CENTER OF
COMPLEX
INTERVENTIONS

The Chelsea Project COVID-19 Intervention Manual

A guide for getting things done during a pandemic

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Executive Summary

Chelsea, Massachusetts had one of the highest COVID-19 transmission rates in New England in the summer of 2020. The Chelsea Project was a collaborative effort that included government entities, local nonprofits, and startups that partnered to deploy wastewater analysis, targeted PCR testing and vaccine outreach, and a community-led communications strategy. The strategy helped increase both testing and vaccination rates in Chelsea. As a results of these efforts, by summer 2021, Chelsea had one of the highest vaccination rates among cities with comparable demographics in the U.S. This handbook explains how we identified the key strategies to tackle this complex problem, built a diverse team, and learned from our successes and failures. We applied data, public health and management theories using human centered design to create solutions that were relevant and useful to the people most affected by COVID and persistent inequities in health.

The purpose of this handbook is to share what we learned and inspire your innovative complex interventions. We would love to hear from you and work with you, so please reach out to us.

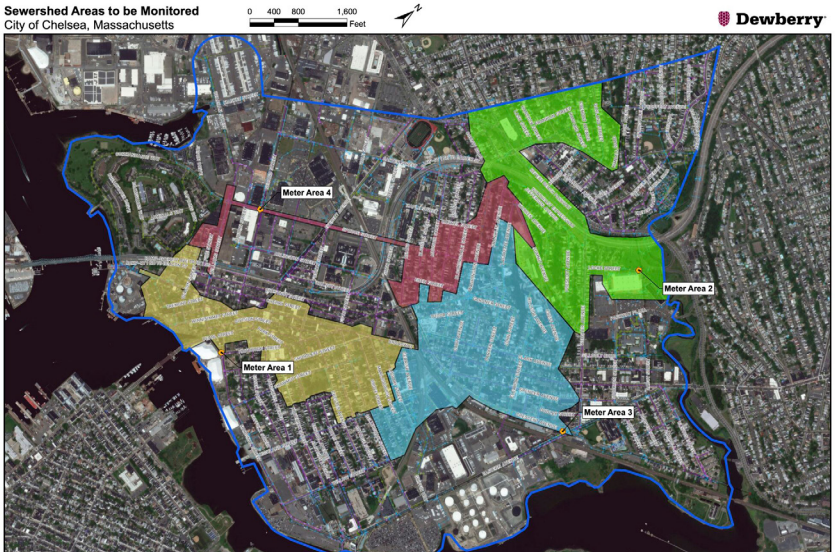


Figure 1. Wastewater testing helped to identify areas of Chelsea with high rates of COVID. Community health workers were deployed to high risk areas to warn residents and distribute personal protective equipment.

Introduction

Public Health interventions are often divided into research and outreach. Few projects direct research results at the population level in immediate ways. The Chelsea Project designed a system to collect and analyze data on COVID rates in wastewater, map neighborhoods with high rates of COVID and direct community health workers (promotores) to high risk areas to distribute information, PPE and vaccine appointments within a one week period. The Chelsea Project demonstrates how turning data into community action can significantly impact vaccination rates by increasing residents understanding COVID trends through trusted messengers.

Community survey results revealed that most people in Chelsea, MA had not had a COVID-19 test by October 2020, because they lacked symptoms to make them think they might be positive[(1)]. Behind that decision were other issues around access to tests, and fear of the consequences of the results. As a response, The Center of Complex Interventions designed and implemented the Chelsea Project (TCP) with the goal to create a long-term, self-sustaining, and resilient public health system. The project involves building block-level sensing and intervention in collaboration with grassroots community organizations and the city government in response to the COVID-19 pandemic.

The project brought together wastewater COVID-19 testing, mapping and deployment of local community health workers to high risk areas to inform residents of rising COVID rates, distribute personal protective equipment, listen to residents and dispel myths about COVID and vaccines, provide immediate appointments to COVID-19 appointments and refer residents to the mobile testing and vaccine unit. The mobile and testing vaccine unit worked in response to wastewater mapping and with guidance from the community health workers (promotoras) in determining the best location and timing for outreach.

