



Smarter New York City: How City Agencies Innovate in a Time of Crisis

Executive Summary

Beginning in early 2020, New York City was overwhelmed by the COVID-19 pandemic that swept the globe. Spiking positive cases caused economic, social, and personal disruptions that affected every aspect of life for New Yorkers. In response, the New York City government created novel and innovative solutions to these mammoth problems.

This Columbia University audiovisual case study examines how New York City agencies drove four major innovations in the face of the COVID-19 pandemic: revitalizing the Emergency Medical Service (EMS) and New York City Fire Department (FDNY) to deal with public health emergencies, creating the Pandemic Response Lab (PRL) to perform massive amounts of testing, pioneering the Open Restaurants program to reopen a fundamental pillar of the city's economy, and starting the Situation Room to ensure a safe and effective return to public education.

Innovation in a time of crisis allows us to more saliently document and study how city agencies organize and mobilize resources to advance urban systems and improve life in the city. Some of the questions explored in this case study include: Do city agencies innovate? If they do, what process is followed? Is there even an innovation process city administrations follow? What drives each innovation phase of this process? What critical issues cities leadership and public entrepreneurs must consider in order to build sustainable innovation agendas? What differentiates innovation in the public and private sectors? How can a better understanding of these differences and similarities, as well, help business developers and local governments improve public/private partnerships and accelerate innovation for all citizens?

Lessons learned can be disseminated and replicated to other NYC agencies and cities around the world. It includes interviews with the FDNY's Lillian Bonsignore, Laura Kavanagh, Cesar Escobar, Brendan McSweeney, and Frank Leeb; the Pandemic Response Lab's Sue Rosenthal of New York City's Economic Development Corporation and CEO Jonathan Brennan-Badal of Opentrans; the Open Restaurants program's Judy Chang, Cordell Schachter, Chandrima Pal, and Joseph Yacca of the Department of Transportation, and Melanie LaRocca of the Department of Buildings; the Situation Room's Senior Advisor for Public Health Jay Varma; as well as city government experts Dr. William B. Eimicke and Dr. André Corrêa d'Almeida of Columbia University.

The case includes the following elements:

- a) Video Interviews
- b) Written Case Study (this document)
- c) Teaching Notes
- d) Annexes

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The Modern Plague: COVID-19

In late 2019, a group of patients mysteriously fell ill in Wuhan, China. Although it seemed they all had pneumonia, the underlying disease has never been seen before. Chinese officials—and eventually the globe—waited nervously for news.¹

By January 2020, the pathogen had been sequenced by Chinese scientists and identified as the virus SARS-CoV-2, more commonly known as novel coronavirus. The mysterious illness caused by the virus was named Coronavirus Disease of 2019, or COVID-19 for short. The name would soon become infamous.

At first, it was unclear what the ramifications of COVID-19 would be across the globe. But as cases climbed and neighboring Thailand and Japan saw their first positive tests, governments around the world began to take more drastic measures to limit the spread of COVID-19. By the end of January 2020, the U.S. suspended all travel to and from China for non-citizens, including those who were already in China when the ban went into place.² Aware that the dense urban packing of New York City makes it particularly susceptible to devastating pandemics, NYC's Fire Department and Emergency Medical Service (FDNY EMS) leased several hundred ambulances from other municipalities for use in case a crisis developed in the city.³

In March 2020, New York City saw the first effects of the COVID-19 global pandemic. Due to New York City's densely packed 8.5 million residents, novel coronavirus spread through the city like wildfire, hitting high-poverty areas and communities of color particularly hard.⁴ NYC saw its first confirmed case of COVID-19 infection on February 29th, 2020.⁵ Two weeks later, New York City documented nearly 200 new cases in one day. Less than one month after that, the city saw over 5,000 documented positive cases of infection. Around this time, the death toll climbed to nearly 1,000 people a day.⁶ As of the end of 2021—nearly two years after the city's first case of COVID-19—New York City has documented nearly 2 million total cases, 150,000 total hospitalizations, and over 35,000 total deaths from COVID-19 infection.⁷

New York City's government had to act fast to limit the growth of cases, hospitalizations, and deaths from COVID-19 infection. Not only was it imperative to protect the lives of its citizens, but slowing the spread of infection was the only way to avoid overwhelming NYC's healthcare infrastructure. On March 16th, Mayor Bill de Blasio ordered the closing of the New York City Public School system, followed by the closing of all NYC bars and restaurants the next day.⁸ While these and other mitigating strategies helped to flatten the curve of new infections somewhat, the city was still faced with the significant problem of

