CONTACT TRACING, TECHNOLOGY, AND COVID-19:
Here’s What Cities Need to Know
About the National League of Cities (NLC)

The National League of Cities (NLC) is the voice of America’s cities, towns and villages, representing more than 200 million people. NLC works to strengthen local leadership, influence federal policy and drive innovative solutions. NLC’s Center for City Solutions provides research and analysis on key topics and trends important to cities, creative solutions to improve the quality of life in communities, inspiration and ideas for local officials to use in tackling tough issues, and opportunities for city leaders to connect with peers, share experiences, and learn about innovative approaches in cities.

About the Authors

Lucy Perkins is a Senior Specialist of Urban Innovation in the Center for City Solutions.

Brooks Rainwater is the Senior Executive and Director of the Center for City Solutions.

Stacy Richardson is Program Director of Urban Innovation in the Center for City Solutions.
INTRODUCTION

COVID-19 is impacting American society in so many ways, but most specifically public health, the economy, and our relationship with government. Terms that were barely recognizable in the American lexicon two months ago like stay at home orders and social distancing are now the norm, with policies governing when we can leave the house, where we can go, how close we can travel next to other people, and whether or not we must wear a facemask in public settings where physical\(^1\) distancing is not feasible is now law in communities nationwide.

This is what is necessary to stem the tide of this global pandemic. Public polling shows that Americans broadly support these measures to keep people safe, flatten the curve, and prevent the spread of coronavirus. As curves begin to flatten in some parts of the country, states are turning to the very real next stage of how to open back up our nation’s cities and towns – and specifically what measures are necessary to safely do so.

As governors debate how to move towards re-opening the economy, there is a clear debate emerging about the role of government. Where does the line of personal freedom cross into public harm? What role does the state play in defending public health? How do local public officials navigate these new and uncharted waters? As public health officials prepare to launch the largest contact tracing effort in the history of our country, what role do new technologies play? How do we protect the personal information of individual citizens as we deploy new types of surveillance technology to help us stem this global pandemic?

---

\(^1\) NLC uses the CDC terminology of “social/physical distancing” to correspond with the CDC guidance found here: [https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/social-distancing.html](https://www.cdc.gov/coronavirus/2019-ncov/prevent-getting-sick/social-distancing.html)
NEW TECHNOLOGY TO HELP FIGHT CORONAVIRUS

There is no economy without healthy people. As local leaders work to re-open the American economy – together with state government – while protecting public health, technology solutions are emerging as a promising tool. These new tech solutions often rely on access to personal information about location and health to predict hot spots of coronavirus outbreaks or mitigate the spread of the virus. These tools present an important balancing act for local leaders – finding the line between protecting privacy and prioritizing public health. This resource guide divides these technology-driven efforts into two categories: predicting where COVID-19 hotspots will emerge to help target resources and assisting in contact-tracing efforts to limit the community spread of coronavirus.

According to the CDC, COVID-19 appears to be spreading easily from person to person throughout a community. The ease of transmission is requiring local leaders to promote physical distancing, take preventative measures, and coordinate resources to limit the negative impact of the pandemic. New efforts have emerged to help local leaders understand how and where cases may spread in their community next. From measuring traffic and pedestrian counts to utilizing smart thermometers, sensors and technology can shed light on how physical distancing efforts are working and where resources should be targeted.

Depending on the level of spread within a community, these attempts to monitor community activity may be done in addition to robust contact tracing efforts. Contact tracing is a term used by public health officials to describe the process of identifying individuals who have been exposed to someone who has tested positive for COVID-19 and safely isolating them to help limit the spread of the virus. Countries across the globe are harnessing the power of technology to assist in their contact tracing efforts – raising questions about their applicability in a United States context.
Global Knowledge Sharing

As the COVID-19 pandemic has impacted countries across the globe, the divergent approaches taken by countries allow for a greater understanding of successful best practices. Countries like South Korea, Germany, and Taiwan have instituted measures, such as large-scale testing, contact tracing, and the utilization of smart technology devices to mitigate the spread of coronavirus. While the level of privacy protections differs from country to country, it is important to pay attention to how fellow democratic countries are protecting privacy while at the same time utilizing surveillance tools in a wholly unfamiliar way within the US context. Dialogue and citizen participation are key during this time, with robust coordination taking place between local and state leaders with their federal counterparts. And, it cannot be reinforced enough that now is the time for countries to learn from what has and has not worked to successfully mitigate these rapidly unfolding challenges.

