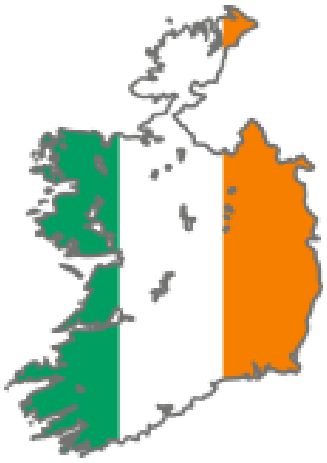
Ireland physical distancing policies and epidemiology from January - August 2020: A case report

Policy Frameworks and Epidemiology of COVID-19 Working Group

March 2021



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Conflicts of Interest

No conflicts of interest were reported.

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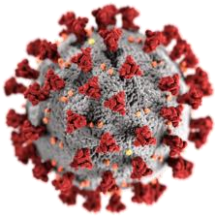
I. Introduction and project description

A new disease that spread around the world

On December 31, 2019, the World Health Organization (WHO) was notified of a cluster of individuals with pneumonia of unknown cause in Wuhan, China. (1) On January 12, 2020, China shared the genetic sequence of the novel coronavirus with other countries to help develop diagnostic tests. (1) Thailand reported the first known case of the novel coronavirus outside of China on January 13, 2020. WHO declared the novel coronavirus (2019-nCoV) outbreak a Public Health Emergency of International Concern on January 30, 2020 with 7,711 confirmed cases, 12,167 suspected cases, and 170 deaths in China and 83 cases in 18 countries outside of China. (1,2) The disease was later named COVID-19 for coronavirus disease 2019 and the virus referred to as severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). (1) WHO declared COVID-19 a pandemic on March 11, 2020. (1)



Physical distancing policies and knowledge gaps

As an emerging infectious disease, there were originally no effective vaccines or preventive treatments for SARS-CoV-2. Therefore, governments have had to rely on the use of public policies to combat the spread of the virus. (1–4) Creating policies has been difficult due to the large amount of information and ongoing uncertainty around the characteristics of the virus and who it affects. (4) One of the most commonly used policy to mitigate (slow) the spread of the virus that causes COVID-19 centres on physical or social distancing, which relies on separating people to reduce the transmission of the virus. (5) However, it is still unclear when is the best time to institute such policies and what happens when distancing policies are eased. There are many aspects of distancing, such as recommendations for maintaining a physical distance in public, banning group gatherings, or complete lockdowns, that complicate their assessment. (5) There are also many factors that have been attributed to people acquiring or having a worse outcome from COVID-19. (6–11) However, there is no harmonized database available with all the policies, epidemiology and contextual information that is needed in order to perform comparative analyses useful to informing policy making.

About this project

The Policy Frameworks and Epidemiology of COVID-19 Working Group was developed after a "CONVERGE Virtual Forum: COVID-19 Working Groups for Public Health and Social Sciences Research." A group of international researchers convened to explore what physical distancing policies countries implemented and their effects on the epidemiology of COVID-19. The Working Group was further supported through an award from CONVERGE and the Social Science Extreme Events Research (SSEER) Network. CONVERGE is a National Science Foundation-funded initiative headquartered at the Natural Hazards Center at the University of Colorado Boulder.

This project is registered in:

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II. Methods

Research design

A qualitative embedded multiple case study research design was used to compare countries (or subnational jurisdictions, such as provinces, states or territories). The suite of public policies and resulting changes in the epidemiology of COVID-19 are examined within their specific country setting. Our cases start in January 2020 and end in August 2020. (Please see full study proposal). Research ethics approval was obtained by the Hamilton Integrated Research Ethics Board (HIREB) (Project # 11243).

Data collection

For each country, the setting, such as health systems, political systems and demographics were described to help with interpretation of findings and potential transferability, or the degree to which findings are applicable to other sites or future research.

Publicly available data was first collected on the jurisdiction following a standardized data collection form. Epidemiological data was drawn from publicly available data. WHO, World Bank, Central Intelligence Agency and other publicly available sources were used for timelines and country characteristics, where possible. Other sources of information included governmental and non-governmental websites, news articles, government reports, and peer-reviewed journals.

Next, key informant interviews were conducted to fill in gaps, verify information found through the documentary searches, and identify further participants and documentary sources of relevant information. (See informed consent and interview guide) Key informant interviews were conducted with policymakers, health workers, researchers and other stakeholders as appropriate to fill in knowledge gaps.

Data analysis and presentation

Our COVID-19 policies and epidemiology databases harmonize data on setting characteristics, policies, demographic characteristics and epidemiological risk factors and outcome metrics. These will further be described in single country or jurisdiction case reports. Comparisons will be selected based on both literal and theoretical replication. Countries that have similarities in either policies or epidemiological trends can be considered literal comparisons, whereas countries that differ will be used as theoretical comparisons. These comparisons will be submitted to peer-reviewed journals for publication.

