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## A comparison of 2020 health policy responses to the COVID-19 pandemic in Canada, Ireland, the United Kingdom and the United States of America<sup>☆</sup>

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### ABSTRACT

This paper compares health policy responses to COVID-19 in Canada, Ireland, the United Kingdom and United States of America (US) from January to November 2020, with the aim of facilitating cross-country learning. Evidence is taken from the COVID-19 Health System Response Monitor, a joint initiative of the European Observatory on Health Systems and Policies, the WHO Regional Office for Europe, and the European Commission, which has documented country responses to COVID-19 using a structured template completed by country experts. We show all countries faced common challenges during the pandemic, including difficulties in scaling-up testing capacity, implementing timely and appropriate containment measures amid much uncertainty and overcoming shortages of health and social care workers, personal protective equipment and other medical technologies. Country responses to address these issues were similar in many ways, but dissimilar in others, reflecting differences in health system organization and financing, political leadership and governance structures. In the US, lack of universal health coverage have created barriers to accessing care, while political pushback against scientific leadership has likely undermined the crisis response. Our findings highlight the importance of consistent messaging and alignment between health experts and political leadership to increase the level of compliance with public health measures, alongside the need to invest in health infrastructure and training and retaining an adequate domestic health workforce. Building on innovations in care delivery seen during the pandemic, including increased use of digital technology, can also help inform development of more resilient health systems longer-term.

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### 1. Introduction

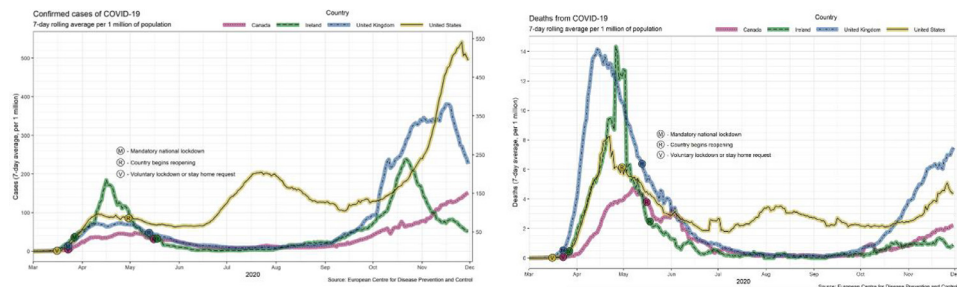
This paper discusses the response to COVID-19 in four North Atlantic countries: Canada, the Republic of Ireland (henceforth known as Ireland), the United Kingdom (UK) and the United States of America (US). These predominantly English-speaking countries have a connected history, with Canada, Ireland and the US having been territories of Great Britain, and having secured independence in the 18<sup>th</sup> (US), 19<sup>th</sup> (Canada), and early 20<sup>th</sup> (Ireland) centuries. Governmental structure is similar in Canada, the US and the UK in that Canada and the US have a federated structure, and while

**Table 1**

Selected indicators of population, health system resources and health status, 2018 or latest available year.

	Population (thousands)*	Population density (people per sq. km)**	Total Health expenditure (THE) as % of GDP	Government spending as % of THE	Physicians per 1000 population	Nurses per 1000 population	Curative care beds per 1000 population	Life expectancy, Total population at birth, Years	Mortality from preventable causes (Deaths per 100,000 population)	Mortality from treatable causes (Deaths per 100,000 population)
CANADA	36,027	4	10.8	70.4	2.74	10.87	3.0	82.0	114	56
IRELAND	4,652	71	6.8***	74.3	3.34	12.88	2.5	82.3	106	65
UK	65,860	275	10.3	77.8	3.91	–	2.5	81.3	118	69
USA	320,878	36	17.0	84.8	3.49	11.89	2.9	78.7	174	88
OECD	–	–	8.8	79.2	3.50	8.80	4.5	80.7	161	93
AVERAGE										

Source: OECD. [29] stat, unless specified. Notes: \*UN (2020); \*\*World Bank (2020) \*\*\* For Ireland, we report THE/GNI due to a significant proportion of GDP in Ireland consisting of profits from foreign-owned companies that are repatriated;\*\*\*\*from Eurostat.



**Fig. 1. Confirmed COVID-19 cases and deaths in Canada, Ireland, the UK and the US.** Note: Note: Direct comparison between countries should be treated with caution as each country has different testing capacity, availability and criteria, may measure and report confirmed cases and deaths differently, and reliability of data may also vary.

the UK formally has a unitary structure it is an evolving quasi-federation with health and social policy the responsibility of devolved governments in Northern Ireland, Scotland and Wales and the UK government in England. Ireland has a unitary rather than federal structure. Ireland is also different from the other three countries in terms of its smaller population and geographical size. While the US has the largest population of all countries, the UK is the most densely populated (Table 1).

Canada and the UK have single-payer, general tax-funded universal healthcare systems. Ireland also has a comprehensive health service funded predominantly through general taxation; however, about 40% of the population also purchase private health insurance, essentially creating a two-tier health system that enables these individuals to gain faster access to hospital care and diagnostic tests when needed. Moreover, there is no universal entitlement to public health care in Ireland, with access to primary care and some hospital services only free of charge to those meeting pre-defined criteria. The US has a mixed regime of public and private population coverage and does not assure healthcare coverage. Differences in responses to COVID-19 reflect these differences in healthcare systems and governance structures.

As shown in Table 1, many health system indicators are similar in Canada, Ireland, and the UK, albeit with Canada having fewer physicians per 1000 population and Ireland a higher number of curative care beds per 1000 population. The US has significantly higher health expenditures, higher government spending, slightly lower life expectancy and higher mortality from preventable causes compared to the other three countries.

