

# DIGITAL CONTACT TRACING & COVID-19

A MIXED APPROACH



## BACKGROUND: COVID-19 PANDEMIC

**MARCH 2020** - COVID-19 declared a pandemic by the World Health Organization (WHO)



**CURRENT COVID-19 OVERVIEW**  
CONFIRMED CASES - 137 M  
DEATHS - 2.95 M

### PUBLIC HEALTH OFFICIALS

WORLDWIDE Scramble to implement broad public health measures



- Personal Hygiene
- Protective Equipment
- Physical Distancing
- Restricted Transportation

### DIGITAL CONTACT TRACING APPLICATIONS

Governments consider deploying mobile applications for personal smartphones supporting contract tracing; using personal digital data to track user movements and proximity to other users



### HIGHLY PUBLICIZED CONCERNS

for personal privacy of digital data and limitations on civil liberties

## TECHNICAL PROPERTIES

### GPS



GPS, Bluetooth, and RFID are the primary technology options for digital contact tracing applications. GPS uses the geolocation of the user to determine close contacts, Bluetooth communicates with nearby devices to record close contacts, and RFID uses magnetic fields to track tags. Bluetooth presents the most viable option for digital contact tracing as GPS has low accuracy and RFID has a limited range. Another consideration for the digital contact tracing apps is the system architecture, which can be centralized, decentralized, or hybrid. Centralized has the key functionalities on the central server, while decentralized on the user device, and hybrid is a mix of the two.

### BLUETOOTH



### RFID

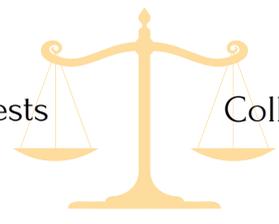


## ETHICAL CONSIDERATIONS

We examined ethical frameworks used to consider the tensions between individual interests (specifically privacy concerns) and collective good (or public health) when considering digital contact tracing applications in response to COVID-19. From a human rights framework, digital contact tracing poses challenges with reconciling the right to privacy and the right to health, as articulated in the 1948 Universal Declaration of Human Rights. The Siracusa Principles are a series of conditions used to assess the limitation of individual rights for the collective good during times of emergency; these principles have been used to create guidelines for assessing ethical permissibility of contact tracing apps.

We also consider the ethical principles first outlined by Beauchamp and Childress: autonomy, justice, non-maleficence, and beneficence. The principles of autonomy and beneficence might be seen as aligned with the tensions between individual rights and freedom and collective good (public health), respectively.

Individual interests  
The right to privacy  
Autonomy



Collective good  
Public health  
Beneficence

# CROSS-COUNTRY ANALYSIS

In order to understand how legal and ethical consideration translates into concrete policy options we did a cross-country analysis of Canada, Norway and Ireland, as countries with the highest respect for civil liberties. As seen from the overview provided in the sidebar, despite efforts to clearly define use of DTC for public benefit, there are important concerns to consider. The use of DCT has a legal basis in all three observed countries, and all of them have ethical guidelines concerning any policy to be enforced during pandemic. All three countries did have some type of pre-launch validation studies, but none of them were comprehensive enough to assess the effectiveness.

Even though financial resources for development of the DCT varied among countries, the main concern is lack of health economic evaluation. Amongst the observed countries, none has reached the 60% adoption threshold needed to ensure effectiveness.

Despite high levels of compliance with mandatory measures, willingness to download the DCT as a voluntary measure is relatively low across countries, which may be explained by individualistic culture that characterizes all three countries. In addition, we must consider digital inequality and lack of access to the DCT across age, gender and race divide.

All three countries have pre-existing robust privacy laws and regulations, especially Ireland and Norway who are bound by GDPR. Yet the violation of privacy is still possible as the case of the first DCT in Norway shows.

Lastly, setting specific objectives, avoiding repurposing and setting an expiration date are all important elements in ensuring adherence to principles of non-maleficence, justice and autonomy. Across all three selected countries there are important concerns, especially about extending single purpose and not setting explicit sunset clauses.



## IRELAND

Name: Covid Tracker  
Legal basis: Heath Act  
Validation: Behavioral study  
Cost: \$1.26M  
Adoption: 34%  
Elderly with smartphone: 37%  
Hofstede scale: 80  
Privacy: The GDPR, Irish Constitution  
Non-maleficence: Single purpose

## CANADA

Name: Covid Alert  
Legal basis: Department of Heath Act  
Validation: Beta testing  
Cost: \$500,000  
Adoption: 16.5%  
Elderly with smartphone: 60%  
Hofstede scale: 69  
Privacy: PIPEDA & The Privacy Act  
Non-maleficence: Purpose and sunset clause

## NORWAY

Name: Smittestopp  
Legal basis: Corona Act  
Validation: App developer, selected municipalities, control tests  
Cost: \$2.3M  
Adoption: 18.3%  
Elderly with smartphone: 89%  
Hofstede scale: 70  
Privacy: The GDPR, Norwegian Constitution  
Non-maleficence: Sunset clause

## POLICY RECOMMENDATIONS

### IMPLEMENTING DIGITAL CONTACT TRACING APPLICATIONS

1

ADOPT A HYBRID SYSTEM ARCHITECTURE USING BLUETOOTH TECHNOLOGY FOR PROXIMITY DETECTION TO MAXIMIZE EFFECTIVENESS, WHILE MAINTAINING A HIGH DEGREE OF CYBERSECURITY (USED IN COMBINATION WITH MANUAL CONTACT TRACING PRACTICES)

2

MAINTAIN ROUTINE EVIDENCE-BASED PRACTICES USED TO EVALUATE HEALTH INTERVENTIONS IN THE NATIONAL HEALTH SYSTEM (EX. HEALTH ECONOMIC ASSESSMENTS SUCH AS COST-EFFECTIVENESS ANALYSIS)

3

IMPLEMENT A NATIONAL PRIVACY REGULATION SIMILAR TO THE GENERAL DATA PROTECTION REGULATION (GDPR) ESTABLISHED BY THE EUROPEAN UNION, WHICH ADDRESSES PRIVACY CONCERNS FOR SENSITIVE OR PERSONAL DATA

4

IMPLEMENT A BROAD ADVERTISING AND PUBLIC MEDIA CAMPAIGN ADDRESSING PUBLIC PRIVACY AND TECHNOLOGICAL CONCERNS, HIGHLIGHTING COLLECTIVE BENEFITS FOR PUBLIC HEALTH