¹ CDC.gov <https://www.cdc.gov/museum/timeline/covid19.html>

² Forbes

<https://www.forbes.com/sites/geoffwhitmore/2020/10/19/when-did-president-trump-ban-travel-from-china-and-can-you-travel-to-china-now/?sh=f3f9e7174847><https://www.forbes.com/sites/geoffwhitmore/2020/10/19/when-did-president-trump-ban-travel-from-china-and-can-you-travel-to-china-now/?sh=48de94ba7484>

³ Lillian Bonsignore interview

⁴ Thompson CN, Baumgartner J, Pichardo C, et al. COVID-19 Outbreak — New York City, February 29–June 1, 2020. MMWR Morb Mortal Wkly Rep 2020;69:1725–1729. DOI: <http://dx.doi.org/10.15585/mmwr.mm6946a2>

⁵ NYC.gov <https://www1.nyc.gov/site/doh/covid/covid-19-data-totals.page>

⁶ NYC Health, <https://www1.nyc.gov/site/doh/covid/covid-19-data-totals.page>. Note that these numbers reflect combined probable and confirmed cases of COVID-19.

⁷ NYC Health, <https://www1.nyc.gov/site/doh/covid/covid-19-data-totals.page>. Note that “Total” reflects combined confirmed and probable cases of COVID-19.

⁸ Investopedia, <https://www.investopedia.com/historical-timeline-of-covid-19-in-new-york-city-5071986>

restructuring its essential operations that could not shut down to deal with the pandemic not only quickly, but also sustainably. To achieve long-term change, city agencies had no choice but to innovate.

Does City Government Innovate?

There is an ongoing debate centered on public innovation and public entrepreneurship. Citizens and many in the private sector believe governments are slow, bogged down by politics and bureaucracy, and therefore cannot be innovative. This inability to innovate, if true, is problematic since, by 2050, the world's cities will hold two thirds of the total population, produce 80% of the global GDP, be responsible for three-quarters of the energy consumption and half of greenhouse emissions, and have one billion vehicles on their streets. This demand, pressure and impact will only grow, and it is crucial to the future of the twenty-first century city that we understand better how city administrations operate and how collaboratively they can develop innovation agendas.

Many public servants, academics and private entrepreneurs believe the public sector does innovate though. Governments have to worry about providing life or death services, so any changes they make must be tried and tested extremely thoroughly before they are implemented. If the public sector unveils an innovation that is not effective, they not only waste precious tax-payer dollars, they risk jeopardizing the lives of their community members. On this higher standard for excellence, Deputy Commissioner of the FDNY Laura Kavanagh states:

If you get a new app on your phone and it works 80% of the time in your personal life, that's great. That's a great success rate. But if we put an application into the field and it works 80% of the time in a fire, that's not great. And so the standard for innovation is very different.

Much of this innovation happens at the level of the city. According to Dr. André Corrêa d'Almeida of Columbia University, city innovation is a predictable and consistent process that involves an implementation pattern. These steps go from identifying the problem, designing a solution, implementing the said solution, and then evaluating its effectiveness in a continuum and interactive cycle.⁹ Dr. d'Almeida also identifies key drivers of innovation ranging from data and technology to leadership and decision-making, networks and collaboration, organizational structure, and regulatory frameworks. The differentiated role of these key drivers throughout the innovation process leads to variations in how specific city-level innovation is implemented.¹⁰

To Dr. d'Almeida, crises such as COVID-19 also do not substantially change how cities innovate but simply provide the need, which makes innovation phases and drivers more salient, observable and researchable. In his words:

Think of the pandemic and the COVID crisis as a magnifier of how cities and municipalities work and operate... the crisis allowed us to create a sense of urgency in how cities and municipalities already operate.

Innovation Through Requirement: FDNY EMS First Responders

For some sectors of New York City, such as schools and restaurants, temporarily shutting down operational capacity at the height of infections makes sense to stop the spread of a deadly and highly virulent pathogen. However, New York City's Fire Department needed to ramp up its ability to act as

⁹ Smarter New York City: How Cities Innovate available at <https://cup.columbia.edu/book/smarter-new-york-city/9780231183758>

¹⁰ André Corrêa d'Almeida interview

cases became more prevalent. The department fought on the front lines and could not afford to shut down for any reason.

FDNY is a complex behemoth. Encompassing both the fire department and EMS, the FDNY employs nearly 11,000 firefighters and 4,500 EMTs and paramedics, and has been the largest and busiest EMS system in the United States since the two agencies merged in 1994.¹¹ Even before the strain brought on by the global pandemic, the department was responsible for responding to approximately 1.5 million calls for help per year.¹² This massive responsibility becomes even greater during times of disaster because FDNY is often the first line of defense standing between New York City's people and crisis. In the words of Chief of EMS Operations Lillian Bonsignore, "When things go wrong, EMS is one of the first, if not the first—particularly in a medical event—the first line of servants that are out there." The COVID-19 crisis was no different.