III. Findings

A. Setting characteristics

Geographic, environmental, social and economic contextual factors

Ireland is in the WHO European Region. (12) Ireland has a population of 4,941,444 and a population density of 70.65 people per km^2. (13) About 63.41% of people live in large urban centres (14), with 40% of the population residing within 100km of Dublin. (15) Ireland and Northern Ireland (a separate jurisdiction) share a border as well as an island. The population of Ireland is heavily weighted on the eastern side of this island, with the western side of the island more sparsely populated. (15)

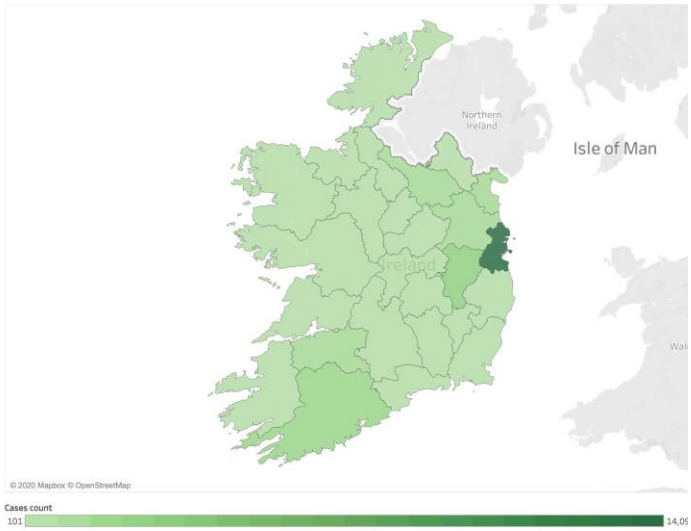

Figure 1: Heat map of Ireland with total COVID-19 cases, as of 08 September 2020(16)

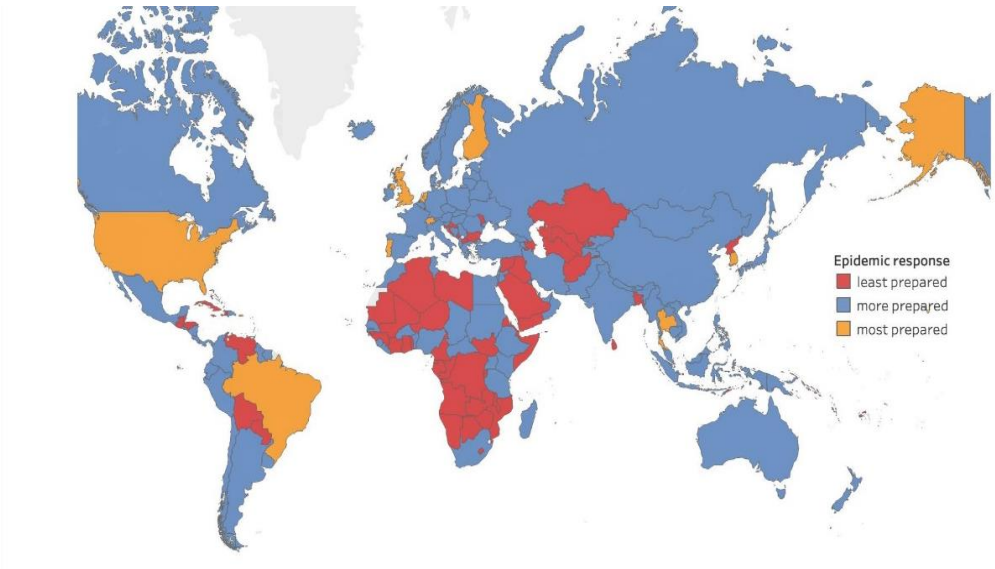

Figure 2. Global Health Security epidemic preparedness rank category

Table 1. COVID-19 relevant contextual factors for Ireland

Global Health Security Index, 2019 (Overall Index Score out of 100 and category) (17)	59 – More prepared
Global Health Security Index, 2019 (Epidemic Preparedness Index Score out of 100 and category) (17)	45.1 - More prepared
Particulate matter (PM2.5) air pollution, mean annual exposure, 2017 (micrograms per cubic meter) (18)	8.21
PM2.5 air pollution, population exposed to levels exceeding WHO guideline value, 2017 (% of total) (19)	0.27
International migrant stock, 2015 (% of population) (20)	15.92
Trust in national government, 2018 (% of population) (21)	67.15
Mobile cellular subscriptions, 2019 (per 100 people) (22)	105.38
Individuals using the internet, 2018 (% of population) (23)	84.52
Index of economic freedom, 2020 (Rank and category) (24)	80.9 - Free
World Bank classification, 2020 (25)	High income
Gini Index, 2016 (26)	32.8
GDP per capita, PPP, 2019 (Current international $) (27)	88,240.90
GNI per capita, PPP, 2019 (Current international $) (28)	68,050
Current health expenditure, 2017 (%) (29)	7.2
Vulnerable employment, total, 2020 (% of total employment) (30)	10.51
Vulnerable employment, female, 2020 (% of female employment) (31)	5.56
Vulnerable employment, male, 2020 (% of male employment) (32)	14.74
Homelessness, 2018 (%) (33)	0.13
Adult literacy rate, 2018 (%) (34)	--
Literacy rate, adult female, 2003 (% of females 15 and above) (34)	--
Literacy rate, adult male, 2003 (% of males 15 and above) (35)	--
Primary school enrolment, 2017 (% net)(36)	95.78