Coronavirus arrived in the North Atlantic countries in mid-to-late January and February. The US was first to have a case on January 20, followed by Canada on January 25, and the UK on January 29. Ireland did not have a case until February 29. The number of cases per 1 million population subsequently grew rapidly, particularly in Ireland and the US (Fig. 1). Numbers of new cases fell in April and continued to fall until mid-June in all countries. Toward

the end of June, cases in the US increased, whereas they stayed steady in the other three countries until September. All countries are experiencing a surge in cases at the time of writing (November 30 2020). Throughout this period, the number of cases varied significantly from region to region in each country, or even on a more localized basis. It should be noted that comparisons based on data in Fig. 1 need to be treated carefully as definitions of confirmed cases and COVID-19 deaths varies between countries, and the reliability of data depends on the testing regimes in each country.

## 2. Materials and methods

Information in this paper was taken from the COVID-19 Health System Response Monitor (HSRM). The HSRM collects and organizes up-to-date information on how countries are responding to the pandemic. It is a joint undertaking of the World Health Organization (WHO) Regional Office for Europe, the European Commission, and the European Observatory on Health Systems and Policies.

HSRM teams of experts in the respective countries utilized a common template to search for and collect information about their country's COVID-19 response. The template divides the responses into the following categories: 1) preventing transmission; 2) ensuring sufficient physical infrastructure and workforce capacity; 3) providing services effectively; 4) paying for services; 5) governance; 6) borders and mobility. From March through November 2020 HSRM teams scanned reliable news sources, academic reports, and peer-reviewed papers in their countries using key words related to the template categories. Findings were published online in the HSRM website at: <https://www.covid19healthsystem.org/mainpage.aspx>. Detailed reports on the COVID-19 responses in the US and across Canadian provinces and territories are published by the North American Observatory on Health Systems and Policies (NAO). In October and November 2020 the HSRM teams of the four countries in this review filled out a questionnaire detailing their

**Table 2**  
Preventing transmission: physical distancing measures and lockdowns.

	First Case	National State of Emergency	Travel restrictions	Lockdowns or stay at home orders	Lifting of first lock-down measures	Re-opening approach	School closings and reopening	Physical distancing & mask mandates
CANADA	Jan 25	On a regional (PT) basis March 13 -27	March 18	No compulsory lockdowns; voluntary stay at home advice issued, prohibitions on public and private gatherings varied by PT	Mid-May	Phased, varied by PT	Early spring 2020, fully reopened September, with timing varying by PT	Varied by PT/municipality
IRELAND	Feb 29	No	Advisory Quarantine	National mandate, end of March	May 29	Phased, national until August when took regional approach	Spring 2020, fully reopened September	National mandate
UK	Jan 29	No	Advisory quarantine	National mandate, end of March	Mid-May	Phased, varied by country	Spring 2020, fully reopened September	Varied by country
US	Jan 20	March 13	1/31- China; March– Europe & Canada	National voluntary, March 16; Some mandates in state/local areas	Some states late April, early May, most states mid-May	Phased, varied by state/ local	Spring 2020, reopened to various degrees late August- early September	Varied by state/ local

country's COVID-19 responses from January through November in each of the template categories and met virtually to discuss their findings. Teams synthesized and compared results across countries. Unless otherwise noted, citations for the results are posted online in the countries pages on the HSRM and NAO websites. Additional citations not in the country pages are noted in the text and referenced at the end of the article.

### 3. Results

#### 3.1. Preventing transmission

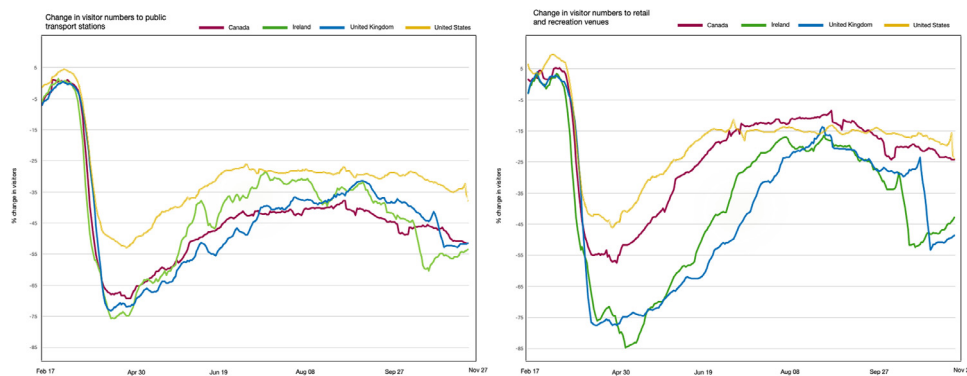
All countries implemented a variety of travel restrictions, lockdowns and physical distancing measures to prevent transmission (Table 2). The prevailing thought from public health experts was that measures such as restricting travel and lockdowns would be temporary and would give countries time to implement pandemic plans, prepare public health and acute care infrastructure and the healthcare workforce (Gostin & Chertoff, 2021).

Despite its federalist structure, the US was the only country to declare a national state of emergency, while Canada did so on a provincial and territorial (PT) basis. Similarly, the US was the first to restrict international travel, but only from China, on January 31. This was extended to Europe and Canada in March. Canada prohibited foreign nationals from entering the country for non-essential travel starting March 18. Unlike many other European Union (EU) Member States, Ireland and the UK (which was still in a transition period from leaving the EU) never formally closed borders or restricted international travel; most international arrivals were nevertheless required to self-isolate for 14 days. The UK, Canadian and Irish governments also advised residents against non-essential international travel. These restrictions came days to months after reports of cases were surfacing in several countries, and did not cover all countries experiencing outbreaks [8].