We aimed to decrease the rates and impact of COVID-19 in Chelsea, MA. Project design ensured outreach, testing and vaccine scheduling were available outside of working hours. Training and deploying promotoras ensured messengers were trusted by the mostly hispanic and immigrant population. The project maintained health equity at its center and all decisions involved human centered design with local residents, researchers and public health experts to ensure applicability and relevance. Frequent meetings with the same core group of people built trust, and enabled the ability to pivot rapidly in the face of change.

WE AIMED TO DECREASE THE RATES AND IMPACT OF COVID-19 IN CHELSEA, MA. PROJECT DESIGN ENSURED OUTREACH, TESTING AND VACCINE SCHEDULING WERE AVAILABLE OUTSIDE OF WORKING HOURS.

We used data triangulation, or mixed methods, which involved collecting and analyzing quantitative data, collecting and analyzing qualitative data, and turning data results into action through human centered design. A clear indicator of success was the overall vaccine rate, which exceeded that of similar cities in Massachusetts. By mid August 2021, overall vaccination rates in adults had reached over 90%, one of the highest vaccination rates in the country for a city with similar demographics.

The tenants of the continuum of research into action through diverse stakeholders could inform the design and implementation of other projects. TCP was unique in sharing results of data collected with those most impacted by a disease, which in turn empowered them to make decisions for their health in trusted spaces. In a time of increased urgency to design responses that are equitable, TCP provides a blueprint for improving the lives of the most vulnerable.

In this manual we explain what we did, why we did things the way we did and how we did it. We are clear about our frustrations and failures and explain how we used them to pivot and adapt. We begin explaining the complexity of COVID as a “wicked problem”, one that has no clear solutions and where all solutions seem to cause additional problems. We then explain the timeline of events from March 2020 to January 2022. This time span covers the bulk of our response as a crisis response. We explain how we built a diverse, multidisciplinary team, which we believe was critical to our success. Finally, we explain our active leadership framework, with concrete examples of how we used each step to respond to the rising crises.

WE ARE CLEAR ABOUT OUR FRUSTRATIONS AND FAILURES AND EXPLAIN HOW WE USED THEM TO PIVOT AND ADAPT.

Our goal with this manual is to share our learnings, explain how we approached health equity using an evidence based approach, and brought together a team of passionate leaders to co-create an innovative solution in a time of extreme hardship and uncertainty. We hope the manual will inspire you to replicate aspects of the model and to insist that data and science are at the core of health equity, and that neither should exist without the other.

Public Health problems are wicked problems

A "wicked problem" is a social, cultural or institutional problem that is difficult to solve. Wicked problems arise from the complex interdependencies that make up public health. Public health is the result of technical and adaptive challenges that are difficult to control all together. This diagram illustrates the complexities of public health systems.