GDP - gross domestic product; **GNI** - gross national income; **PPP** - purchasing power parity

Population health characteristics

Life expectancy at birth in Ireland is 82.26 yrs (2018). (37) For males, life expectancy at birth is 80.5 yrs, and for females it is 84.1 yrs. (38,39) Non-communicable diseases are believed to play a role in who develops severe symptoms of COVID-19. In Ireland, the proportional mortality from cardiovascular diseases was 29%, cancers 30%, chronic respiratory diseases 9%, and diabetes 2%. (40) (See Figure 3.) The probability of dying from cardiovascular disease, cancer, diabetes, or chronic respiratory disease was 10.3% for all adults, and 11.9% and 8.7% for males and females, respectively. (41)

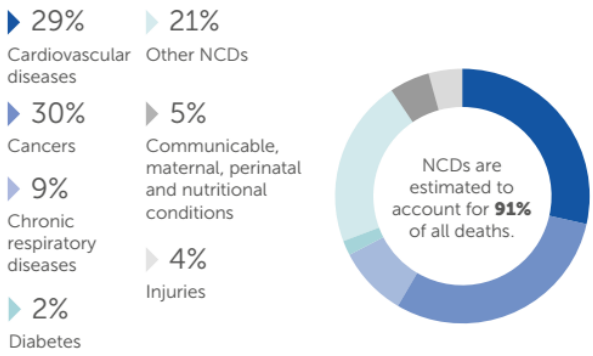

Figure 3. Proportional mortality from non-communicable diseases (NCDs) - Ireland, 2016 (40)

Table 2. Age and health characteristics for Ireland

	Male	Female	Total
Population ages 0-14, total, 2019 (% of total population) (42,43)	535,482 (10.84)	509,652 (10.31)	1,045,134 (21.15)
Population ages 15-64, total (% of total population) (44,45)	1,585,594 (32.09)	1,607,897 (32.54)	3,193,497 (64.63)
Population ages 65 and above, total (% of total population) (46,47)	330,589 (6.69)	372,231 (7.53)	702,813 (14.22)
Current tobacco use prevalence, total, 2018 (%) (48)	26.1	21.2	23.6
Raised blood pressure (Systolic blood pressure ≥140 or Diastolic Blood Pressure ≥90), ages 18+, 2015 (%) (49)	25.4	20.2	22.8
Raised fasting blood glucose (>7.0mmol/L or on medication), ages 18+, 2014 (%) (50)	8.4	6.2	7.3
Prevalence of obesity among adults (Body Mass Index ≥30), 2016 (%) (51)	26.5	27.3	26.9
Prevalence of Human Immunodeficiency Virus (HIV), 2019 (% of population ages 15-49) (52)			0.2
Bacillus Calmette-Guérin (BCG) Immunization coverage estimates (%) (53)			N/A
Prevalence of undernourishment, 2018 (% of population) (54)			2.5

Governance and health systems

The Republic of Ireland is a democratic country with a parliamentary republic system of governance. (15) The current Centre-right government, Fianna Fail, has been in place since June 27, 2020. (55) Fine Gael had been the party in power prior to this time; elections in February 2020 concluded in a stalemate, which was resolved in June 2020 with a coalition between Fine Gael, Fianna Fail, and the Green Party, and power transitioned from Taosieach (Prime Minister) Leo Varadkar to Micheal Martin of Fianna Fail. (54,55) Power for health is centralized in the country, with the Department of Health, headed by the Minister for Health, leading health policy. Public health services are delivered by the Health Service Executive (HSE). (56,57) The HSE was operationalized in 2005 and is administratively divided into four main areas: HSE Dublin Mid-Leinster, HSE Dublin North-East, HSE West, and HSE South, with each Administrative Area delivering services to the people in its region. (57) While citizens are entitled to access healthcare through this public system, there is also a private sector for health services in Ireland. The HSE is tax-payer funded. (56,58)

Table 3. Political and health system indicators for Ireland

Fragile States Index score, 2020 (maximum 120, higher is worse) (59)	19.9
Fragile States Index rank, 2020 (out of 178 countries, higher is better) (58)	168
Global Freedom score and status, 2020 (60)	97 - Free
Internet Freedom score and status, 2020 (61)	--
World press freedom index, 2020, global score (0-100, lower is better) and rank (out of 180 countries, lower is better) (62)	12.6 - 13
Physician density, 2018 (physician/1,000 pop) (63)	3.31
Hospital bed density, 2013 (beds/1,000 pop) (64)	2.8