Harnessing the Power of Density and Technology

Cities across the globe spent nearly $141 billion on smart city efforts in the last year alone. It’s not surprising that these investments are now being used to help lead the charge against coronavirus. Efforts range from deploying smart devices like connected thermometers that aggregate body temperatures to produce literal “heat maps” to monitoring traffic patterns to determine adherence with shelter in place guidelines. The National League of Cities released a report detailing trends in smart cities – including the potential for cities to utilize connected devices and aggregate level data to monitor health. The utilization of this type of technology has always raised questions about user privacy, but with public health now driving an increase in data utilization, the conversation is more on the forefront than ever.

The CDC recently published a study titled, “Timing of Community Mitigation and Changes in Reported COVID-19 and Community Mobility – Four U.S. Metropolitan Areas, February 26–April 1, 2020” that looked at the relationship

---


between community mitigation efforts, confirmed COVID-19 cases, and travel patterns. The report relied on data from a company called SmartGraph, which gathers location data from apps on cell phones. In other countries with stricter privacy guidelines, this practice is less common but is still up for discussion. Large cell phone carriers are in active discussions with the UK about how to share aggregate level data.

The Newcastle University Urban Observatory recently released a study detailing their analysis of over 1.8 billion data points tracking aggregate movement across the region. The researchers have developed ways of using machine learning to analyze vast amounts of data collected by sensors deployed across the UK. These sensors are embedded in traffic cameras, streetlights, utility meters, etc. The analysis from the observatory shows drastic reductions in pedestrian traffic, automobile trips, and has even created a way to determine if pedestrians are more than 2 meters apart when walking on public sidewalks. The University has provided the UK government with a variety of datasets to help determine where social distancing measures are working and where additional resources may be needed.

Germany will emerge as a country to watch as the world seeks to find its way out of the 2020 pandemic. The country recently announced a change in direction regarding its digital contact tracing efforts. Public health officials originally announced plans to store individual data in a central repository – giving them increased access to information about the spread of COVID-19. This raised concern from privacy experts who have favored a decentralized approach. Germany’s app is still in development, but the country is discussing a national effort, which could serve as a model for similar national or regional efforts in the United States.

Preventing the Spread

Federal officials laid out a plan to reopen the American economy on April 16th – relying on robust testing, data on level of community spread, contact tracing, and isolation. Each of these components can be enhanced utilizing technology.
as evidenced by international efforts in Hong Kong, Singapore, and others. Once a community begins to transition from a mitigation status of “shelter-in-place” or “safer-at-home” – cities and their public health counterparts will be relying on implementing contact tracing to identify, monitor, and isolate individuals who have been exposed to COVID-19.

The foundation of contact tracing is a robust testing program. The administration’s plan to re-open the economy specifically lists the “Ability to quickly set up safe and efficient screening and testing sites for symptomatic individuals and trace contacts of COVID+ results” as well as capacity to test flu-like individuals and sentinel surveillance systems for asymptomatic cases serving vulnerable populations. This robust testing program is then linked to a tracking effort where health officials identify everyone who encountered the COVID-19 positive person in the last 14 days. Those individuals are notified and monitored or quarantined until they have been cleared.

