays in resuming care. Latvia did not have similar requirements for resuming care, and individual providers could make decisions about what health care services to continue.

3.7. The Baltic countries coordinated to create a 'Baltic bubble' for movement between countries

During the first wave of the pandemic there was little collaboration between the three Baltic countries, but in some areas there were notable examples of close cooperation. Among those is cross-border movement collaboration, when the Baltic countries decided to reopen their borders to one another on May 6th 2020. This represented the first reopening of internal borders in the EU and was commonly referred to as the 'Baltic bubble'. In connection with the lifted travel restrictions, on May 14th 2020, the three Ministers of Health approved a joint statement to control the spread of COVID-19 in this common travel zone. The three countries agreed to drop the requirement for self-isolation of individuals traveling between the three countries as long as they had not visited other countries. The 'Baltic bubble' remained operational until September 2020, when infection rates across the region started rising.

4. Discussion

4.1. Early restrictions and pre-emptive measures may have limited the impact of the first wave of the pandemic

Estonia, Latvia, and Lithuania all implemented restrictions within three weeks of the first reported case in their countries and entered lockdowns with fewer than 30 reported cases. This may have determined the initially low spread and provided time to build up mechanisms for testing and contact tracing. It also provided crucial time to understand more about the virus, build on existing capacity, and coordinate the response without health systems being overwhelmed with COVID-19 cases.

The Baltic countries brought on scientific experts to advise on restrictive measures and communicate about COVID-19. While there may have been lack of communication clarity at the beginning, potentially due to multiple webpages, hotlines, and other communication channels, as well as general uncertainty about the disease, this steadied after the first few weeks. In general, society was well informed and complied with restrictions regarding isolation, social distancing, face covering requirements and internal movement.

4.2. Prioritizing and speeding up testing and contact tracing supported continuation of low case numbers

The Baltic countries performed higher tests per population than many other European countries. All countries enlisted help of private laboratories to support testing capacity and relied on GPs as well as phone lines to determine testing needs. The Baltic countries' mix of public and private testing providers was based on the

pre-existing capacity of the country, yet all countries exerted regulatory authority over testing regardless of setting. Additionally, all three countries separated the testing location from other service provision fairly early on, therefore limiting the possibility of transmitting the virus while doing tests. Furthermore, all three countries conducted preventative testing in specific population groups free of charge when conditions for targeted testing for suspected disease were met, and operated mobile testing locations flexibly in regions based on needs.

Once tests were conducted, the information moved quickly to the responsible public health authority, with all countries aiming to provide positive test results to the contact tracing authority within two days. For example, each COVID-19 case was traced and contact persons were identified and given further recommendations for testing and isolation. This enabled the countries to keep relative control on the case numbers and contacts of cases, as any delay in reporting testing has subsequent impacts on the risk for transmission [24]. Additionally, the implementation of supporting measures, such as IT tools including contact tracing apps in all countries and expanded funding for sick leave, encouraged people who might be infected to stay at home. Estonia also introduced additional IT tools for self-diagnosis and test result reporting, as well as databases to map contacts and conduct automatic calls.

4.3. Maintaining provision of non-COVID services was the greatest challenge during the first wave

All three Baltic countries made changes in their service provision by introducing remote consultations in order to meet the needs of the people when face-to-face services for non-COVID-19 health needs did not operate in full capacity. The countries also made quick decisions to allocate more financial resources to the health system and change the ways to finance services in order maintain financial liquidity of health care providers as they had to limit services and ensure additional measures of infection control.

While little data are available at this stage, it is already clear that the cancelation or postponement of routine services and non-urgent procedures will reverberate in the longer term. In Estonia and Latvia, providers had slightly more flexibility to offer services based on individual provider discretion, whereas Lithuania required that health care providers submit plans to the national level prior to reopening care, while stable financing irrespective of volume of services may have discouraged some providers from prompt restarting of face-to-face services.

4.4. The Baltic states were able to develop novel ways to procure PPE for their populations

Although case numbers remained low in first months, the Baltic states had serious issues related to the supply and sourcing of PPE. The emergency situation revealed shortages in government stockpiles of medical reserves which meant that in all countries, the health sector did not have an 'airbag' upon which to rely. This may be partially due to the difficulty of prioritizing planning and financing of public reserves, as investing in preparedness may not be considered as urgent to the health system as other issues. The governance situation and accountable ministry for sourcing PPE also switched several times throughout the pandemic, which might point to unclear roles in the case of health emergencies.

In comparison to other countries, Estonia, Latvia, and Lithuania have small markets and limited economic power, suggesting that they are not attractive to international suppliers and not able to place bids higher than other countries. This vulnerability was further exacerbated by extremely limited local production possibilities, resulting in the very realistic prospect of running out of PPE, especially for health professionals, and inability to expand testing

in the early months of the pandemic. This may have contributed to the proactive response taken by the Baltic countries to prevent the problems of PPE shortages that could overwhelm the health system.