Square Pegs in Round Holes: Ambulances and the CAD System

Faced with 6,000 calls a day at the outset of the pandemic, including some from their own sick personnel, FDNY was challenged by a tidal wave of need.¹³ But they had to move forward, continuing to serve their community while attempting to implement new solutions to these unprecedented roadblocks. This structure of "innovation through requirement," as Chief Bonsignore called it, forced FDNY EMS to not only create solutions quickly but to respond flexibly as these new solutions led to unforeseen problems of their own.

Such was the case when FDNY preemptively ordered hundreds of additional ambulances from other municipalities to keep up with this heightened need. Though the vehicles themselves were essential to increase the department's responsiveness, they also forced FDNY to solve a new problem: integrating each of the new vehicles onto the department's existing navigational infrastructure. First responders must have access to accurate GPS systems that work in NYC. Otherwise, it is impossible to reach those the department is trying to serve. Despite this need, many of the new ambulances were not equipped with navigational technology compatible with FDNY's existing system. Without compatible GPS systems, the new ambulances would be useless.

Undeterred, FDNY began problem-solving with the ambulances' existing capabilities. They converted the ambulances' cellular phone system into an inclusive mobile computer-aided-dispatch (CAD) system. This system combines the 911 calling system with the department's GPS, alerting the closest ambulances to emergency calls in real-time.

The CAD system was made even more efficient through collaboration with the Department of Transportation (DOT) and Columbia University's School of Engineering and Applied Sciences (SEAS). This public-private partnership—which received core funding from Google.org—analyzes DOT traffic data to distribute ambulances most effectively, reach those in need most quickly, and avoid overcrowding hospitals.¹⁴ The CAD system minimizes response time and maximizes city resources, issues of paramount importance for a department that is, in the words of Chief Bonsignore, "very much reliant on their ability to get in and get out."

Human-Centered Support During Crisis

FDNY was forced to adapt more than just technologically. As hospitals were overwhelmed by infected people, FDNY made a difficult decision to change its ambulance protocol. Because of the prevalence of

¹¹ Lillian Bonsignore and Brendan McSweeney Interviews

¹² Lillian Bonsignore Interview

¹³ Cesar Escobar Interview

¹⁴ Statement from Columbia Engineering,

<https://www.engineering.columbia.edu/press-release/optimizing-fdny-ambulance-response>

cardiac arrest among serious COVID-19 patients, FDNY often had to perform resuscitations on arrival. But if signs of life remained elusive for the patient even after initial attempts, first responders were instructed to leave the dying.¹⁵ The department could not risk overburdening hospitals even further.

These repeated run-ins with the dead and dying took their toll on the first responders. “We save lives for a living and a lot of those patients that we were coming across were not being saved,” Chief Bonsignore explained. On top of that, the department lost 14 of its members over the course of the crisis, three by suicide.¹⁶ Many of the first responders felt they had nowhere to turn for mental health help. “There’s no place to go and deescalate; there’s no place where you can find comfort,” Chief Bonsignore continued:

A lot of our people... were afraid to go home and bring this virus to their families. So they didn't even have the comfort of going home and crying in the arms of their loved ones over this incredible amount of death and destruction that they were seeing... we're going to see the effects of this pandemic for years to come.

Amid these hardships, the department saw a 25% increase in counseling sessions.¹⁷ But they wanted to create a way for first responders to share their burden. As a result, FDNY created one of the largest, active member peer support groups in the United States.¹⁸ The additional support was met with widespread approval and the group is expected to remain operational even outside of crisis times.

Reinforcements: Training in a Pandemic

The pandemic affected not only the operations of existing first responders but also FDNY’s ability to train recruits. While training may seem of secondary importance when compared to COVID-19, the crisis amplified the need for newly qualified recruits trained in the most up-to-date methods. At times during the COVID-19 crisis, a quarter of FDNY’s first responders could not work due to infection.¹⁹ As a result, the department found itself cripplingly short-staffed even as the need for manpower climbed.

At any given point, FDNY has up to 16,000 members and trainees cycling through certification training.²⁰ Many are active service members required to renew their training every three years. To increase the number of first responders available, FDNY gave every member a one-year extension of certification.²¹ Not only did this increase the number of boots on the ground, but it also decreased the number of trainees enrolled in the academies. During a time of virulent viral spread, this helped to limit exposures.