Neither Canada nor the US mandated national lockdowns, whereas Ireland and the UK did so at the end of March. The regional/state approach to lockdowns in the US and Canada follows their federalist structure. An additional factor in Canada may have been negative public reaction to a 1970 event in which an emergency measures act was used against a radical separatist group.

Instead of national mandates in Canada and the US, residents were strongly advised to stay at home (voluntarily) as much as possible except for essential activities. In many regions of Canada, PT and local governments restricted gatherings, and closed schools, parks and non-essential businesses, imposing substantial fines on violators. In some regions in the US, similar limits were placed on gatherings, with schools, dine-in restaurants and other indoor or outdoor venues closed in areas with high rates of transmission (US). Some Canadian PTs had restricted travel into their PT or state for periods of time.

In Canada, the Prime Minister appealed for residents to voluntarily “go home and stay home” on March 23, 2020, at a time when 1430 cases and 20 deaths had been reported. By the time of the national advisory to stay at home on March 16 the US already had 3,774 cases and 69 deaths. In the UK, a national lockdown was announced on March 24 at a time when there were 10,312 reported cases and 364 deaths. However, the number of reported cases in the US and UK at this time is likely to be underestimated as testing was limited. A mandatory stay at home order was issued in Ireland on March 27, when 19 deaths and 1,819 infections had been reported. Ireland's decision to order a national lockdown at a comparatively early stage was informed by witnessing what was happening in other parts of Europe and North America, and the country's poor health infrastructure such as low numbers of hospital beds and ICU beds that would be overwhelmed by high numbers of infections. The UKs decision to lockdown was likely taken too late, but lack of testing limited knowledge on how far the virus has spread through the country. The UK ultimately locked-down following the public release of modeling studies showing that the



**Fig. 2. Google Community Mobility Trends: Visits to retail and recreation venues and public transport stations in North Atlantic Countries February –November 2020.** Notes: Change in visitor numbers is measured relative to a baseline day; a baseline day is the median value from the 5-week period between Jan 3rd and Feb 6th 2020. This index is smoothed to the rolling 7-day average. Source: Ritchie [35], Google COVID-19 Community Mobility Trends (2020).

National Health Service (NHS) would be overwhelmed if such actions weren't taken.

As an indicator of the strictness and adherence to lockdowns, Fig. 2 reports the change in the number of visitors to non-essential businesses and services and use of public transportation from February through November 2020. Trends show that all countries experienced a sharp drop in visits to retail and recreation venues and public transportation use in March albeit with a smaller decline in the US, continuing through April, and increasing only slightly after that.

All four nations began coming out of full or partial lockdowns in early (US)-to late (Ireland)-May (Fig. 1) using a phased reopening. All but Ireland initially took some form of a regional approach, with Ireland later taking a more regional approach from August 2020. In Canada, the PTs and local governments decided the level and timing of reopening, resulting in some jurisdictions opening much earlier than others. While the Public Health Agency of Canada (PHAC) released guidelines for reopening, PTs and local governments generally did not follow recommendations. In the UK, the devolved nations kept the lockdown in place longer than England due to concerns that cases and the R-number were still too high. In the US individual states decided the level and timing of reopening. Decisions were not always based on the Centers for Disease Control and Prevention (CDC) guidelines, as several states began reopening while case rates were still high and testing was not up to recommended levels.

Schools and universities were closed nationwide in early spring 2020 in all countries (with exceptions for children of essential workers in Ireland and the UK). Schools fully re-opened in September 2020 with enhanced cleaning and safety precautions in Canada, Ireland, UK, with variation in timings across PTs and UK nations. Primary and secondary schools and some universities partially or fully reopened in the US in September.

Physical distancing and the wearing of masks by all individuals inside public places became important measures enabling easing stay-at-home restrictions and lowering transmission of the virus for those in public places. As with other measures, only Ireland took a national approach. A proportion of the population did not adhere to mandates/guidelines regarding masking and social distancing in all countries, except Ireland.

### 3.1.1. Testing

Table 3 presents information on testing in the four countries. Testing is fundamental for generating accurate surveillance data that can guide the implementation of appropriate public health measures. However, the public health systems of all countries faced challenges in procuring, manufacturing and distributing test kits as well as building up lab testing capacity in the face of high demand

early in the pandemic. For example, the UK had limited laboratory capacity prior to the crisis, and outsourced testing to private companies with no experience in the area, who often failed to deliver on targets. In the US initial testing development and capacity were hindered by defective tests and slow enlistment of private laboratories.

Due to these start-up challenges, all four countries decided to prioritize testing eligibility, focusing on testing symptomatic individuals, travellers returning from high incidence areas, and/or high risk groups. In periods when testing capacity was overwhelmed, tests were restricted to priority groups. In Ireland in late March, for example, testing was limited to healthcare workers, close contacts of a confirmed case, pregnant women, and those with chronic conditions; this was relaxed in May when anyone with symptoms became eligible for a test.

Canada and the US did not have a uniform testing strategy, and shortages of testing supplies occurred in some areas. As a result, testing capacity and eligibility varied by PT, state and local government jurisdiction. In Canada some PTs performed fewer tests than physical capacity allowed and had a growing backlog of tests. In the UK, all nations had similar testing eligibility, although the devolved nations tested essential workers earlier than in England and there were differences in timing of non-symptomatic testing in nursing homes.

Differences existed among the four countries on whether referrals were needed to get tested, and if so, by whom. In Canada and the US, the need for referrals varied by region and time period. In some PTs at certain times no referral was needed, while in others referral through a self-screening tool, COVID-19 hotline, primary care or specialist physician has been needed. In areas with low testing capacity, a referral from the head of public health was needed. In October testing in Ontario was restricted to by-appointment only. In the US, testing decisions were at the discretion of individual providers and local or state health departments, and varied by state, county, and city. In contrast to this regional approach, Ireland and the UK had more uniform requirements, but differed as to whether referrals were needed. In Ireland, a health professional referral was required, whereas in the UK symptomatic individuals could self-refer and general practitioners could not order tests.