Despite, or perhaps due to, their precarious starting point, the Baltic countries developed some creative solutions for sourcing PPE. All Baltic countries responded by centralizing procurement during the first wave, increasing local production and securing purchases from abroad. Local production of masks by both hospitals and private sector companies created additional supply, although not necessarily up to the safety standards required for settings with higher transmission risks. Also, the role of the state ambassadors to make connections with suppliers abroad may have contributed to obtaining supplies in the at crucial early weeks.

4.5. The Baltic countries generally exhibited a centralized national approach, with the one coordinated effort in the 'Baltic bubble'

Most COVID-19 measures, from quarantine regime requirements to securing physical resources, were coordinated at the national level, and although the weekly calls between the Baltic Ministers of Health during the first wave of the pandemic provided a forum for discussion, it did not lead to a cross-country health policy response within the Baltic region.

However, the 'Baltic bubble' provides an interesting case study for reopening borders, especially at a time when many EU countries did not emphasize cross-border collaboration. Beyond this, official international collaboration included co-operation within the EU structures for procurement of PPE and equipment, and, more recently, vaccines. All three countries are signatories in the European Commission's Joint Procurement Agreement since 2014 [25].

4.6. Subsequent waves of COVID-19 had a much heavier impact on the Baltic countries

As in many other countries, the Baltic countries faced much bigger subsequent waves of COVID-19, with incidence rates sometimes being among the highest in the EU. In all countries, the second wave was initially delayed until October 2020, however during that month, which in Lithuania also coincided with Parliamentary elections, trajectories started to diverge markedly. The two-stage general election on October 11th and 25th 2020 in Lithuania potentially made it politically harder for the government in power during the pandemic to start reimposing stricter measures that would match the pace of spread of the disease. By mid-November 2020, the incidence rate in Lithuania exceeded Latvia's by 3-fold and Estonia's by 4-fold (Fig. 1), and its health system started to experience pressures unseen previously.

5. Conclusion

As relatively small countries, the Baltic countries relied on central planning for many activities, and financial support was distributed at the state level. Each country included the scientific community as part of the emergency response in making prognoses and recommendations, and also looked outside of the country to international guidance from scientists, including the WHO, ECDC, and more. As the pandemic progressed, the Baltic countries established more clear lines of responsibility and paths of escalation within governance to avoid mixed messages and duplication of efforts between stakeholders.

One of the key pre-existing limitations present in all countries are the shortages of nursing staff, and this would have been exacerbated during the first wave of COVID-19 if more cases required treatment within health care facilities. Subsequent waves demonstrated that this indeed remains a major weakness of the health

systems. Yet to date the countries have not yet determined clear policies on how ensure sustainability, resilience and wellbeing of workforce, particularly during major health system shocks.

The Baltic countries did not experience a severe first wave of COVID-19 as seen in other countries, and health system resilience was not fully tested in the first months of the pandemic. Yet, the details captured in the initial response, where much is unknown, provide insight into how the countries may respond to other health system shocks. In the context of the Baltic countries, the early centralized governance and coordinating mechanisms, creative strategies to surge capacity, and the context of low COVID-19 incidence are key features of the initial response.

Disclaimer

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Declaration of Competing Interest

We declare no competing interests.

References

[1] Eurostat. Population Density. (2020). Available at: https://ec.europa.eu/eurostat/databrowser/view/tps00003/default/table?lang=en.

[2] Karanikolos M, Gordeev V, Mackenbach J, McKee M. Access to care in the Baltic States: did crisis have an impact? Eur J Public Health 2016;26(2):236–41. doi:10.1093/eurpub/ckv205.

[3] Bankauskaite V, O'Connor JS. Health policy in the Baltic countries since the beginning of the 1990s. Health Policy 2008;88:155–65.

[4] Behmane D, Dudele A, Villerusa A, Misins J, Kļaviņa K, Mozgis D, Scarpetti G. Latvia: Health system review. Health Systems in Transition 2019;21(4):1–165.

[5] Habicht T, Reinap M, Kasekamp K, Sikkut R, Aaben L. van Ginneken E Estonia: Health system review. Health Systems in Transition 2018;20(1):1–193.

[6] Kasiulevicius V, Lember M. Lithuania. In: Kringos DS, Boerma WGW, Hutchinson A, Saltman RB, editors. Building primary care in a changing europe: case studies. Copenhagen: European Observatory on Health Systems and Policies; 2015. p. 155–61.