To limit the amount of exposure time for trainees, FDNY transitioned to remote video lessons and simulations via their online Learning Management System (LMS). While LMS had been an idea within the academy for over two years, it had never been utilized for training. Faced with a time crunch, the system had to be rapidly improved and outfitted with adequate, up-to-date training videos before recruits fell behind. As FDNY’s chief of training Brendan McSweeney explained, “Something that we were going to work on and hopefully roll out within a one-year period had to be done in a three week to one-month period.”

¹⁵ Interview with Lillian Bonsignore

¹⁶ Interview with Lillian Bonsignore, NY Daily News

<https://www.nydailynews.com/new-york/nyc-crime/ny-mental-health-crisis-among-nyc-ems-20210314-iy2yj6e5rdbb7ik7tscpltgudem-story.html>

¹⁷

<https://www.nydailynews.com/new-york/nyc-crime/ny-mental-health-crisis-among-nyc-ems-20210314-iy2yj6e5rdbb7ik7tscpltgudem-story.html>

¹⁸ Interview with Lillian Bonsignore

¹⁹ Laura Kavanagh interview

²⁰ Lillian Bonsignore interview

²¹ Cesar Escobar interview

Achieving this meant utilizing the diverse skill sets of department members to render the system operable and create new training videos. As Chief McSweeney continued:

We have such talented members out there in the fire department that not only are good at firefighting, but they have a tremendous skill set in the arena of editing filmmaking video production. So we tried to grab members out there who had these skill sets during this pandemic.

The resulting version of LMS was useful for supplementing training but it cannot replace hands-on training. To acclimate paramedic recruits to the chaotic and human elements of the job without exposing recruits to infection, the department relied on its simulation laboratory. The laboratory enables recruits to work with state-of-the-art technological mannequins that simulate medical conditions. Through these mannequins, recruits are taught to insert IVs, take blood pressure, and intubate patients. Instructors can even talk through the mannequins remotely to teach the students how to deal with patients personally, not just medically.²² Combined with the LMS, the simulation laboratory and limited in-person training allowed FDNY to keep up with training throughout the pandemic and beyond.

The Role of Technology and the Human Factor

Throughout the pandemic response, the FDNY acknowledged the need to rely on technological tools to enhance its operation. No matter how cutting edge a piece of technology is, without the human capability to adapt its usage into something effective to their own operation, its potential transformativeness would be irrelevant. Laura Kavanagh reflected:

I think that level of flexibility is going to be a positive one. And I think having devices in every unit or with every member is going to vastly increase our situational awareness... it's not just about learning the procedures, it's about being able to adapt to changing environments.

FDNY members themselves have exemplified the positive relationships between humans and technology and how existing technological tools such as training videos, while simply sounded, can be tremendously impactful in responding to a crisis of this intensity.

Comprehending the Crisis: Pandemic Response Lab

The Lack of Testing Capacity and the Case of Market Failure

While FDNY focused on responding to cases of severe COVID-19 infection, the rest of NYC had no idea how many cases existed. This was because the United States—the country with the highest number of diagnosed cases and confirmed deaths from COVID-19—was unable to accurately assess the extent of the virus due to the limited availability of early testing. The CDC test kits that were initially available were eventually found to produce “untrustworthy results” by the New York City Public Health Laboratory.²³ Failure to accurately assess the extent of COVID-19 cases in the nation’s most densely packed city could be catastrophic. Fast, accurate, available tests were a key factor in managing the pandemic in New York City.

²² Cesar Escobar interview

²³ Shawn Boburg, Robert O’Harrow Jr., Neena Satija and Amy Goldstein. April 3, 2020. “Inside the coronavirus testing failure: Alarm and dismay among the scientists who sought to help”. Washington Post.

<https://www.washingtonpost.com/investigations/2020/04/03/coronavirus-cdc-test-kits-public-health-labs/>

To increase NYC's testing capacity, a local supply chain for test kits was put together by a group of academic leaders. The academic council set a goal of increasing testing to 50,000 to 100,000 tests per day.²⁴ It quickly became apparent that NYC would need a radically new facility given that the private sector alone would not be able to hit the mark, which was surprising knowing that the city houses one of the most advanced privately-own health sciences infrastructures in the world. This led Sue Rosenthal of the New York City Economic Development Corporation (NYCEDC), and a member of the academic council, to ask "Could we actually build a lab?" The Pandemic Response Lab (PRL) was born.