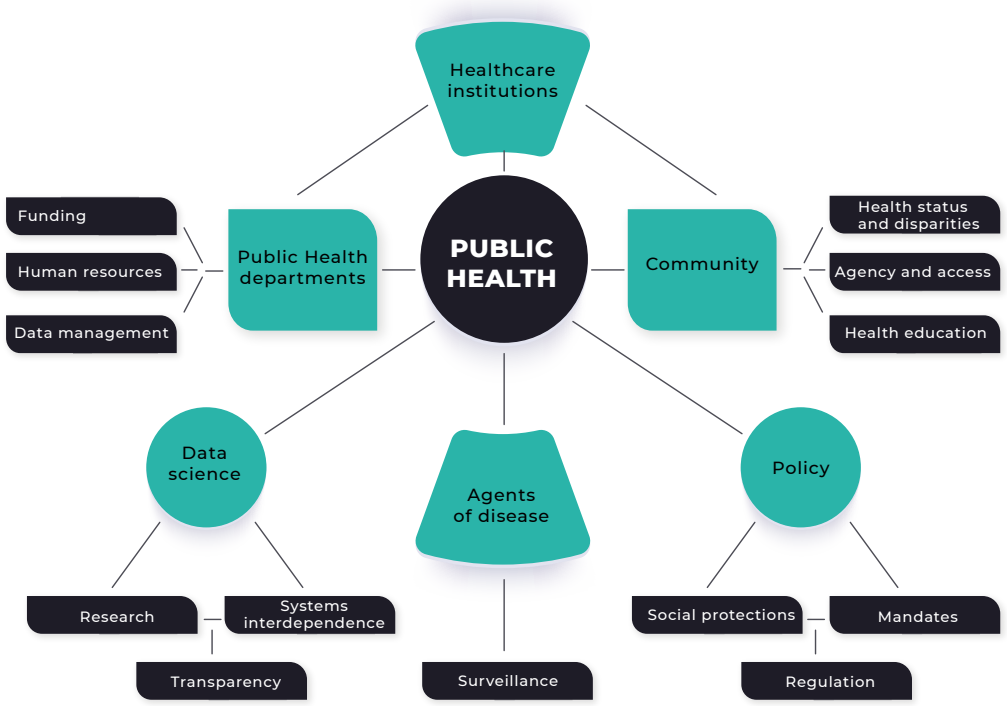


Figure 2. Public Health systems are complex and multi-layered.

A "WICKED PROBLEM" IS A SOCIAL, CULTURAL OR INSTITUTIONAL PROBLEM THAT IS DIFFICULT TO SOLVE.

WICKED PROBLEMS OFTEN HAVE NO DETERMINABLE STOPPING POINT, AS ONE SOLUTION OFTEN BEGETS A NEW PROBLEM.

The left side of the diagram represents those involved directly in public health, both from the research and data science perspective to the implementation through local departments. The right side of the diagram represents those impacted by public health, and those who impact it.

This diagram is a way of mapping the landscape and understanding the power and position each stakeholder has in defining and solving a public health problem. At CCI we believe we need to work with all stakeholders: from defining the problem; collecting the data to understand it; working with the agencies who will help address it; those who provide the funding and regulatory framework to sustain interventions; and finally the community who is both affected by the problem, and who is key in solving it, by participating in designing and implementing solutions and changing their behavior in ways that save lives and improve health.

Why are public health problems wicked problems?

Wicked problems are defined as problems that lack clear goals and solutions. They are constrained by real world realities and often a solution to one aspect of a wicked problem creates a new problem. A wicked problem is difficult or impossible to solve because of incomplete, contradictory, and changing realities and requirements that are often difficult to identify ahead of time. Wicked problems are difficult to fix, as there is no single solution to the problem; and "wicked" denotes resistance to a solution resolution, rather than evil. Wicked problems often have no determinable stopping point, as one solution often begets a new problem. Efforts to solve one aspect of a wicked problem may reveal or create other problems.

As described by Rittel and Webber[(2)], wicked problems have 10 important characteristics:

1) They do not have a definitive formulation.

2) They do not have a "stopping rule." In other words, these problems lack an inherent logic that signals when they are solved.

3) Their solutions are not true or false, only good or bad.

4) There is no way to test the solution to a wicked problem.

5) They cannot be studied through trial and error. Their solutions are irreversible so, as Rittel and Webber put it, "every trial counts."

6) There is no end to the number of solutions or approaches to a wicked problem.

7) All wicked problems are essentially unique.

8) Wicked problems can always be described as the symptom of other problems.

9) The way a wicked problem is described determines its possible solutions.

10) Planners, that is those who present solutions to these problems, have no right to be wrong. Unlike mathematicians, "planners are liable for the consequences of the solutions they generate; the effects can matter a great deal to the people who are touched by those actions."

THE CHELSEA PROJECT WAS AN EXAMPLE OF HOW WE CONFRONTED THE WICKED PROBLEM OF COVID-19 TRANSMISSION IN THE CITY OF CHELSEA

At CCI we tackle wicked problems. The Chelsea Project was an example of how we confronted the wicked problem of COVID-19 transmission in the city of Chelsea. On the surface, it seemed that Chelsea residents were disproportionately impacted by COVID: not only did they have more cases of COVID than the rest of Massachusetts [3], but they also became sicker from it [1]. However, these data points were part of a larger, complex story of trust, relationships, mobility, resources and racism. COVID was a health crisis, but it also became an economic, mental health, and access to education crisis. Vaccine rollout revealed layers of crises in access to healthcare services, information and trust in institutions. Even mask wearing as a solution became a crisis of leadership, data interpretation and eventually bodily autonomy.