[7] Kauno diena. "Gydymo į staigos – neviltyje: dėl COVID-19 patirtas išlaidas kompensuos tik rudenį " [Medical institutions are in despair: the costs of COVID-19 will only be reimbursed in the autumn]. (6 August 2020). Available at: https://kauno.diena.lt/naujienos/sveikata/sveikata/gydymo-istaigos-neviltyje-del-covid-19-patirtas-islaidas-kompensuos-tik-rudeni-979808.

[8] Ministry of Health. "Valstybinės ligonių kasos direktoriaus kreipimasis į gydymo į staigų vadovus" [Address of the Director of the State Health Insurance Fund to the heads of medical institutions]. (31 March 2020). Available at: https://sam.lrv.lt/lt/naujienos/valstybines-ligoniu-kasos-direktoriaus-kreipimasis-i-gydymo-istaigu-vadovus.

[9] Ministry of Health. 30 March 2020 Order. (2020). Available at: https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/37755b01732a11eaa38ed97835ec4df6.

[10] Ministry of Health. 1 June 2020 Order. (2020). Available at: https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/b6a1f3b0a55d11eaa51db668f0092944.

[11] National Health Insurance Fund. "Gydytojų specialistų konsultacijos" [Consultations of Medical Specialists]. (2020). Available at: http://www.vlk.lt/veikla/veiklos-sritys/sveikatos-prieziuros-paslaugu-bazines-kainos/Documents/0506%20Ambulatorin%C4%97s%20specializuotos%20aspp.pdf.

[12] National Health Insurance Fund. "Dauguma gydymo į staigų pasirengusios atverti duris" [Most treatment facilities are ready to open their doors]. (8 June 2020). Available at: http://www.vlk.lt/naujienos/Puslapiai/Dauguma-gydymo-%C4%AFstaig%C5%B3-pasirengusios-atverti-duris.aspx.

[13] National Health Insurance Fund. "Pasitarime gydymo į staigos paragintos greičiau atnaujinti paslaugų teikimą" [The meeting called on medical institutions to resume services more quickly]. (24 July 2020). Available at: http://www.vlk.lt/naujienos/Puslapiai/Pasitarime-gydymo-%C4%AFstaigos-paragintos-grei%C4%8Diau-atnaujinti-paslaug%C5%B3-teikim%C4%85.aspx.

[14] Murauskiene L, Janoniene R, Veniute M, van Ginneken E, Karanikolos M. Lithuania: health system review. Health Systems in Transition 2013;15(2):1–150.

[15] van Ginneken E, Habicht J, Murauskiene L, Behmane D, Mladovsky P. The Baltic states: Building on 20 years of health reforms. BMJ 2012;345:e7348.

[16] Eurostat. Out-of-pocket expenditure on healthcare. (2020). Available at: https://ec.europa.eu/eurostat/databrowser/view/tepsr_sp310/default/table?lang=en.

[17] OECD/European Observatory on Health Systems and Policies. *Estonia Country Health Profile 2019*State of Health in the EU. OECD Publishing; 2019. Paris/European Observatory on Health Systems and Policies, Brussels. doi:10.1787/0b94102e-en.

[18] OECD/European Observatory on Health Systems and Policies. *Latvia Country Health Profile 2019*State of Health in the EU. OECD Publishing; 2019. Paris/European Observatory on Health Systems and Policies, Brussels. doi:10.1787/b9e65517-en.

[19] OECD/European Observatory on Health Systems and Policies. *Lithuania Country Health Profile 2019*State of Health in the EU. OECD Publishing; 2019. Paris/European Observatory on Health Systems and Policies, Brussels. doi:10.1787/35913deb-en.

[20] Roser M., Ritchie H., Ortiz-Ospina E. and Hasell J. "Coronavirus Pandemic (COVID-19)". (2020). Retrieved from: 'https://ourworldindata.org/coronavirus' [Online Resource].

[21] Rechel B., Maresso A., van Ginneken E. Health Systems in Transition. Template for authors. (2019). Copenhagen: World Health Organization (acting as the host for, and secretariat of, the European Observatory on Health Systems and Policies).

[22] ECDC. Data on testing for COVID-19 by week and country. (26 November 2020). European Centre for Disease Prevention and Control. Available at: https://www.ecdc.europa.eu/en/publications-data/covid-19-testing.

[23] OECD Testing for COVID-19: a way to lift confinement restrictions, Paris: OECD Publishing; 2020. Available at: http://www.oecd.org/coronavirus/policy-responses/testing-for-covid-19-a-way-to-lift-confinement-restrictions-89756248/ .

[24] Rajan S, Cylus J, Mckee M. What do countries need to do to implement effective 'find, test, trace, isolate and support' systems? J R Soc Med 2020;113(7):245–50. doi:10.1177/0141076820939395.

[25] European Commission. Signing ceremonies for Joint Procurement Agreement. (2020). Available at: https://ec.europa.eu/health/preparedness_response/joint_procurement/jpa_signature_en.