The Creation of PRL

The Situation Room's Senior Advisor for Public Health Jay Varma reflected:

The single most important thing for a city government to do in an epidemic is to make sure that you can prevent as much illness and death as possible by marshaling all of the resources at your disposal. That includes both the resources of the government, but also of civil society and other organizations.

The Pandemic Response Lab (PRL) is an example of the positive impact public-private partnerships can have in solving challenges. PRL was founded through a partnership between the New York City Economic Development Corporation (NYCEDC), New York University (NYU), Opentrons – a Brooklyn-based robotics and life science company – and the New York City Department of Health. Opentrons supplied hundreds of robots to hospitals and independent labs for use in administering and processing COVID-19 tests.²⁵ The New York City government then put Opentrons in contact with NYCEDC and NYU. Spurred on by the urgency of the pandemic, Rosenthal states, "within three months we had essentially set up this lab that would normally, in my belief, would take well over a year, possibly even two, to build."

The program was successfully designed by leveraging the strength and capability of all three partners. OpenTrons provided the equipment to set up and operate the lab, while NYU provided expertise in research and lab operations.²⁶ NYCEDC forged connections between key health partners around the city, connecting them to PRL.²⁷ By simultaneously building the hardware of the lab and the information connections, PRL was able to receive samples and tests from these health partners the moment the lab became operational. This saved time and ensured a healthy working partnership from day one. The success story of PRL also showcases the political commitment from city governments needed in order to address challenges of this scale. By not only imagining and bringing to life a solution that leverages the strength of each stakeholder, NYC city government agencies also backed this commitment with legal support to ease the barrier of establishment for a project like this one.

PRL in Action

PRL's mission is two-fold. First, to provide fast and accurate test results; second, to compile easily accessible data on COVID-19 cases.²⁸ The necessity for quick testing turn-around was especially pressing because, in some areas of the country, tests took 10 days to process.²⁹ "At that point, the test is quite frankly useless," Rosenthal added. The centralization of expertise and automation of the testing process allowed for testing to be done incredibly quickly. According to Opentrons CEO Jonathan Brennan-Badal, "The process as a whole can be completed in as little as three hours, and we promise a 24 hour turn-around time... 99% of our samples meet that turnaround time." This is two to three times faster than

²⁴ Sue Rosenthal interview

²⁵ Jonathan Brennan-Badal interview

²⁶ Pandemic Response Lab: Our History <https://pandemicresponselab.com/history>

²⁷ Jonathan Brennan-Badal interview

²⁸ Sue Rosenthal interview

²⁹ Sue Rosenthal interview

the industry standard.³⁰ In addition to being faster, Brennan-Badal claims that the tests are “a fraction of the cost of any other lab, saving hundreds of millions of dollars in testing costs.”

This combination of speed and affordability made PRL instrumental in reaching the goal of 100,000 daily tests. As Jay Varma of NYC’s Office of the Mayor, explains:

We were able to ramp up capacity from a few thousand tests a day, to 10,000 or 15,000, to over 50,000 to 60,000 a day by the end of the summer of 2020. And then eventually hit 100,000 by mid Fall of 2020.

By achieving the first part of its mission, PRL knowledge of exposure rapidly, helping to limit outbreaks.

The second aspect of PRL’s mission is with mass data. PRL compiles and stores data from every test it receives. This is key for providing governments with information to make decisions about combatting COVID-19 most effectively. Rosenthal commented:

It led to the city having information— and the state having information— for its population that was more robust so that it could determine what the positivity rate was, where there were spikes if there were neighborhoods that needed additional testing, additional outreach, additional communication, to be able to react and manage COVID, but then also help reopen the economy to the extent possible.

Complimentary, while mass data is recognized to have a tremendous impact in providing mechanisms for swift decision-making, balancing the enormous scale information with its relevance is an art. Similar to the experience of the FDNY, Laura commented: “the more information our members have, the more safely they can proceed into what have become increasingly complex emergencies and you have to balance that with not overloading them.” Having a clear vision and purpose of which data is needed to capture and to share is a lesson learned from both the FDNY and the PRL project.

The Future of PRL

PRL remained an integral part of New York City’s pandemic response even as COVID-19 evolved. PRL does not stop its data analysis when it detects a positive test. Instead, it determines the specific genome of the positive sample.³¹ This has been instrumental in learning information about new COVID-19 variants—such as Delta and Omicron—as they emerge. Figuring out trends in transmission across variants helps shape policies that can evolve with the coronavirus.