Pandemic experience and preparedness

The Emergency Preparedness index for Ireland is 45.1 (with a rank of 62/195 countries). (17) Ireland's last experience with a pandemic was in 2009 (H1N1 Influenza A pandemic), and prior experiences with SARS and MERS helped define preparedness plans in the case of a novel pandemic. (65,66) The H1N1 pandemic infected more than 3,000 people in 2009-2010, resulting in more than 20 deaths. (65) A study from 2015 showed a need for increased preparedness of hospitals in the event of a subsequent pandemic. (67) Ireland's National Risk Assessment from 2019 indicates on page 64 that pandemic influenzas are the "reasonable worst case scenario in the Irish context." (68) This report warned of the health and socio-economic effects of a pandemic, indicating that the HSE and Department of Health would work closely with the European Centre for Disease Control, as well as the World Health Organization, to both monitor and plan for mitigation of infectious diseases reaching this scale. (68)

The Department of Health also published the National Pandemic Influenza Plan of 2007, which indicated concern that increased (international) air travel would pose a greater threat to Ireland, since the emergence of new pathogens could spread quickly even if they first appeared in other parts of the world. (69) The plan indicated that containment would be necessary until vaccines are developed; containment includes contact tracing, treatment of the disease, and isolation of cases and contacts. (69) The plan also outlines the structure that would form under a public health emergency, including specific expert groups and the activation of the National Public Health Emergency Team, which would facilitate a course of action between the Department of Health and the HSE. (69) The Department of the Taoiseach released a specific SARS-CoV-2 plan on March 16, 2020, which was published on the government's website and is available to the public. (70)

Ireland has a mix of laboratory systems, including public health, hospital, academic centres, and private laboratories. At the beginning of the COVID-19 pandemic, testing was centralized through the National Virus Reference Laboratory, with a capacity of approximately 1500 tests per day. (71,72) Testing capacity was later increased to 100,000 tests per week through collaborations with private hospitals and centers, as well as the securement of additional reagents in mid-April 2020. (73)

B. Policies and epidemiology

Cases and social distancing policies

Ireland's first case of COVID-19 was recorded on February 29, 2020, and Ireland had 100 cases confirmed by March 14, 2020. On March 12, 2020, the National Public Health Emergency Team and the Department of the Taoiseach released statements that Ireland would move from a strategy of containment to a strategy of delay (or mitigation), closing schools and instructing the reduction of social contacts. (74) At this time, there were 90 confirmed cases and there had been 1 death, reported March 11, 2020. Emergency legislation was signed by the president on March 20, 2020, giving the government power to "detain people, restrict travel and keep people in their homes during the current COVID crisis." (75) As of August 31, 2020, there were 28,811 cases and 1,777 deaths.