Figure 3. A Chelsea resident gets vaccinated against COVID at a local clinic.

CHELSEA RESIDENTS WERE DISPROPOR-TIONATELY IMPACTED BY COVID

More resources on Wicked Problems:
https://www.wickedproblems.com/1_wicked_problems.php

Identifying COVID in Chelsea as a wicked problem

The city of Chelsea occupies about two square miles just north of Boston. It has an estimated formal population of 40,000 residents, but informal estimates claim there may be up to 75,000 residents [4]. A city of mostly low-wage Latinx immigrants, it is known for having overcrowded and substandard housing, high levels of poverty and food insecurity. While the underlying social and economic realities of this community might have predicted a major catastrophe with the arrival of COVID, public health professionals and medical researchers were shocked when an exploratory study carried out in April found antibodies to COVID among 30% of Chelsea residents [5]. By the week of June 10, 2020, Chelsea had recorded 2839 cumulative cases of COVID, at a rate of 7537 per 100,000 and a positivity rate of 38% which contrasted the state positivity rate of 15% [6]. These data showed that Chelsea had a COVID-19 rate almost six times higher than the state average and that many of those being tested are positive, an indication of both a high rate of disease as well as low rates of testing [3,7].

CHELSEA HAD A COVID-19 RATE ALMOST SIX TIMES HIGHER THAN THE STATE AVERAGE.