Tracing cases of COVID-19 is more difficult and important due to some of the characteristics of the disease. Since the disease spreads rapidly, one missed case can cause a significant domino effect in a community. Additionally, the infection can spread before a patient has any symptoms. This requires anyone exposed to be isolated immediately after exposure – making rapid testing and identification more imperative. Third, there is no current treatment for COVID-19 so people must comply with quarantine orders for the duration of their infection. According to Johns Hopkins, “A contact tracing of this unprecedented scale and of this critical and historical importance to the function and reopening of society has never before been envisioned or required. And our current core public health capacity is woefully insufficient to undertake such a mammoth task.”

States and local governments are already thinking creatively about how to overcome this resource shortage. With experts estimating that we may need as many as 100,000 additional public health workers specifically focused on contact tracing, state, local, and tribal governments are deploying innovation to fill the gap. For example, Massachusetts has deployed a multi-sector contract tracing initiative known as the community tracing collaborative led by Partners

---

IN MINNESOTA

1,000 workers hired

15 tracers per 100,000

in Health. With experience in fighting various epidemics across the globe, the partnership leverages technical experts from the non-profit, corporate, public, and philanthropic sectors to “go on the offensive.”6 To scale this effort, the state is hiring 1,000 additional public health workers – bring their number of tracers to 15 per 100,000 in the state.

Given the limited nature of our public health infrastructure, it is critical that communities leverage every tool that can help stretch capacity and bend the curve downward. Technology has been used to help supplement the efforts of health workers. Across the globe, technologists both within and outside the public sector have been developing ways to harness innovation to help with each stage of the response effort:

**Communication:** Keeping lines of communication open between government officials and the public is essential to maintaining public trust, which is the foundation of effective response to COVID-19. In Singapore, the Division of Open Government created an app called Postman that allows government health officials to send direct communication to residents to combat misinformation campaigns and increase the flow of information. They also developed FormsSG, an easy to use technology that allowed government officials to move large components of their work online by developing new forms. The rapid spread of COVID-19 means that business must move online as much as possible. This app allowed health ministers to conduct contact tracing interviews online – making the process more efficient.

**Identification:** Since individuals can be asymptomatic for weeks before they develop symptoms of COVID-19, identifying everyone who may have been exposed is difficult. Aside from the sheer challenge of remember your daily movements over multiple weeks, the COVID-19 virus lasts for several days on hard surfaces and can linger in the air for up to three hours. There are several international examples of apps that assist in this identification and subsequent notification: PEPP-PT in Europe, MPACT in Massachusetts, and TraceTogether in Singapore to name a few. All the efforts have asked citizens to voluntarily opt into the program that links positively identified COVID cases with individuals who may have been exposed. A recent study from Oxford University indicates that at least 60% of a country’s population needs to utilize the apps for them to be successful at bending the curve.7

---


Previous software applications deployed internationally have faced technical challenges in using location services to identify who may have been in the same area as someone who tested positive. Apple and Google recently announced a change that will allow applications operated by public health officials to use Bluetooth technology to track the distance between phones. The API for this technology will be provided to public health authorities to build apps. To answer concerns from privacy advocates, the tech giants have committed to eliminating this feature once the pandemic ends - though skeptics point out the difficulty in defining the conclusion of a pandemic.8

Isolation: Public health officials need the ability to monitor the extent to which individuals are complying with contact tracing efforts by quarantining or self-isolating. They also need the ability to link individuals with resources that allow them to successfully isolate. These resources will be specific to each case but may include food, housing, replacement wages, and non-emergency health services.9

Technology can play a “force multiplier” role according to experts at Johns Hopkins by allowing health workers to check-in with more citizens. In Singapore, for example, the open government office developed an app called “Homer” that allowed individuals in isolation to check-in with their case worker by voluntarily sending their location data. The individual is prompted with a few text message throughout the day asking them to check-in. This helps supplement manual check-ins and helps tracers target their resources to individuals who are not closely complying with instructions.