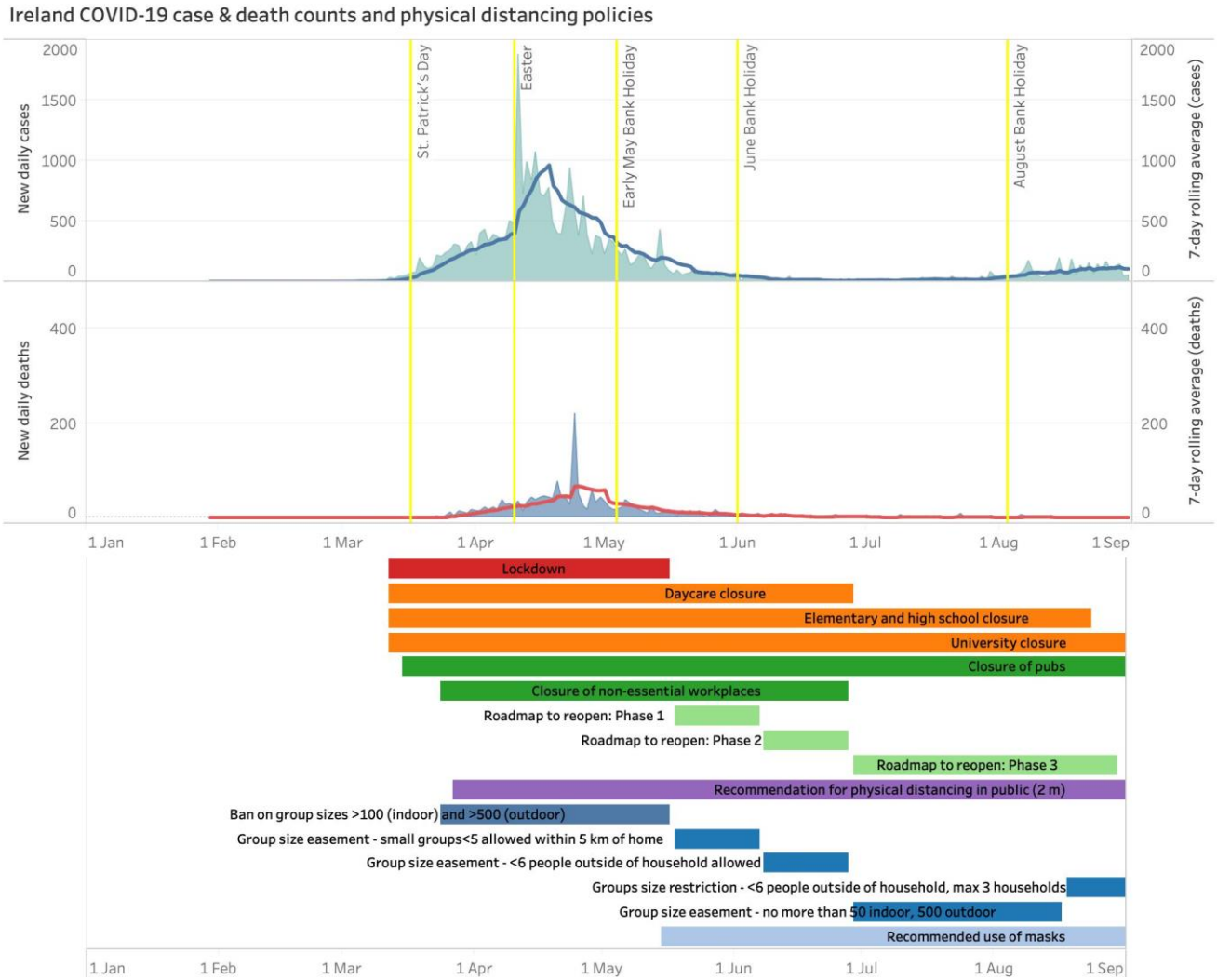

Figure 4. Number of reported COVID-19 cases and deaths in Ireland with select policies from January to September 1, 2020

Description of events in Ireland

Since January 2020, The National Public Health Emergency Team (NPHET) has provided almost daily briefings on the COVID-19 situation in Ireland, all of which are publicly available on a centralized government website page dedicated to the pandemic. This information has been supported by statements from The Department of the Taoiseach, which has addressed prominent shifts in the public management of COVID-19 (including the announcement to close schools on March 12, 2020). (74) Media briefings have also been held with Chief Medical Officer Dr. Tony Holohan and Deputy Chief Medical Officer Ronan Glynn, who acted in this role from July to October 2020 when Dr. Holohan stepped down due to personal circumstances. (76,77) The National Public Health Emergency Team (NPHET) was established on January 27, 2020 in response to the perceived threat of COVID-19. The Coronavirus Expert Advisory Group, comprised of experts who provide advice to NPHET and led by Dr. Cillian de Gascun, met for the first time on February 5, 2020. (74) During the course of the pandemic, NPHET has submitted public health and policy recommendations directly to the Irish Government, which have then been accepted and/or adapted by the government prior to rollout. In addition to the Expert Advisory Group, NPHET has also been supported by a number of expert subgroups including the Behavioural Change Subgroup, Irish Epidemiological Modelling Advisory Subgroup, etc. (78,79) These groups have been responsible for reviewing evidence of best practices, conducting research, and monitoring data from both Ireland and the international community within the jurisdiction of their expertise. The Health Protection Surveillance Centre, a division of the HSE, has also been responsible for preparing epidemiological reports to NPHET and helping to facilitate public health advice to the public. (56,80)

Ireland has followed what can be called a mitigation strategy. Prior to March 12, 2020, officials had stated Ireland's approach would be to contain the virus; with the increase in cases and closure of schools on March 12, 2020, messaging shifted towards a delay/mitigation approach. (74,81–84) Messaging on this strategy has remained largely consistent in that there has been a call to "flatten the curve;" herd immunity was not entertained as an option. (78,79,85) At the beginning of the pandemic, there was public support for the actions of closing schools and restaurants, and reducing social contacts, and a sense of solidarity that the public would do what was needed to mitigate the spread of the virus. (79,86)