PRL’s success in New York City has led to efforts for expansion into other cities. They opened a center of operation in Washington DC and are planning a branch in Los Angeles According to Brennan-Badal, PRL is “a highly replicable model where we can provide extremely affordable testing for COVID, but (also) for hundreds of other common tests. The great benefit of (expanding) is that we can save hospitals and health systems and ultimately everyone across the U.S. a significant amount of money in testing costs and enable underserved communities to have better access to critical testing.”

Hungry for Change: The Open Restaurant Program

As COVID-19 cases gradually declined by the summer of 2020, city agencies began to expand their focus to include the health of the city’s economy. Since the March 2020 lockdown, one of the world’s most vibrant economies suffered massive job losses and revenue decreases in the tourism, real estate, and service industry. The plan to revitalize the economy started with the restaurant and dining industry.

³⁰ Pandemic Response Lab: Why PRL? <https://pandemicresponselab.com/why-prl>

³¹ Pandemic Response Lab: Why PRL? <https://pandemicresponselab.com/why-prl>

In 2019, the NYC restaurant industry employed over 300,000 people across nearly 25,000 eating establishments. Collectively, this amounts to \$10.7 billion in total wages and roughly \$27 billion in taxable sales.³² The sheer volume of people impacted by the restaurant industry's shutdown led to widespread calls to figure out a reopening solution. According to DOT's Judy Chang, "In early spring in 2020, we got a lot of calls from elected officials, the hospitality industry, and individual restaurants, to think about what we can do to help this industry that was on its knees."

At the same time as city officials began to feel pressure to reopen restaurants, they were also facing increased pressure to create widely accessible, outdoor spaces where people could interact with one another after months of isolation. As Chang recalls:

We were getting a lot of pressure to think about closing down some streets to vehicular traffic so people could safely be out and exercise, and maybe even catch up with a friend they haven't seen in several weeks.

This was not only an opportunity to revitalize one of the pillars of New York City's economy but also a chance to rethink how public space is utilized.

Unlikely Partners: The Department of Transportation and The Department of Health

When considering which city agency should spearhead the reopening of dining establishments, the Department of Transportation (DOT) may seem an old choice; however, this is a challenge of available space. DOT's Cordell Schachter said:

One thing that COVID forced on us was to think literally outside the box, outside the buildings, in how do we allow these businesses to continue to operate, to stay in business? And can we give New Yorkers other places where they can get together, have a meal, as opposed to inside the buildings?

Controlling over 6,000 miles of streets across NYC, DOT could access a lot of vacant space.³³ The goal of New York City's government evolved from simply reopening restaurants into making the streets "less a conduit for traffic and vehicle traffic and more a conduit for human interaction and commerce and culture." Safety is the primary concern for DOT so the agency worked closely with the Department of Health to ensure the project would prove beneficial to all New Yorkers.

The Open Restaurant Program

The Open Restaurant Program permits restaurants in NYC to open new outdoor dining areas in the open air of the city's streets. Coordinating 25,000 restaurants across 6,000 miles of road would require serious innovation. Similar to the PRL story, the voices of civil society organizations were heard and made an impact in the creation of the Open Restaurant Program. DOT's Cordell highlighted:

So one of the reasons why the open restaurants program was so successful and started so quickly is that the restaurants are represented by a restaurant and hospitality association. So it was that association and their leaders that were talking with city hall and talking with agency executives about what they wanted to achieve.

DOT staged the Open Restaurant Program in two steps: enrollment and oversight. Enrollment meant applying for participation in the program; oversight meant ensuring that the restaurants complied with

³² Office of the New York State Comptroller, <https://www.osc.state.ny.us/files/reports/osdc/pdf/nyc-restaurant-industry-final.pdf>

³³ NYC DOT: About <https://www1.nyc.gov/html/dot/html/about/about.shtml>

the rules and standards of the program.³⁴ Both of these processes necessitated a significant increase in data and information technology (IT).

Thought for Food: IT in the Open Restaurants Program

The only logistically feasible way to allow all of New York City's restaurants access to the Open Restaurant Program's application was to make it online. DOT was also under pressure to push out the application as soon as possible. DOT partnered with their business collaborator Esri, to organize restaurants geographically using prebuilt geospatial and mapping templates and codes. This ensured that DOT did not have to build a system from scratch.³⁵ The department also partnered with Microsoft and the Environmental System Research Institute to centralize this information onto an online application.³⁶ The result of this public-private partnership was a success. DOT rolled out the app in nine calendar days, the first time DOT made an application available for public use in under two weeks.³⁷

Thousands of restaurants applied for the program on the first day the application was publicly available.³⁸ Now the Open Restaurant Program had to ensure compliance with the program's operational standards. Dining inspections are handled by both DOT and NYC's Parks Department, which utilize both proactive and complaint-driven inspections.³⁹ These inspections are key to ensuring the program continues to run smoothly long after implementation. DOT's Judy Chang observes:

Inspections are critical for a program like this. I think having people understand that their safety, that their patient safety, that the protection of their property was the focus, our compliance rate steadily climbed up to well over 95%, I think in a matter of weeks.