---


PRIVACY 101

Data drives modern day decision-making across both private and public spheres of life – and privacy has emerged as a central issue as we navigate our increasingly digital world. In the wake of COVID-19, several privacy experts have agreed that there is a role for technology to play in stemming the outbreak but like most other digital data gathering efforts – must be done responsibly and transparently.

Regulatory structures governing privacy protections are continuously examined, updated, and changed here in the US and throughout the world. This variance in global privacy laws is due to a range of issues including cultural norms, governance structures, political history, and more. And, these differences play out not only between, but within countries. Overall, more trust is placed in local and state governments compared to the federal government. That said, most regulations guiding personal privacy are developed and enforced at the federal and state levels. Nonetheless, local leaders have a responsibility to understand the regulatory landscape and stay abreast of changes in order to anticipate and assist in mitigating subsequent impacts on their local communities.

Is Your Data Private?

For smartphone users in the U.S., data collected on an electronic device is considered private and protected from government access without a warrant or subpoena. The Electronic Communications Privacy Act established that the content of email and telephone conversations, in addition to the related information stored by service providers such as billing history and IP address, is protected by the Fourth Amendment. In recent years, the U.S. Supreme Court has ruled that these protections also apply to other types of information collected and stored on phones, to include location data. A government entity wishing to access a person’s data stored on a third party server must obtain a warrant.

Additionally, federal laws provide a baseline of other protections, such as rules for storing, transferring, and utilizing electronic health information; health insurance and health information technology for economic and clinical health act (HITECH).

---

10 See Carpenter v. United States
11 Health Insurance Portability and Accountability Act (HIPAA) and Health Information Technology for Economic and Clinical Health Act (HITECH)
requirements for federal agencies to notify the public of records kept about them; and the right for a person to access records kept about them. It is important to note that these laws apply to federal agencies. Given current discussions about predicting and preventing the spread of the novel coronavirus, state governments are likely to take the lead in setting relevant procedures and privacy policies. Some states have state laws that provide restrictions on the use of a person’s online information although typically these laws focus on private sector use of individual consumer data, the most well-known of which is the California Consumer Privacy Act of 2018. Many states have strict reporting requirements to keep the public informed on the status of their data. That is, when an organization storing protected information (typically health, financial information, and personally identifiable information such as social security numbers) experiences a cyber security breach, there are requirements to promptly notify affected residents.

Privacy about Personal Health Information

The Health Insurance Portability and Accountability Act (HIPAA) allows health care providers to disclose certain information, such as diagnosis of a communicable disease, to public health authorities without consent. State or local governments are not allowed to force treatments upon infected individuals but are permitted to quarantine or isolate someone until they no longer pose a risk to the public. However, individuals must have access to due process in the form of prior notice, a hearing, and an appeals process which is manageable for illnesses affecting a small number of Americans each year (such as Tuberculosis), but would be very difficult if not impossible to implement on the large scale currently necessary to control the outbreak of coronavirus.

Under exceptional circumstances, such as the 2020 pandemic, policies can be altered to support more agile emergency responses. In March 2020 the HHS waived penalties for specific health care facilities with respect to certain HIPAA requirements. It is important to note that this waiver contains explicit limitations, such as the time constraint of validity only lasting 72 hours from the state’s emergency declaration. Still, local officials should be aware of the ongoing changes to federal privacy standards and prepare to help residents navigate these changing waters.

Privacy Act
Freedom of Information Act.
In the public health realm, most states maintain databases of protected health information for the purpose of monitoring prescription drug usage. This information is only accessible to state and local public health officials and many states maintain strict prohibitions against use by law enforcement entities or other actors outside of the state government. Of important note is that multiple states have been compelled in court to turn over information from these protected databases to the Federal government, typically for investigations by the Drug Enforcement Agency. The looming implication of these judgments is that any state or local health data could be obtained by a federal agency through subpoena power, without requirements for a warrant.