All countries took action to develop new testing locations to help enhance testing capacity and improve access. Testing locations varied across countries, with primary care playing a more important role in Ireland and the US than in Canada and the UK. In Canada, testing occurred in emergency departments, designated hospitals, mobile clinics, and drive-through facilities. Some regions offered in-home testing. In Ireland, testing has taken place in hospitals, offices of GPs, COVID testing centers, meat factories and

**Table 3**  
Preventing transmission: testing.

	Initial focus on priority populations*	Uniform testing strategy	Shortages of supplies	Referrals needed?	Locations	Test reporting time	Daily COVID-19 tests per thousand people in March/April (7-day smoothed)*	Daily COVID-19 tests per thousand people in October (7-day smoothed)*	Absolute (and relative) change in daily testing between March/April and October
<b>Canada</b>	Yes	Varies by PT	Yes	Varies by PT	EDs, mobile units, drive throughs	Varies across and within PTs (e.g. from 2.75 to 5.75 days by region)	0.16 (March 18)	1.84 in 10/16	+1.68 (+1,043%)
<b>Ireland</b>	Yes	Yes	Not after initial period	Everywhere provider referral required	Hospitals, GP offices, testing centers	2-3 days, not always achieved	0.32 (March 25)	2.90 in 10/16	+2.58 (+820%)
<b>UK</b>	Yes	Some variability in devolved countries	Not after initial period	Everywhere: anyone symptomatic can get a test	Test centers, mobile units, home tests	59-61 hrs, not always achieved	0.26 (April 7)	3.85 in 10/16	+3.59 (+1,365%)
<b>US</b>	Yes	Varies by state/local	Yes	Varies by state/local	Physician offices, urgent care, testing centers, drive-thru	3-4 days (5-7 in some areas)	<0.01 (March 8)	3.18 in 10/16	+3.18 (+105,867%)

Notes: \*symptomatic individuals, travelers returning from high incidence areas, and/or high risk groups; \* Source: [20].

nursing homes. In the UK, regional and satellite test centres and mobile testing units have been set up, and self-administered home testing has been introduced. In the US, testing can take place in physician offices, COVID testing centers, urgent care centers, and drive-through centers.

Another consideration is test reporting time, which needs to be within a few days for contact tracing to be effective. Table 3 reports recent testing times on average in each of the countries. Reporting times are similar in Ireland and the UK, but vary between US states and Canadian PTs.

Testing capacity has grown phenomenally since the start of the pandemic, as Table 3 shows. Ireland had the capacity to conduct around 100,000 tests a week by August, but this was not utilized until the September/October surge when testing needs reached and exceeded capacity by mid-end of October. By mid-October Canada was testing 1.84 per thousand per day, Ireland 2.90, the UK 3.85, and US 3.18 (Hasell, Matheiru Beltekian, et al, [17]). Still, no country reports meeting its testing target consistently in all regions.

### 3.2. Physical infrastructure and workforce

Shortages of medical technologies and supplies including ICU beds, ECMO (extracorporeal membrane oxygenation) machines, testing equipment and PPE, occurred in the first months of the pandemic in all countries. In the UK and US, PPE shortages in hospitals and nursing homes were reported to be severe (McGarry [26]). While Canada and Ireland did not experience widespread shortages of PPE in hospitals, they did initially in nursing homes and community services including GPs.

Although it is natural that medical supply shortages would occur during a pandemic, these four countries had a tight supply of acute-care beds to begin with, making it especially difficult to keep

up with the acceleration of acute-care cases (Table 1). Additionally, US, healthcare institutions have high occupancy rate and stock inventory very leanly [34], so as COVID-19 infections accelerated the existing supply of ICU beds, ventilators and PPE quickly fell behind demands. National stockpiles in all countries were insufficient to cover the rapidly increasing need for PPE, ventilators, and other equipment.

In all countries, equipment and supplies from usual sources were not enough, so businesses retooled to produce needed items. For example, in Canada, Ireland and the UK, liquor producers were retooled to make hand sanitizer, with clothing manufacturers producing face masks. In the UK and US manufacturers with little or no experience in making ventilators were publicly funded to commission or make these products, leading to concerns over non-transparent and unusual procurement procedures.

Due to the shortages of medical equipment and supplies, standards and regulations were relaxed in all countries for some items, such as hand sanitizers in Canada and the UK and for ventilators in the UK and US. Problems with quality of the items were found with PPE from China in Canada and Ireland, and with nationally produced ventilators in the UK and US. In addition, the price paid for these items were sometimes above the usual market rate.

In the US, pre-pandemic primary care and possibly specialty care physician and nursing shortages existed (Haddad, Annamaraju & Toney-Butler, 2020). Ireland had a comparatively low rate of doctors pre-crisis, while the UK faced chronic workforce shortages in particular for nurses and across social care. In Canada, workforce shortages were evident mostly in rural parts of the country before the pandemic, but they became more pressing, especially among critical care nurses (e.g., in Ontario), and LTC workers in hard hit urban areas [25].

As the pandemic grew all countries experienced some degree of shortage of health professionals and social care workers. Shortages in the UK and US might have been less severe had the countries not had sizeable pre-existing workforce shortages.