Community Building: Trust and Verify

It would have been impossible to inspect thousands of participating restaurants ahead of allowing them to reopen. Instead, restaurant owners were allowed to follow online guidelines and self-assess their readiness to reopen. It took the city time, resources and unprecedented coordination efforts between city agencies with personnel on the streets to create a web of onsite inspection routines. Until this happened, trust and accountability were critical to help businesses recover, local communities partly regain their vibrancy and DOT operate.

NYC now plans to make the initiative permanent, launching the permanent Open Restaurant Program in 2023.⁴⁰

Schooling Safely: The Situation Room

From the beginning of the pandemic, what to do about public schools was a contentious issue. Shutting down nearly 2,000 schools and forcing online learning on unprepared teachers and students was far from ideal. With the new school year looming and over one million NYC students facing the prospect of another formative year spent online, the city had to act before the new school year beginning in fall 2020.

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³⁴ Cordell Schachter interview

³⁵ Cordell Schachter interview

³⁶ Chandrima Pal interview

³⁷ Cordell Schachter interview

³⁸ Judy Chang interview

³⁹ NYC.gov <https://www1.nyc.gov/html/dot/html/pedestrians/openrestaurants-faq.shtml>

⁴⁰ NYC.gov <https://www1.nyc.gov/html/dot/html/pedestrians/openrestaurants.shtml#permanent>

⁴¹ <https://www.nychealthandhospitals.org/t2corner/voices-of-test-trace-corps-the-situation-room/>

Inter-agency Cooperation

The urgent need to address the problem of educating the city's youths safely led to the formation of the Situation Room. This multi-agency partnership combined the Department of Education, the Department of Health, and the Test and Trace Corps all under the guiding force of the Department of Buildings.⁴² This system seeks to combine the strengths of each department without forcing any of them to forego their daily operations in service of the Situation Room. As summarized by Melanie LaRocca, commissioner of New York City's Department of Buildings:

What we did was continue to have agencies do what they're responsible for doing and seamlessly siphon off portions of each agency, pull them out, have them act as if they are one entity, um, and do something fundamentally different than they've ever done before, all while continuing their day-to-day missions leaving that uninterrupted.

Each agency provides its area of expertise. The Department of Education provides experts in tune with the goals of New York City's schools. The Department of Health supplies expert epidemiologists to analyze information and offer advice for outbreak mitigation. The Test and Trace Corps track down individual cases of infection and monitor those who have been exposed. Finally, the Department of Buildings ensures that the schools themselves are notified and provided with the information they need to act.⁴³ Because of the structure of New York City's school system, multiple distinct schools often occupy the same building. This could lead to unknown exposures as students share the same physical spaces but are under the supervision of different entities. The Department of Buildings ensures all building residents are aware of potential exposures.

Situation Room Function

The primary purpose of the Situation Room is to consolidate all of the agencies involved in ensuring safe and effective in-person learning under one roof. To achieve this, the project seeks to streamline the process of collecting data on positive cases in schools and sharing that information efficiently between school staff, families, and the city government. This way, the Situation Room can mitigate outbreaks by more effectively flagging and removing positive cases and exposures in schools before they become uncontrollable. As Dr. Jay Varma states:

If somebody tests positive who was in any way physically present in a school, we need to know who that person is when they were in the school, who they might have been exposed to, and what actions need to be taken for that person, for the people they exposed, for other people in the building, and for the school system as a whole.

Mitigating outbreaks requires first being aware of infections. To ensure all positive cases of COVID-19 get reported to the schools through the Situation Room, the program employs three pathways for information sharing.⁴⁴

Pathways for Information

⁴² <https://www.nychealthandhospitals.org/t2corner/voices-of-test-trace-corps-the-situation-room/>

⁴³ Jay Varma interview

⁴⁴ Jay Varma interview

The Situation Room is effective because of its organizational power. When multiple entities such as schools, physicians, primary care offices, and even individuals engage in testing practices, they create the potential for news of a positive case to be lost as it is transferred to multiple different entities. Prevalent and available testing is effective only when the results of those tests are known by those who need to. To ensure news of a positive result never gets fumbled on the way to NYC's schools, the Situation Room provides one location for the information to be sent.