CONSIDERATIONS FOR LOCAL LEADERS

Of course, even with the assistance of technology, 100% compliance with public recommendations is likely impossible. The challenge for local leaders and public health officials is to maximize the resources they have to confront the new phase of this pandemic. Given the challenges facing local leaders as they seek to build something that has never been built before, here are some important considerations:

**Embrace your role in protecting public health through thoughtful governance.** The current crisis is as much an affront to public health, safety and our collective survival as it is a question of personal privacy. Local leaders hold a position of trust with their residents, placing them in a prime position to lead dialogue and guide public opinion.

1. **Take your role as a leader seriously by working to educate yourself on the science behind CDC recommendations and to promote a culture of trust in scientists and respect for healthcare.**
2. **Emphasize public health in both decision-making actions as well as in public communications, underscoring the gravity of the situation and the potential for cooperation to solve these challenges.**
3. **Work collaboratively with your state government to get a seat at the table when these decisions are made.**
4. **Develop a background familiarity on the process and efficacy of contact tracing in order to assist state health officials in impressing its importance upon the public.** The CDC has recently released guidelines on contact tracing.
5. **Work to encourage state governments to set restrictions on law enforcement usage of COVID-19 surveillance data as well as sunset provisions and an oversight authority with a complaint mechanism.**
6. **Prepare to serve as an advocate for residents and elevate concerns of privacy violations should they occur.**
Coordinate as closely as possible with neighboring jurisdictions on topics such as communication methods, messaging, and enforcement techniques in order to minimize the confusion for residents caused by a patchwork response.

Think about how your strategies will center equity. Data has shown disparate impacts from the coronavirus. In Chicago, Black Americans have accounted for 56% of COVID-19 related deaths – despite being 23% of the population. Experts in epidemiology acknowledge the results are upsetting but not surprising considering inequities in preventative care and impacts of decades of structural and institutional racism such as segregation and concentrated environmental hazards. Additionally, there are data that suggest that immigrant populations, the elderly, people who are housing insecure, and people who are incarcerated suffer disproportionate vulnerabilities.

Technology will not treat everyone equally unless it is intentionally designed to do so, and the history of data collection by government entities has had disproportionate impacts and at times questionable intent, furthering the legacy of structural racism. The way humans implement technology can either exacerbate or mitigate the way this legacy is embedded into technologies and algorithms. There has been research documenting the impact that technology can have if it is not built with a racial equity lens. Facial recognition software, for example, has been found to disproportionately misidentify Black, Asian, Native Americans, and women. It is important for local leaders to realize that equity must be centered in both their public health response and any technology that is deployed to assist it. Promising strategies include:

- Disaggregating data by race whenever possible. This step is important in self-monitoring of trends and policies, predicting differential impacts by populations where negative impacts will be felt most acutely, and planning support for your most vulnerable residents.
- Provide resources to residents about ways to combat bias, hate speech, and hate crimes. King County, for example, provides a tool kit for residents who want to promote a cohesive community response and counter racially

---


motivated attacks online.

① Use data to determine who has access to technology in your community and work to ensure their access is as equal as possible.

② Examine the differential impacts of technology and surveillance by race and neighborhood when combined with historical inequitable uses of data and other systems that utilize data to criminalize people.

③ Examine neighborhood, socioeconomic status, gender, race, age, ethnicity, ability, and other demographics of essential workers or other individuals whose jobs cannot be performed at home in order to determine potential disparate negative impacts.

④ Develop a support plan for hourly wage earners who cannot afford to miss workdays or hours due to a mandatory quarantine. Such a plan may include wage replacement, paid sick leave, rent and mortgage freezes, food delivery, subsidized childcare, or simply friendly wellness checks.

⑤ Collaborate with landlords, tenant advocacy groups, and related organizations to prepare rent freezes or other support mechanisms.

⑥ Prepare hotel rooms or other alternative housing arrangements for individuals who must quarantine but do not have access to adequate housing or who must be separated from their current household.