The shortages were exacerbated by PPE shortages, leading to high infection rates among health and social care staff. In Canada, 19.4% of confirmed COVID-19 cases occurred among healthcare workers and resulted in 12 deaths as of July 23, 2020. A large number of LTC staff (9,650) contracted COVID-19, resulting in 9 deaths as of May 25 2020. In Ireland, 16.6% of healthcare workers contracted the virus by the end of November. In the UK COVID prevalence was 3.3 times higher for health workers in patient-facing roles than the general public. In the US, COVID prevalence was 1.3 times higher among healthcare workers than in the general populace and as of September 2020, over 1,700 healthcare workers had died from COVID-19. Although these estimates are different across countries and cannot be compared as they are reflective of eligibility for testing for health workers, they indicate the extent of healthcare workforce infections in the respective countries.

### 3.3. Providing services effectively

As noted, routine healthcare services, such as annual checkups and non-urgent elective procedures, were postponed in all countries in mid-March or, particularly in the case of primary care, moved online, and any excess capacity was utilized for COVID-19 care. In Canada, some healthcare workers were redeployed to long-term care facilities, testing centres and field hospitals. In Ireland the government bought private hospital care for the surge in cases and redeployed public health staff to COVID-related testing and care. The National Health Service (NHS) in England also block-bought capacity in private hospitals, temporarily bringing 10,000 beds and private sector staff into the public sector. In the US medical-surgical units were converted to ICU beds and healthcare workers were moved to areas of greatest need.

In addition to making use of excess capacity, Canada repurposed decommissioned hospitals and non-medical facilities, such as hotels, for COVID care. Retired staff were called back, and licensing was expedited. In Ireland, some hospitals reorganized so that patients were cohorted and the most experienced decision-makers were on the wards. The UK built new temporary “Nightingale” field hospitals in several cities and also took steps to bring retired, otherwise inactive and foreign-trained but unregistered health professionals in to support the response. New hospital discharge policies also allowed for urgent discharge of patients medically fit to leave. This freed up 15,000 beds in England, but resulted in patients being discharged into care homes without being tested or required to isolate, likely spreading the virus to a vulnerable population.

Not all the capacity built up by these measures ended up being used. In Ireland, the expected surge that prompted the government to buy private hospital beds never materialized. In Canada and the UK, field hospitals built to handle COVID patients were not heavily utilized but remained on standby for the second wave.

Countries began providing routine services again in early summer. Canada and the UK took a phased approach, with essential services such as cancer screening programmes permitted before elective procedures and procedures such as routine dental care, last given the potential high-risk from prolonged face-to-face contact and potential need for special infection control measures. Ireland opened up all routine services gradually from July with a plan to do so safely. The US also reopened routine outpatient visits, routine dental care, and elective procedures. The postponement of routine services has created a substantial backlog of patients needing care and contributed to lengthening waiting lists. In the UK for example, the proportion of patients waiting more than 18 weeks

for routine care following a referral increased from 16.5% in January 2020 to 48% in June 2020 [33].

### 3.4. Paying for services

Government-funded healthcare systems covered all residents, immigrants and overseas visitors for COVID-19 testing and care in Canada, Ireland, and UK. In the US, without universal healthcare, testing was covered for everyone, but care for the illness was not. Through the Families First Coronavirus Response Act (FFCRA) COVID-19 testing was available free of charge for everyone, and co-payments for COVID-19 testing for all types of insurance were waived. Care for privately and publically insured individuals ill with COVID was covered through their insurance, with co-payments and deductibles waived by many insurers. Some insurance companies removed prior authorization and out-of-network requirements. For the uninsured, which was 12% of the population going into the pandemic, and which rose by 5.4 million as employer-based insurance was lost with job losses, acute stabilizing hospital care would be covered in non-profit hospitals' through their charge to accept charity care (although hospitals might try to get funds from the patient). Hospitals received funds through the CARES Act to help them with the additional expenses from this uncompensated care. For services other than acute hospital care, the uninsured either needed to pay out of pocket or have insurance.

These measures assured financial access to COVID-19 care in Canada, Ireland and the UK, but in the US uninsured and some insured individuals experienced financial barriers, with emerging evidence of high levels of foregone care during the pandemic in the US due to financial concerns [2]. Additionally, out-of-pocket expenses for the uninsured and some insured in the US has left families with medical debts.

Evidence is also emerging that Black Americans are disproportionately affected by the coronavirus [4]. This is hypothesized to be due to both socioeconomic and health system factors. People with a black or South Asian ethnic background in Canada and the UK have also been shown to be disproportionately affected by coronavirus (ONS, [30,32]). This is unrelated to health care coverage, but instead driven by multiple factors including those that place these groups at greater risk of exposure to infection [7].

### 3.5. Governance

COVID-19 response leadership is summarized in Table 4. All countries had pandemic plans in place prior to COVID. However, the plan in the US was not activated. Various national public health departments were responsible for coordinating the response at the national level, but in the US, a multi-agency ad hoc Coronavirus Task Force established by the Trump administration initially overshadowed the public health agencies. In all countries, regional public health agencies were responsible for activities in that area.

Public health agencies/services were not fully independent from the government in any country. While Canada and Ireland did not experience any significant issues with this, the US experienced increasing Trump administration interference in public health decisions, announcements, and guidelines.

Scientific advisory bodies were activated or formed by governments in all countries to provide evidence-based recommendations to policy makers. Independent scientists in the UK and US have, however, criticized the undue governmental influence on these bodies. In the US, the Trump administration went as far as rewriting scientific guidelines to correspond more to the administration viewpoint and gave advice that directly contradicted that of scientists.