The first path through which news of a positive case can be sent to the Situation Room is from direct testing by the schools themselves. As Dr. Jay Varma explains:

We do testing in our schools of anybody physically present there at least once a week. So we take a random sample of 10% or 20% of the people physically present in that school and we call them down to a special place and we take swabs from them and then get results back within 24 hours. Any of those test results, they get immediately reported to the Situation Room.

This process ensures that there is no intermediary party to contend with. Results go directly from schools to the Situation Room.

The second path for information goes directly from physicians to the Situation Room through an electronic reporting system to the city government. For each positive case that is reported, a member of New York City's testing and tracing team conducts interviews with the patient to determine if they have had any contact with any of NYC's schools. If contact is determined, the tracer immediately notifies the Situation Room who is in direct contact with the school.⁴⁵ Because of the presence of outside testers dealing with private citizens, this avenue involves many different actors. The Situation Room is integrated into multiple steps of the process to ensure the information chain remains unbroken.

The final path through which the Situation Room learns of positive cases is through self-reporting. Every individual that comes into routine contact with an NYC school—be they teachers, students, parents, administrators, or custodians—are instructed to alert the Situation Room if they receive a positive test. This simple tool ensures that no one falls through the cracks and misses getting their information reported. Everyone assumes individual responsibility. It is also necessary because many teachers, administrators, and staff members employed in NYC schools live in New Jersey and Connecticut.⁴⁶ Out-of-state positive cases often do not get reported to employers in NYC; this path makes sure that the Situation Room is still made aware. Awareness is only half the battle for the Situation Room, though. The program must also be able to use the information in such a manner as to mitigate the risk of outbreaks for schools.

The Situation Room's Response

Information disseminated through any one of these pathways is only as effective as the Situation Room is once they receive it. Recognizing the importance of who receives this information, the Situation Room employs a "Test and Trace" team (T2s). These members are responsible for dealing with both incoming and outgoing information. They must catalog positive cases that are called in while advising the caller, but they must also inform the schools that were affected and provide advice to the administrators on how to move forward.⁴⁷

T2s do not make their recommendations alone. The Situation Room also employs a team of epidemiologists who carefully consider the specifics of each report before deciding the likelihood and

⁴⁵ Jay Varma interview

⁴⁶ Jay Varma interview

⁴⁷ <https://www.nychealthandhospitals.org/t2corner/voices-of-test-trace-corps-the-situation-room/>

scope of a potential outbreak.⁴⁸ It is only once this professional consideration has been reached that the school is advised on how to react to a positive case. Thus, the Situation Room is more than just an alarm bell; they provide tailored instructions for mitigating detrimental outcomes as well.

Conclusion

Why do urban innovation and improved governance at city level matter? What is the relevance of case studies about how city agencies innovate? Simply put, they matter because our happiness and wellbeing, and that of future generations, which include environmental and biodiversity preservation, depend on how well cities respond and adapt to multiple local, regional, and global challenges. These responses and adaptations require the design, implementation, and evaluation of new approaches while searching for answers and solutions to new problems and opportunities, improving operations, enhancing quality of life for residents, increasing quality of decision-making, reducing cost of operations, and increasing speed of decision-making.

The COVID-19 pandemic upended the world as we knew it. New York City was particularly hard hit. Still, New York City's government created a series of innovations to better protect and serve its citizens in a time of crisis. FDNY used technology to respond to calls more efficiently, updated protocols when they did not fit the extenuating circumstances, supported one another mentally and emotionally in their time of need, and still managed to train a new generation of first responders.

The Pandemic Response Lab enabled New York City to move forward by increasing the city's testing capacity when the private sector alone was not capable of. Through a public-private partnership, PRL provided access to cheaper, more plentiful, and faster tests. The Open Restaurant Program reopened restaurants and provided communities with more usable outdoor space to interact. Similarly to PRL, the Open Restaurant Program offers an alternative approach to public-private partnerships. Finally, the city created the Situation Room to mitigate, in quasi-real time, outbreaks in NYC's schools as they returned for in-person instruction. The Situation Room is a cross-agency collaboration with the Department of Buildings overseeing the Departments of Health and Education, and also the Test and Trace Corps.

The Teaching Notes provided next in this document offers operational definitions of several concepts introduced in this case study, such as innovation phases, drivers and critical issues. Instructors can use these definitions to discuss their applicability and relevance in other cities and urban environments. There are many ways to incorporate case studies in the classroom and use them to engage students in problem solving, hands-on, and practical activities. The Teaching Notes proposes three general pedagogical and teaching strategies instructors can follow to use this case study in their courses, depending on the learning goals set.

⁴⁸ Jay Varma interview