⑦ Encourage providing paid sick leave to all individuals required to quarantine in order to boost compliance and alleviate the financial burden of missing work.

**Communication with your residents will be critical.** Local and state government are the most trusted level of government. Accordingly, as the public is asked to forego some of their personal privacy to protect the public health, it will be essential that local leaders proactively and thoroughly explain the importance of prioritizing health and science. Specific consideration should be given to how to reach vulnerable and marginalized communities. Promising strategies include:

① Hosting regular briefings to inform traditional and new media on the latest efforts, rates of transmission, and the importance of compliance.

② Establishing partnerships with stakeholder groups – employers, faith-based

---

organizations, and nonprofits – to ensure all sectors understand containment efforts and the role they play.

- Hiring and training messengers from specific communities where infection rates have been high with a specific focus on vulnerable and marginalized populations.

- Using expansive and creative methods to make public health information available to all of your residents. For example, the City of Boston sent trucks throughout its neighborhoods to broadcast information about the novel coronavirus in multiple languages, and multiple cities are turning to an array of social media applications, including TikTok, to reach younger audiences.

**Consider privacy and security before promoting technology.** Crises have the power to enable drastic changes to our civic fabric. Consider the long-standing surveillance that has been deployed in the post-9/11 era. Unlike 9/11, the ongoing nature and speed of the COVID-19 crisis means that decisions about surveillance and technology must be made at an even more accelerated pace. However, this doesn’t mean decisions won’t have long standing impacts. It’s up to local and state leaders to ensure this crisis is used to positively rebuild our society instead of providing a way for privacy concessions to be used for profit or prosecution. Local leaders should consider privacy before using technology to directly respond to the coronavirus, in addition to working with state leaders to advocate for privacy considerations in state or regional technology-based solutions.

- Transparently describe and publish data collection, data access, and data storage procedures.

- Encourage your state to adopt a decentralized app with minimal data storage to promote privacy and security.

- Work with your state officials to expressly define who does and does not have access to data. Determine discipline procedures for individuals and organizations who violates the access policy.

**Deploying technology is not a substitute for investing in your public health workforce.** The Trust for America’s Health recently released a report showing a decades long underfunding of America’s public health infrastructure. While the coronavirus is the enemy at the gate for
now, the true threat is the continued underfunding of America’s public health system. Technology, while it can lead to efficiencies, will not be a substitute for true public health infrastructure. To help properly use technology, local officials should understand its limitations and how it fits into the broader public health effort:

- The American Civil Liberties Union (ACLU) recently released a white paper raising concerns about the accuracy of location technology and its ability to identify contacts. The report indicated that algorithms used to determine a “contact” will be forced to rely on assumptions about timing spent around an infected person, proximity to the person, and other variables that may result in flawed assumptions about risk of exposure.\(^{19}\)

- Once an individual has been identified as having exposure to COVID-19, a trained healthcare worker needs to contact them to explain their exposure, their risk, and what they need to do next. These healthcare workers play a critical role in ensuring an individual is able to comply with quarantine orders by providing hands on support that can be improved by deploying technology – but cannot be replaced.

**Place the local health department at the forefront of enforcement and compliance.** The response to the COVID-19 pandemic should be driven by public health officials. This extends to the question of who should have access to personal data from technology used to fight the pandemic. To ensure that public health remains the focus, local leaders should:

- Advocate for local control of enforcement, and explicitly name public health departments as the only agencies with access to personal health data.

- Place limits on the access of your law enforcement organizations to COVID-19 surveillance data. Doing so will set a positive standard for others to follow and will help encourage residents to participate.

- Whether deploying technology to help understand individual or broad community movements, develop an oversight mechanism to monitor your technology and data collection efforts.

- Establish clear procedures for individuals to file complaints if they believe a

\(^{19}\) Stanley, J., & Stisa Granick, J. (2020). The Limits of Location Tracking in an Epidemic (Rep.). ACLU.