In all countries, there has been push-back from politicians on the stringency of measures to reduce transmission, although in

**Table 4**  
COVID-19 response leadership.

	Pandemic plans	National public health response coordination	Regional public health responsibilities	Independence of public health agencies.	Independence of scientific advisory groups
<b>Canada</b>	Yes	Centre for Emergency Preparedness and Response, a division of the Public Health Agency of Canada (PHAC). Multiple committees work to coordinate responses across the country.	PT ministries of health and public health agencies	PHAC is an agency of the federal government. PT public health agencies are part of government public health systems, with some PT “arm’s length” agencies (e.g., Public Health Ontario and British Columbia Centre for Disease Control).	Many federal and PT scientific advisory groups with varying levels of transparency. The federal Minister of Health oversees PHAC; president and Chief Public Health Officer appointed by Prime Minister.
<b>Ireland</b>	Yes	Department of Health hosts National Public Health Emergency Team (NPHE) and HSE. New inter-mediary structure in Sept with secretary generals from government departments.	Regional public health departments	Part of government, but NPHE is reasonably independent. No undue influence by government on agency.	Coronavirus Expert Advisory Group advises NPHE; is independent of government
<b>UK</b>	Yes	Department of Health and Social Care (DHSC)	Public health departments in each nation	PHE is an executive agency of the DHSC and accountable to UK government; public health departments in devolved nations accountable to governments.	Scientific Advisory Group for Emergencies (SAGE), New & Emerging Respiratory Virus Threats Advisory Group, Advisory Committee on Dangerous Pathogens, and others. Some questions regarding independence as some SAGE members are government employees while meetings attended by government advisors
<b>US</b>	Yes, not activated	Centers for Disease Control and Prevention (CDC) + Corona-virus Task Force	State, county, and city public health departments	CDC part of US Department of Health and Human Service (HHS); issues with gov. interference in public health decisions & guidelines	Dr’s Fauci and Brix on the Corona virus Task Force, CDC, National Institutes of Health. These were marginalized over time, scientific evidence ignored & contradicted by gov.

Canada this has been limited to a couple of PT governments. In Canada, there are variations across the country, and some media reports of politicians in a minority of provinces not always following public health expert advice during the second wave of the pandemic. In Ireland, the government response has followed public health advice but with some deviation since June. In the UK, conservative Members of Parliament (MPs) have opposed a national lockdown during the second wave, although the Cabinet has generally not been openly critical of scientific advice. In the US the situation went beyond push-back to take the form of interference in scientific and public health guidance.

All but Ireland responded to the pandemic in a decentralized manner, reflecting their political structures. The response in Canada was largely led by PT governments, with the federal government providing a supporting role, especially regarding income supports for individuals and businesses. Although there were varying levels of transparency, most measures appeared to be evidence-based. However, sometimes conflicting messaging across different orders of government has, at times, created confusion among the public. In the UK, the devolved nations and the UK government in England, largely took an aligned “four nations” approach at the beginning of the pandemic until reopening began in May, when devolved nations reopened slower and instituted mandatory use of facemasks earlier than England. As with Canada, the divergent rules created some confusion among the public over which rules were in place and why. In the US, the Trump administration abdicated leadership by April, with State and local governments stepping-in. Responses differed based on region, with the south and central states opening earlier and/or faster, and not mandating physical distancing and mask wearing. In contrast to the decentralized approach of these three countries, Ireland’s re-

sponse was led nationally through the Department of An Taoiseach (Prime Minister), the Department of Health, and the HSE, guided by the National Public Health Emergency Team (NPHE).

#### 4. Discussion

The findings above bring out similarities and differences in COVID-19 responses in the four North Atlantic countries. Below we summarize some key findings and suggest lessons that emerge from these. Since findings are descriptive in nature, the lessons we draw from them are also necessarily qualitative. It should also be acknowledged that decisions were made against much uncertainty and rapidly evolving evidence, and governments and scientific advisors had to take actions that had never been done before. Decisions were also influenced by health system capacity and fragility going into the pandemic.

*4.1. In some countries lockdown measures were potentially implemented too late or were not strict enough, while reopening may have begun too early*

COVID-19 cases first appeared in Canada, the UK and the US in late January but lockdowns did not occur until the end of March (Fig. 1). Further, in Canada and the US there were no national mandates or even by PTs in Canada. Earlier and mandated national lockdowns might have resulted in lower spread of the virus. However, Canada’s cases and deaths per population were much lower than the other countries (Fig. 1) despite recommendations to stay at home only being advisory. Also, Ireland initiated a national mandated lockdown within a few weeks of their first case (Table 2), but its per capita cases and deaths were high. This



highlights that specifics and strictness of lockdown and reopening mandates/guidelines and population adherence to the mandates/guidelines were also important factors in the severity of the first wave.

All countries began reopening in early-to-late May under varying circumstances (some with better control of the virus and more effective surveillance; see Fig. 1) and with varying approaches (national versus decentralized, varying strictness and phasing of containment measures). Most countries' cases and deaths continued to fall in June–August as countries reopened. However, the US experienced a rebound or second wave in June–August, and all countries are undergoing another wave beginning in September that is ongoing into November. The rebound spike in the US may have been due to lack of national mandates and certain states not following CDC guidelines for reopening safely [1]. Similarly, reopening plans for Canadian PTs did not follow the recommendations of PHAC as there was not sufficient testing, tracing, or supports for isolation in place at the time of reopening and surveillance capacity was insufficient. These findings reflect those of Han and colleagues (2020) who find that a number of high-income countries, including the UK, opened up before surveillance was ready and infections were being adequately suppressed. Going forward, they advise that reopening after lockdowns should occur gradually and cautiously and restrictions should not be eased until the situation can be well monitored.

#### 4.2. Canada, the UK and US experienced some noncompliance with containment measures and “pandemic fatigue” among the population

With the exception of Ireland, countries experienced some non-compliance with containment measures (such as physical distancing and wearing masks), which may have contributed to virus spread. The higher levels of compliance in Ireland in part relates to the close alignment between public health advice and political leadership in the early months of the pandemic, which allowed for clarity of message and uniformity in responses. However, over time, with changed political leadership, this wavered.