Ireland had its first case of COVID-19 on February 29, 2020. The first documented case was travel-related. (87) Prior to Ireland's first confirmed case, an individual traveling to Northern Ireland had passed through Dublin airport; this person was diagnosed with COVID-19 in Northern Ireland on February 27, 2020. (88) Citizens in Ireland became more directly affected in March 2020 when community transmission was noted. On March 12, 2020, the Taosieach Leo Varadkar announced a course of action in Ireland in response to rising cases and the World Health Organization's March 11, 2020 declaration of a pandemic. On this day, he announced the closure of schools, colleges and daycare facilities, the cancellation of gatherings of 100 or more people indoors and 500 people outdoors. He additionally urged the reduction of social

contacts and advised individuals to work from home when possible. These measures were initially intended to last until March 29, 2020. (74,82) On March 15, pubs were ordered closed and people were advised to "avoid having house parties in the interest of social distancing." (89) On March 24, 2020, non-essential services and businesses were asked to close, including the postponement of non-essential health services, and people were "urged to stay at home whenever possible." Restaurants were limited to takeaway and delivery at this time. Where closure of facilities was not possible, social distancing was recommended. (90) A list further detailing businesses affected by this order was also provided by the Department of the Taoiseach. (74) Physical distancing measures were first explicitly defined as remaining 2 metres apart in a statement published March 27, 2020, along with an urgent message for the country to stay at home; as a part of this order to stay home, no travel greater than 2km outside the house was advised and household visits were discouraged. (74) Colloquially, the country was thus considered in full lockdown starting March 27, 2020, although some indicate that the lockdown started once schools closed March 12, 2020. (91) Face coverings or masks were not recommended early on in the pandemic due to a cited lack of evidentiary support for their efficacy. Face coverings were not recommended until May 15, 2020, and this recommendation was tentative. (92,93) Face coverings became mandatory August 10, 2020 in certain indoor settings and shops, with face covering requirements not further clarified by the Department of the Taoiseach until August 18, 2020. (94–96)

Travel restrictions were recommended in line with the European Union, with special restrictions for individuals arriving from China, Iran, Italy, and Spain. Non-essential travel was advised against. (97–100) Ireland is also unique, geographically: It is on a shared island with Northern Ireland, which is under different governmental jurisdiction. Because the border is not physical, different governmental management of the pandemic between the two countries posed additional challenges. (101) Self-isolation in Ireland was recommended for 14 days for anyone traveling, as well as individuals expressing any symptoms and those who had come into contact with individuals with confirmed diagnoses. (78,84,97,102) NPHET advice to the government to make quarantine mandatory after travel was not fully adopted. (78) A passenger locator form went info effect May 28, 2020, to aid in contact tracing efforts for travelers. (103) Contact tracing in Ireland was initiated on February 27, 2020, with delays starting in March 2020 as cases began to climb. (78,104) At least 9 centres were established at universities and government offices starting in March 2020. (104) Drive-through COVID-19 testing sites were also established, with Dublin stadium opening for drive-through testing on March 18, 2020, although testing was initially limited to healthcare workers and those presenting with fever or at least 1 other COVID-19 symptom. (105,106) It is also worth noting that Ireland was one of the first countries to initiate a contact tracing app to be downloaded by individuals on their phones. The app launched July 6, 2020 and was downloaded 1.3 million times in the first week. As the most-downloaded app in Europe in this short time, its success points to a sense of camaraderie in the fight against COVID-19 in Ireland. (78,107)

Initially, gatherings over 100 (indoors) and 500 (outdoors) were cancelled and banned starting March 12, 2020. The country then progressed towards a statewide stay at home order, with the

most drastic iteration announced on March 27, 2020, limiting household visits and travel to 2km outside the house. A planned Roadmap to Reopening, with 5 phases, was subsequently announced by the government on May 1, 2020. (108) On May 5, 2020, individuals were allowed to travel 5km outside the house. Phase 1 of the roadmap began May 18, 2020, allowing outdoor meetings of small groups between different households as well as childcare for healthcare workers. Phase 2 began June 8, 2020, allowing household visits. Phase 3 of reopening was initiated on June 29, 2020, and allowed small gatherings of 50 individuals indoors and 200 individuals outdoors as well as daycare and pre-schools for essential workers. (108) Physical distancing instructions of keeping 2 metres apart, however, remained in place throughout this entire time. While Phase 4 and Phase 5 were scheduled to occur later in the summer, these dates were shifted and then delayed multiple times in July and August. In August 2020, with cases rising, Ireland shifted its approach from emphasizing the Roadmap for Reopening to a county/regional-specific approach allowing further regulation in certain areas. (108–110)

Throughout the month of August, some counties experienced the lifting of certain restrictions, while restrictions were tightened or extended in others (most notably, in Kildare county, in which further restrictions were imposed from August 7, 2020 through August 31, 2020). (110,111) On August 18, 2020, new measures were introduced across the country to combat the rise in cases, including the limiting of household guests to 6 people from no more than 3 households, and gatherings or parties at restaurants and cafes limited to 6 people indoors or 15 people outdoors. Two metre physical distancing remained in place throughout this time. (96) Towards the end of August 2020, NPHET members expressed the need to highlight how restrictions have proven beneficial in reducing COVID-19 cases to the public. (112) It is worth noting that although this report covers only the events and epidemiology through August 31, 2020, Ireland was the first country in Europe to impose a second nationwide lockdown (with the exception of schools, which will remain in person) in response to the second wave of increasing infections. The second lockdown began on October 21, 2020, and is anticipated to last 6 weeks. (113)