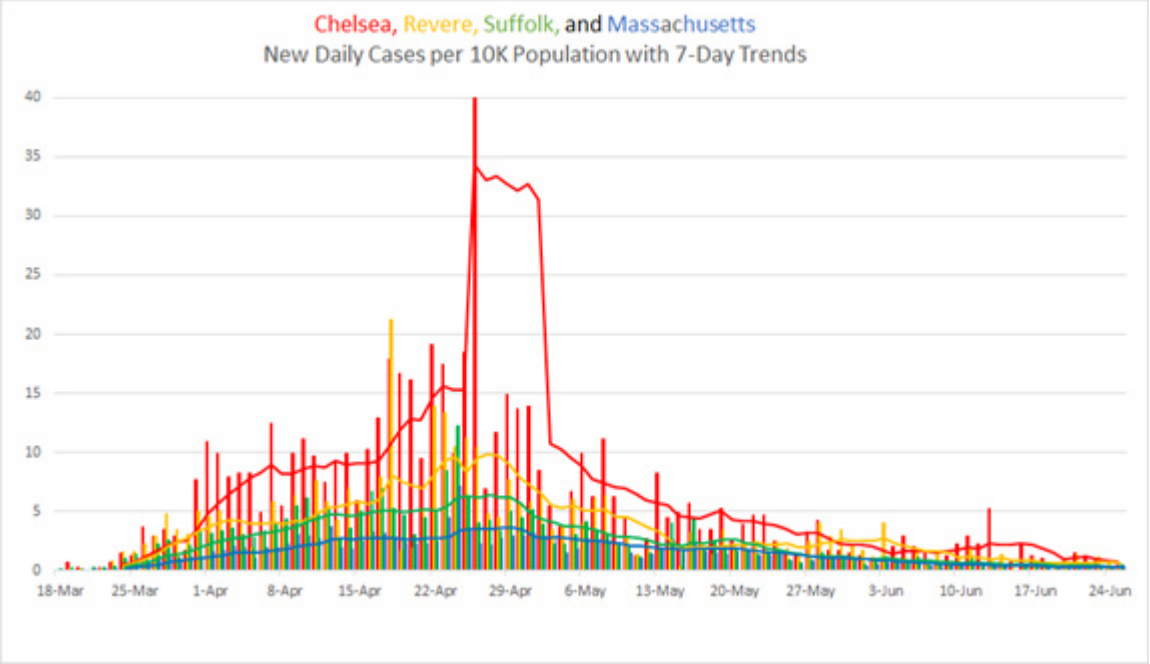


Figure 4. COVID-19 Case count March-June 2020

While Chelsea possesses many of the vulnerabilities that characterize a community devastated by COVID, understanding the impact of the pandemic requires careful assessment of the ecosocial realities that drove such high rates of transmission and bad outcomes. At the same time, communities are much more than their vulnerabilities. Chelsea serves as a vivid example of this. While it suffers from deep disparities, the community also activated an unusual, effective and collective response that was unique in Massachusetts. Learning

from Chelsea can teach public health professionals broader lessons about how vulnerabilities can activate grassroots responses that go beyond the basic needs of residents and establish systems for strength and resilience.

It wasn't just the arrival of the virus in Chelsea that devastated the city. While a disproportionate number of residents became sick and died [3], a much larger number of residents lost their jobs. Research revealed that by fall 2020 81% of residents depended on a food pantry for food [1]. Chelsea residents needed jobs, but working would put them at risk of transmission.

INTERVIEWS EXPLORED HOW RESIDENTS RELIED ON EACH OTHER FOR PSYCHO-LOGICAL, EMOTIONAL AND LOGISTICAL SUPPORT

Qualitative research conducted in Chelsea elicited how the basic cultural values and structures that value family and collective well being over that of the individual within Latinx societies built family strategies for survival and resilience during COVID. Women described sharing food boxes with their sisters and friends, cooking for families with a sick member, distributing child care so women who had not lost their jobs could go to work, and praying together on the phone. The interviews explored how residents relied on each other for psychological, emotional and logistical support [1]. Most of the core tenants of what kept Chelsea residents alive and gave them hope, were also leading to high rates of transmission of the COVID-19 virus.

While we knew our end goal was to decrease the transmission of COVID and save lives, we knew it was not as simple as asking people to wear masks, maintain social distance and test frequently for COVID.

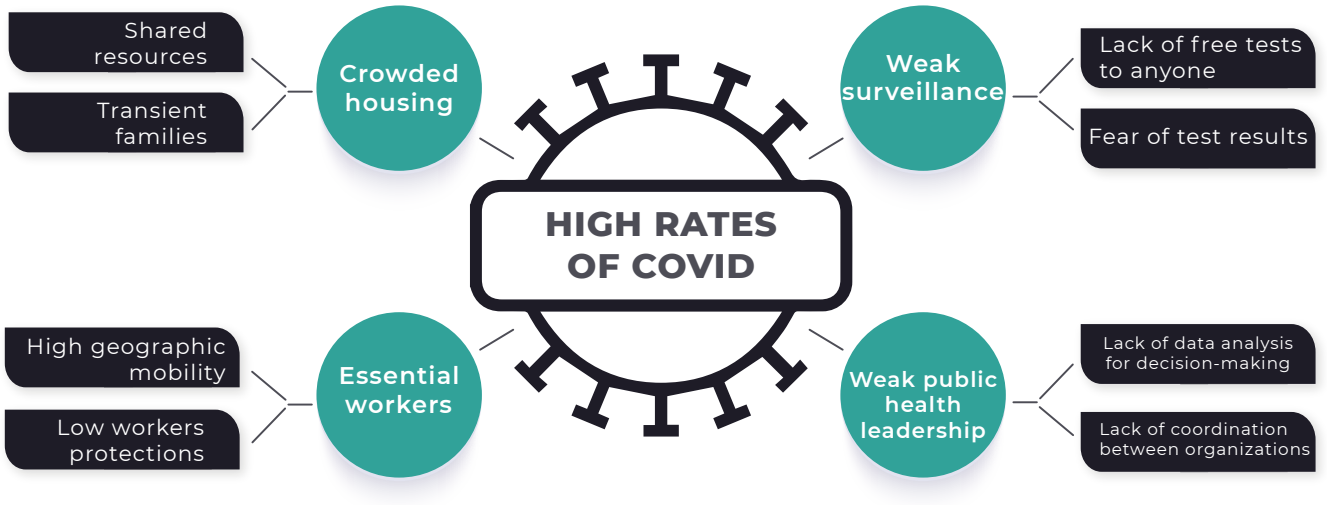


Figure 5. Drivers of high rates of COVID in Chelsea in Summer 2020.