Several factors have possibly contributed to non-compliance in the other countries. First, changing and/or conflicting messages about how to contain the spread of the virus could contribute to non-compliance once new and more restrictive measures are announced [3]. Lack of prior experience with pandemic restrictions may also play a role, as some Asian countries appear to have been more successful because the public has gone through several pandemics and are conditioned to cooperate with strict rules and invasive surveillance [19].

Another factor, especially relevant during the second wave, is “pandemic fatigue,” described as “demotivation to follow recommended protective behaviours, emerging gradually over time and affected by a number of emotions, experiences and perceptions” (World Health Organization [40]). Strategies that may help reduce pandemic fatigue include acknowledging hardship and minimizing restrictions to allow people to live their lives to the greatest extent possible. It is also important that government officials and key public health leaders adhere to measures.

Compliance was also affected by concerns that measures such as lockdowns and social distancing cause too much damage to the economy. While it is undeniable that containment measures cause harm to the economy and that extreme measures such as lockdowns should be evaluated for their economic impact, there is evidence that early and effective public health measures that lead to quick control of a pandemic could reduce economic fallout whereas slowly implemented and lax measures delay pandemic control and contribute to a longer and deeper economic downturn (see for example research by Gros and colleagues [16,39,31]). In addition to effective public health measures, appropriate socio-

economic policies that help protect businesses, jobs and livelihoods are needed to reduce economic damage and gain adherence to public health measures (Thunstrom et al., [39]).

The final factor in noncompliance is the belief by a segment of the population that public health measures such as wearing masks, social distancing, and lockdowns, limit their freedoms and conflict with their rights. While these beliefs are an understandable reaction to the drastic change in lifestyle associated with pandemic containment measures, to some degree these beliefs have been encouraged by certain political parties, leading to a politicization of adhering to containment measures (Golwitzer, et al., [14]). For example, following the lead of President Trump in the US, a proportion of the population believes that the pandemic is overhyped by scientists and that illnesses and deaths are not significant, and/or the containment measures infringe on their freedom and rights [3]. The same strategies employed for pandemic fatigue may help with addressing this type of noncompliance, as well as public health, community, and business messaging of the importance of the containment measures [36] and national or regional mandates [6].

#### 4.3. All countries experienced challenges in building up testing capacity and implementing supporting test, trace and isolate strategies

All countries faced initial shortages of testing supplies and other testing challenges. Although testing capacity ramped up phenomenally, it is not consistently at recommended levels in any of the four countries. Future waves will likely challenge the system even more. Additionally, following through with contact tracing and isolating, which are both essential for breaking the chain of transmission, has been challenging. England, for example, has capacity to do more than 200,000 tests per day but problems with centralized testing and tracing systems and app failures, among other issues, have resulted in continued underestimation of cases and insufficient numbers of people exposed to infections being traced [10,19]. Crozier and colleagues [9] have developed a number of recommendations to improve the effectiveness of testing, including: testing criteria be expanded to include a wider variety of symptoms (e.g. the 11 defined by the CDC); local testing be scaled up; and greater utilization of lab capacity in universities and research institutes. To improve tracing they recommend additional training of contact tracers, integration of tracing systems, and focusing resources on identifying clusters, among other suggestions. Better sick pay coverage and identification of employers that do not allow employees to take time off if exposed to infection may improve self-isolation rates.

#### 4.4. Shortages of healthcare workers and PPE may have contributed to high rates of infection among healthcare workers in some countries

All countries experienced shortages of healthcare personnel and PPE during the pandemic, a challenge common in other high-income countries [19]. Studies have found that among other factors, insufficient PPE likely contributed to high rates of Coronavirus infections among health and social care workers [9,28], which in turn accentuated workforce shortages [19]. It is possible that shortages of healthcare workers during the pandemic may lead to workers working while infected with COVID-19, leading to further transmission among co-workers and patients, and to personal safety errors due to overtime and/or work stresses [5,11]. The obvious fix for these issues are ensuring better availability of PPE and staffing, but staffing shortages, particularly of physicians and nurses, are endemic in the UK and US, making this difficult to accomplish. Having a bigger pandemic stockpile of PPE would help reduce initial shortages, while a plan for implementing production

and distribution of PPE at the start of a pandemic would help keep supplies up after the stockpile runs out. Procedures need to be in place to make sure stockpiles are reviewed and updated regularly. How much to have in a pandemic stockpile is a key question that needs researching.

#### 4.5. Surge capacity initiatives interrupted routine care and will have long-term implications for waiting lists and health outcomes

All countries cancelled or delayed non-essential care during the pandemic to create surge capacity, while people delayed care-seeking when needed out of fear of catching COVID-19 in health care settings (Health Foundation [21]). Together, these factors led to a significant drop in health care utilization during the pandemic in all countries (Mehrotra et al., [27]; [13]; IHCA [22]). These delays will contribute to already long waiting lists in all countries and are likely to have severe implications for health outcomes going forward. A recent analysis from the UK, for example, suggests that interruptions to cancer care and screenings during the pandemic will lead to a sizeable increase in avoidable deaths from cancer over the next five years [24].

Countries have already begun to address built-up demand and longer waiting lists by adopting a number of innovative responses. These include the enhanced use of digital technologies such as remote consultations, eHealth records and e-Prescribing, as well as greater use of patient triage and reconfiguring care pathways. More research on the effectiveness of these different measures will be important to assess which may help best restore and rebuild health care services in a way that can help countries prepare for future crises and build a more resilient health system [38]. Overcoming the issues created by postponed or cancelled care will nevertheless be more difficult in countries such as Ireland, UK and US that entered the crisis with insufficient physical infrastructure and workforce shortages.