Factors leading to a good uptake of policy interventions at the beginning of the pandemic in Ireland included a general sense of solidarity among the public in the collective effort to mitigate COVID-19's effect. Key informants noted that messaging early on about the action plan for the pandemic were clear, with almost daily updates from NPHET supplemented with messaging directly from the Taoiseach (at the time, Leo Varadkar) who addressed the nation and urged unity. (74,79,101) One informant noted that this strong sense of cohesion within leadership, including messages from public health experts and statements from the government and Taoiseach, contributed to "harnessing that collective desire to support each other" through the pandemic. (79) Messaging about physical distancing measures was also communicated through the media and through the HSE, which initiated a public health campaign involving posters and displays urging 2 metre physical distancing and staying at home. (78,79,101) Key informants confirmed that the media played a key role in this early messaging as well as a trusted and respected institution in Ireland. (78,79) Overall, key

informants felt that the approach for mitigation in Ireland was fairly successful, especially at the beginning of the pandemic in that Ireland was able to "flatten the curve" and not overwhelm the healthcare system in the early months. (78) One informant noted that financial support from the government early on also helped to increase a sense of solidarity in combating COVID-19, and that people generally wanted to do what they could to prevent the further spread of this illness. (86) This sense of urgency can also been seen in Ireland's activation of NPHET, along with the COVID expert advisory group and other subcommittees, early on in the pandemic. Because so little was known about COVID-19 at this time, it was essential to have dedicated groups advising best practices, addressing areas of concern, and conducting research to develop cohesive plans of action.

However, some challenges were also highlighted. Lack of PPE, limited testing, and delays in contact tracing all posed challenges at the beginning of the pandemic, similar to the challenges of other jurisdictions. Almost all the key informants noted that lack of control over outbreaks in long-term care facilities was one of, if not *the* most problematic issue Ireland faced in its management of the pandemic. In April 2020, 60% of COVID-19 deaths had been traced to nursing homes. (114) Lack of (governmental) ability to regulate long-term care facilities contributed to challenges managing the effect of COVID-19 in these populations, as many of these facilities are privately owned and struggled to secure proper PPE and oversee staff. Similar difficulties in regulating workers were seen later on in meat-packing plants where clusters and outbreaks have occurred throughout the pandemic. (78,86,112) Key informants noted that on the whole, Ireland's approach and the public's response met new challenges starting in the summer of 2020 with efforts to reopen. Public fatigue with COVID-19, as well as a perceived shift from very consistent to more inconsistent messaging, were cited as potential causes contributing to an increase in COVID-19 cases over the summer, especially in August 2020. The June 27, 2020 transition to the new Taoiseach and government, as well as the July 2020 stepdown of the Chief Medical Officer were also noted as potential transition points affecting the COVID-19 response in Ireland. The previous Taoiseach and CMO had experienced popular support for their management during the pandemic, and this shift in power posed new challenges to remain consistent in messaging as Ireland proceeded with Reopening stages and then altered the course of these planned openings. (79,85) One informant noted that consistent messaging would always be more challenging with reopening due to the relative complexity of this process, as opposed to initial communication about closures. (78) Nevertheless, some confusion around messaging, starting in summer 2020, was noted around public understandings of why group sizes were differently restricted based on settings, for instance in restaurants and pubs. Informants cited that this public confusion (and lack of governmental clarity) about why certain measures were being taken might have contributed to a growing sense of COVID-19 fatigue among certain parts of the population as cases began to rise in August 2020. The government was also criticized by some for mixed messaging with regards to the lag time between recommendations and mandates for facial coverings. In addition, a publicized dinner among government officials in August 2020 was heavily criticized for lack of physical distancing and failing to set a good example for the public. (85,115)

Physical distancing policies were supported through economic relief for individuals and businesses, and informants cited that this support likely helped facilitate public solidarity early on. Starting as early as March 15, 2020, the government introduced measures to support workers affected by COVID-19, offering an Employer Refund Scheme, which was quickly replaced by a Wage Subsidy Scheme on March 24, 2020 that allowed employers to pay employees throughout the shutdown. (74) The government has also offered flat rate Pandemic Unemployment Payments to employees who lost jobs March 13, 2020 or later, and this is set to continue well into 2021. (116) Additionally, the International Monetary Fund (IMF) noted that there were "moratoriums on evictions and rent increases for the duration of the COVID emergency." (117) Starting May 2, 2020, the government publicized additional supports for businesses affected by the pandemic. (117)

Several suggestions for improved responses to the COVID-19 pandemic or future pandemics were provided by interviewees.