Timeline of events for The Chelsea Project

Change occurs when systems adapt to new realities. Some changes bring opportunities and hope, and communities are quick to take them on. Other changes involve loss, and these often generate resistance and avoidance by communities.

Many of the changes implemented during COVID-19 involved loss, and were met with resistance: mask wearing, physical isolation, stay at home orders, were difficult for humans who are social beings. In response, we saw many communities dropping mask mandates sooner than what was advised by those examining the data [8]. On the other hand, many people resisted returning to work in an office, despite other restrictions being lifted [9]. Therefore, in public health we must always weigh losses against the gains. Public Health can seem unpopular if it only offers losses to communities. Human centered design by communities enables projects to create solutions that focus on the gains of public health, over the losses involved in behavior change. During The Chelsea Project, we consulted with the community on how to make information, education and recommendations meaningful, in a way that would allow them to be with their families and loved ones.

DURING THE CHELSEA PROJECT, WE CONSULTED WITH THE COMMUNITY ON HOW TO MAKE INFORMATION, EDUCATION AND RECOM-MENDATIONS MEANINGFUL

When we adapt a system in the face of change, we must carefully look at the current system to understand what is working and what isn't. Often when we look at a project retrospectively, we only consider the successes and present why we did so well. However, ignoring our failures is to ignore the overall success of TCP (The Chelsea Project), because much of what we did was because of failures and challenges. What was critical to our approach was to constantly look at the quantitative and qualitative data and understand what it was telling us about the system of Chelsea. We used data triangulation, or mixed methods, which involved collecting and analyzing quantitative data, collecting and analyzing qualitative data, and turning data results into action through human centered design with community members themselves.

Our sources of quantitative data may seem straightforward: COVID-19 databases, percentage of positivity, increases in the levels of COVID-19 in wastewater and the current vaccination rate. However, initially none of these resources existed. The first assessment of the system's response to COVID was understanding what existed, to push and advocate for data access and transparency, and oftentimes, create what did not exist.

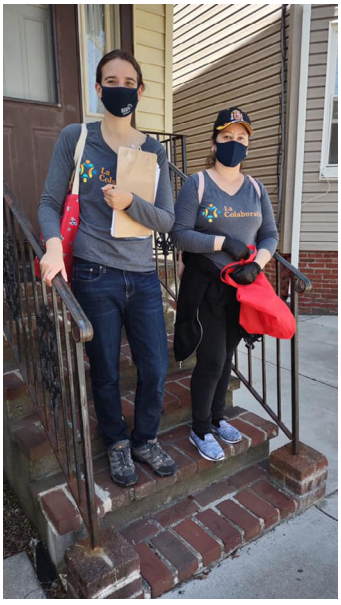
For example:

Community survey results revealed that most people in Chelsea had not had a COVID-19 test by October 2020, because they lacked symptoms to make them think they might be positive. Behind that decision were other issues around access to tests, and fear of the consequences of the results (such as not being able to work due to a positive test). As a response, CCI implemented wastewater testing for the city, which captured the prevalence and change in COVID-19 infections, while ensuring anonymity. Had we not looked at the population's "failure" to test themselves, we would not have implemented wastewater testing.

Figure 6. A Community Health Promoter helps a Chelsea resident secure a vaccine appointment.

EACH WEEK THEY REPORTED "LOCAL GOSSIP" ON THE SYSTEM AND WE WOULD BE ABLE TO ADAPT MESSAGING, HOURS, OUTREACH AND OTHER ACCESS POINTS TO QUICKLY ADDRESS TRUST AND RELEVANCE

Our sources of qualitative data always helped us to understand our quantitative data. While we watched COVID-19 vaccination rates increase or remain stagnant, the team of health promoters was listening to conversations about vaccines and the vaccination outreach system. Each week they reported "local gossip" on the system and we would be able to adapt messaging, hours, outreach and other access points to quickly address trust and relevance. Again, these changes were done because we were listening to failures in the system.