#### 4.6. Lack of entitlements to care may have affected access to treatment in the US

All but the US ensured that payments for COVID-19 testing and treatments were covered. In the US, although testing was free to all, treatment of COVID for the uninsured was not guaranteed. Little has been published on the effects of gaps in insurance coverage in the US on access to treatment and outcomes. If the past is any indicator, studies of the H1N1 virus found that the US uninsured were more likely to delay treatment and get care in an emergency room rather than doctor's office and were less likely to get vaccines and antiviral therapy [23].

It should be noted that financial barriers for some non-COVID conditions remain in both Ireland and the US, since neither country provides universal coverage for health care. With many of those who contract COVID ending up with long-term health effects and the postponement of non-essential care during the pandemic increasing waiting lists for other conditions, this is problematic. It is important that both countries continue efforts to progress towards universal health coverage post-crisis.

#### 4.7. Governmental officials pushed-back and influenced or interfered in scientific pandemic leadership and guidance in some countries, especially the US

In this finding we distinguish between governmental pushback on the one hand, and influence or interference on the other. By pushback we mean that public health/scientific advice was made public and then the government criticized or disagreed with it, and may have taken other actions. Influence can be described as

the government being involved in public health/scientific decision-making, including by actively changing guidelines, data and reports.

At one time or another in Ireland, the UK and US there was push-back from national and/or regional government officials on the stringency of measures. In the US pushback was related to the politicization of the pandemic, with opposition to containment measures by the Trump administration and populist leaders [18]. At this time, little has been written regarding causes and effects of pushback. The reaction appears to be due to governments having to consider not only virus containment but also maintaining the economy and, in the US, considering the electoral cycle. Unfortunately (and ironically), pushback undermines public health guidance in pandemics and could contribute to prolonging the pandemic, thereby exacerbating the deleterious effects on the economy. In Canada and the UK, there was discord between scientists and public health experts, with the scientific community criticizing some government decisions or requesting that stronger action be taken; in some cases this resulted in the government changing course.

In the US, the government went further to be *involved* in public health and scientific decision-making, thereby influencing and interfering with the development of guidelines, guidance and reports. As with pushback, studies have not been conducted regarding factors that influence these actions or the consequence of them. Negative consequences are likely to be even more pronounced than with pushback.

These findings highlight the importance of trust and collaboration between the government and public health and scientific bodies when dealing with pandemics. Gostin [15] writes that the single most important pandemic lesson is that leadership and public trust is crucial. We would add that in order for this to occur the government must trust the advice of public health and scientific experts and work with these bodies to produce and publicize the best evidence on pandemic measures.

#### 4.8. The ability of the federal system to compensate for federal failure may have provided a safety net, but may also have created mixed messaging

The increased flexibility of a more decentralized approach in Canada, the UK and US appears to have had both positive and negative consequences. It helped by allowing for specificity in COVID responses and prioritizing of resources. In Canada, public health agencies could meet the specific epidemiological needs of the locality. For example, most cases initially occurred in the larger more populous PTs; thus, additional measures were taken in these areas (e.g. mandating face coverings). In some northern and remote regions with high-risk populations, strict travel bans were implemented. Also, flexibility in economic relief measures allowed PT governments to prioritize sectors and individuals in their region most in need of support. In the UK, public trust in the devolved administrations was higher than in the UK government potentially increasing adherence to public health measures [12]. In the US certain state governors were able to take a more scientific approach than if the Trump administration had controlled the response (for example, appropriate phase of reopening, mandating or recommending masks and physical distancing). Decentralization in the US occurred down to the local level. If state governors did not take appropriate measures, county public health departments could step in and put the county under more stringent measures. If the county did not, the city government could do so (except where state governors ruled against local autonomy).

The increased flexibility had a downside too. In Canada it delayed responses in some areas and produced disparate messaging at the beginning of the pandemic. For example, certain areas pro-

moted traveling for the school break while others asked residents to avoid non-essential travel. It also hindered coordination in securing PPE and service delivery, particularly in long term care. Finally, there were differences in contact tracing and testing capacities with some PTs being over capacity, but others under. In the US, the drawback to decentralization was that some states took a less scientifically advisable approach. As Altman [1] observed: "...the result when you leave it to states to decide (is): pacesetters, a muddled middle, and laggards, often in the South. The consequences this time may be tragic (p. 1)." In even starker terms, the *New England Journal of Medicine* on October 8, 2020 placed much of the failure to contain the pandemic and many of the deaths in the US on the lack of leadership [37] from the Trump administration.

## 5. Conclusion

This paper has presented a comparison of the COVID-19 responses in Canada, Ireland, the UK and US during the first wave of the COVID-19 pandemic. Our analyses reveals that all countries faced a number of challenges in putting in place requirements for an effective pandemic response, including rapidly scaling-up testing capacity, implementing effective and joined-up test, trace and isolate systems, ensuring adequate supplies of PPE and other essential equipment and creating surge capacity. Many of these issues were exacerbated by countries entering the COVID-19 pandemic with shortages of health workers, insufficient hospital capacity and inadequate pandemic stockpiles.

All countries introduced innovative solutions to try and overcome these issues such as enhanced use of digital health technologies, and assessing their effectiveness will be important to help countries prepare for future waves. Experiences also reveal that strong and consistent alignment between public health, health system and political leadership and messaging will be key to ensuring public compliance with any future public health measures. Moreover, universal coverage is important to reduce unmet care needs and health inequalities among vulnerable population groups that have placed some groups at higher risk from COVID-19 than others. In the longer-term, investing in health sector physical infrastructure and training and retaining an adequate domestic health workforce will be fundamental to create a resilient health system, both in the countries studied and elsewhere.

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## Declaration of Competing Interest

None to declare.

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