- Cohesive messaging and public trust in leadership, including among public health experts, media, and the government, were noted as contributing to success early in the pandemic.
- There was confusion about the effectiveness of wearing masks and facial coverings, which did not become mandatory until August 2020; this mandate could have been implemented earlier.
- It was highlighted that there should have been an increased effort to protect vulnerable populations, specifically those in long term care facilities, and that privatization of these sectors might have contributed to unique challenges in regulation of infection spread.
- It was noted that it would have been beneficial to see proactive leadership from other countries, particularly the United States and the United Kingdom, in response to the pandemic in order to help guide decision-making and increase a sense of solidarity among the international community.
- Increased testing capacity and quicker contact tracing earlier on would have been beneficial to help prevent community spread.
- There could have been more restrictions around access into the country. Recommendations to make quarantining mandatory after travel were not adopted by the government, and the government received some criticism for not closing international borders right away.
- Financial support to those affected by unemployment during the pandemic was cited by multiple informants as fostering a sense of unity and support in the collective effort to flatten the curve.
- In general, informants noted that all responses (implementing shutdown, advocating physical distancing, etc.) could have been implemented more quickly.

Disproportionately affected populations

There are certain groups that have been affected disproportionately in Ireland.

Long-term care (LTC) residents

It was reported that in April 2020, 60% of deaths from COVID-19 were linked to nursing homes. (114) Failures to protect vulnerable populations in long-term care facilities was consistently cited as one of the greatest failures in the pandemic response.

Individuals accommodated by Direct Provision system

Direct Provision is a system that provides accommodation to international protection applicants, and rates of COVID-19 infection were higher in these populations (1.9% as opposed to 0.5% infection rates in the country as a whole) due to structural constraints hindering physical distancing and shared residences. (118)

Workers at Meat Packing Plants

COVID-19 outbreaks at meat packing plants have been problematic throughout the pandemic. Initial clusters were identified at these facilities in April 2020, and by the end of July 2020, there had been 23 outbreaks and 1,047 cases among workers. (112) An investigation on these outbreaks was conducted at the end of July 2020 and specific recommendations were made to reduce the chance of further outbreaks, although positive COVID-19 cases and outbreaks have still occurred since this time. (112,119) It has been suggested that outbreaks have been driven by individuals with COVID-19 who remain asymptomatic, the physical organization and conditions of work at plants (which hinders physical distancing and encompasses physical exertion), as well as the inability of workers to maintain physical distancing in often shared living accommodations due to low wages. (120) This at risk population also highlights the particular vulnerability of migrant workers, who comprise 58% of those employed in the meat sector. (120)

Comparisons with other country responses

There are many concerns in trying to compare countries' responses to COVID-19. This is shaped by limitations of the data itself and differences in contextual factors. A separate paper by this working group describes limitations of COVID-19 data. (Submitted) Table 4 presents a list of countries included in this project and their use of different physical distancing policies.

Table 4. Comparative national-level responses to COVID-19 by country – updated August 21, 2020 (filled in means policy was implemented)

AUS–Australia, **BGD–**Bangladesh, **BRA–**Brazil, **CAN–**Canada, **CUB-**Cuba, **DNK–**Denmark, **DJI–**Djibouti, **EGY-**Egypt, **ENG-**England, **FRA-**France, **GHA-**Ghana, **IND-**India, **IRE-**Ireland, **KAZ-**Kazakhstan, **NDL-**Netherlands, **NIR-**Northern Ireland, **PAK-**Pakistan, **RUS-**Russia, **SCL-**Scotland, **SLE-**Sierra Leone, **SGP-**Singapore, **KOR-**South Korea, **SRI-**Sri Lanka, **UAE-**United Arab Emirates, **VN-**Vietnam, **WLS-**Wales

IV. Discussion of main findings, limitations, and next steps

Ireland has a population of 4,941,444, with 28,811 cases and 1,777 deaths as of August 31, 2020. This number is very likely an underreporting of cases, due to delays and limitations on testing at the beginning of the pandemic. (78) It was also difficult to trace which deaths were due to COVID-19, especially early in the pandemic, and thus the number of reported deaths could have been underreported as well. Discrepancies were noted early on between official government figures and an increase in deaths reported on the website rip.ie, a public form documenting deaths and wake information in the country. Information on deaths reported through rip.ie helped to re-assess mortality and contributed to epidemiological modeling. (101) As Ireland has proceeded with phased reopening stages, there has been an increased rate of COVID-19 transmission. And, as more regionally-specific approaches were piloted, it became more difficult to fully locate the relationship between policy implementations at the national level and epidemiological outcomes during this timeframe.

Conclusions

COVID-19 has caused significant loss of life, economic hardship, and social changes in Ireland, although the long-term effects of this pandemic have yet to be fully understood. Although the data collected for this study included policy responses and epidemiological data through August 31, 2020, it is worth noting that Ireland was the first country in Europe to implement a second nationwide lockdown/stay-at-home order starting in October 2020. (113) Further contextualized research needs to be conducted to determine which physical distancing policies are the most effective for specific settings. It is also imperative to improve surveillance and reporting systems internationally to deal with this and future pandemics. Comparative work is being conducted by this Working Group to understand what policies work, where and why.

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