Therefore, as we reconstruct the story of TCP, we need to consider both successes and failures, because in many cases the success is built on a series of failures. In the face of failure, we would re-convene, think of new strategies, test them, and see if they had an impact on results.

It is important to understand that a complex intervention is often based on the weaving together of successes and failures, understanding the relationship between the two and constantly adapting activities and strategies.

The following timeline maps "successes and failure" during the COVID pandemic.

TCP Timeline

Date	Success	Failure
March 24, 2020	Massachusetts issues a "stay at home" order in response to the spread of COVID-19 BOs in Chelsea begin food pantry outreach Pandemic response team created at the city-level meets daily bringing together response in Chelsea Massachusetts issues a "stay at home" order in response to the spread of COVID-19 Pandemic response team created at the city-level meets daily bringing together response in Chelsea City of Chelsea begins food pantry outreach and distribution with CBO's augmenting support.	The overcrowded conditions, coupled with essential workforce and lack of access to PPE (among others) facilitate massive spread of the virus.
April 2020	APHVC reaches out to support Chelsea in COVID-19 response and health director denies need for support. Volunteers are deployed to the department of Strategy and Innovation APHVC reaches out to support Chelsea in COVID-19 response. The Director of Health and Human Services declines support. Volunteers are deployed to the department of Strategy and Innovation.	The department of HHS does not create a COVID-19 strategy for the city.
May 2020	Partners in Health alongside Chelsea's Public Health nurse begin Contact Tracing for the city of Chelsea Conversations begin about founding The Chelsea Project.	Chelsea gathers media attention as the epicenter of the pandemic.
June 2020		Chelsea records 2839 cases of COVID with a 38% positivity rate (14% for Massachusetts).

July 2020	Funding secured for The Chelsea Project with the idea to begin testing wastewater in Chelsea to monitor COVID-19 levels at the building level in order to support interventions, particularly in housing situations where there are overcrowded households; discussions move from residential buildings to schools to neighborhood scale	Access to state COVID-19 data is requested from the City of Chelsea. Chelsea's Director of HHS initially denies access to MAVEN database for COVID-19 positivity analysis
July-September 2020	Quantitative and qualitative survey design (IRB approval, testing and launch). The state launches Stop the Spread, which creates two free COVID-19 testing sites in Chelsea.	Although funding is secured for TCP, lack of dedicated staff delays launching of specific activities. Partners are overwhelmed with the immediate response.
August 2020	First positive COVID-19 cases database received from MDPH after coordinating with Chelsea's Public Health Nurse and the Board of Health Chair.	
September	The Chelsea Project continues to explore idea of monitoring wastewater in Chelsea to monitor COVID-19 levels at the building level in order to support interventions, particularly in housing situations where there are overcrowded households.; discussions move from residential buildings to schools to neighborhood scale; discussions also include participation in the Metro North calls that include local health departments, hospitals and human service organizations	
October 2020	Analysis of COVID-19 positive cases in Chelsea presented to the Board of Health, Pandemic Response Team, and City Manager and local CBOs.	

October 2020	Discussions continue about potential for wastewater testing in Chelsea; Discussion begin to involve City Engineer in DPW and consultant for wastewater systems and mapping, Dewberry; discussions begin to involve mapping of wastewater system and determination of sewersheds that draw on only contributions from Chelsea residents; four wastewater systems identified; proposal made to temporarily acquire wastewater samplers due to desire to get system up as quickly as possible (before winter surge) and due to limited availability of samplers on the market; initial contract with Biobot established for	
November 2020	Wastewater sampling and analysis begin in Chelsea in two sewersheds; Dewberry, City Engineer and additional consultant show DPW staff how to install samplers, take samples and package for sending to Biobot; initial contract is for 3 months of twice weekly sampling	Efforts to connect sampling results to immediate local action are not ready when sampling begins; partnership with city health department is weak and partnerships are not fully developed with community based organizaion
November/ December 2020	The Chelsea Project launches with dedicated staff from CCI and partner organizations. Meetings were organized weekly to implement wastewater testing and activating community health workers. Data analysis and presentation of quantitative and qualitative research	
December 2020	Initial contact occurs between MGB RADX project team and the Chelsea Project in an effort to coordinate deployment of mobile testing in Chelsea in response to areas with high virus concentration in the wastewater; partnership addresses issue under discussion in TCP regarding how to support testing in connection with wastewater monitoring	

January 2021	Health promoters project launched in Chelsea modeled on the Latino Taskforce in San Francisco. Health promoters deployed to areas with high rates of COVID in wastewater MGB launches its testing van at La Colaborativa. TCP created a series of videos (4) featuring local influencers and leaders to promote vaccine uptake among the Chelsea population. They are distributed through social media channels (facebook especially).	Launching the health promoters project was hard. The team needed to come out of a local CBO because of the trust networks. A local CBO was identified but staff was too overwhelmed with other tasks to supervise, and train existing health promoters. A dedicated person was hired to manage the health promoter staff and outreach program.
January 2021	Contract for analysis of wastewater samples in renewed for 5 months with once weekly sample at four sewersheds in Chelsea. The North Suffolk Public Health Collaborative (Chelsea, Revere, Winthrop) inaugurates a first responder clinic in Revere.	COVID-19 cases surge.
February 2021	First community COVID-19 and mobile vaccination clinics for ages 75+ inaugurated in Chelsea at La Colaborativa in partnership with East Boston Neighborhood Health Center and at Chelsea Housing Authority buildings. TCP created a series of videos about vaccine safety using local leaders and influencers in Spanish.	Vaccines are distributed in a tiered way from elders to younger people. This despite most cases in Chelsea being among residents 30-49 years old. Vaccines are distributed through an appointment system that requires online access or calling EBNHC.

March 2021	Chelsea's Department of Public Health organizes vaccination clinics for educators and begins coordination with MDPH for a FEMA supported clinic. MDPH launches Vaccine Equity Initiative which supports door knocking strategies. Chelsea's DPH coordinates with three local organizations to lead the outreach strategies: Green Roots, Chelsea Black Community and La Colaborativa. The Chelsea Department of Health, La Colaborativa and Green Roots begin weekly calls to strategize COVID outreach and systems improvement. Health promoters are trained on vaccine safety and dispelling vaccine misinformation. In response to demand, EBNHC and the City open Monday evening vaccine clinics. The Chelsea Department of Health, La Colaborativa and Greenroots begin weekly calls to strategize COVID outreach and systems improvement. Health promoters are trained on vaccine safety and dispelling vaccine misinformation.	The team recognized that testing at the Food Pantry did not work. The Mobile testing van was redeployed to Bellingham Square and the health promoters deployed to bring people to be tested.
April 2021	MDPH FEMA supported clinic opens at Chelsea's Senior Center. The clinic is walk-up Fridays, Saturday and Sundays. The clinic is operated and supported by city staff and Chelsea Black Community. Vaccine hesitancy survey is conducted at La Colaborativa to inform next steps in vaccine outreach.	Those most hesitant to vaccinate are between 21 and 30 years old.
May 2021	MGB expands menu of services and begins providing vaccines at its mobile testing van.	

June 2021	La Colaborativa begins hosting health fairs to promote vaccines among youth, a result designed from the vaccine hesitancy research. Chelsea Health Department coordinates ongoing mobile clinics at local parks, with additional city non-profit organizations and at special events to continue promoting vaccine visibility and acceptance.	
June 2021	Contract for analysis of wastewater samples in renewed for four months with once weekly sample at two sewersheds in Chelsea; decision to go with two sites reflects in the moment consideration of declining COVID-19 cases, budget availability and correlation of sets of sewershed concentration levels.	
July 2021	1st Health Equity Forum held to share insights, strategies and results from COVID-19 outreach work in Chelsea TCP pivots toward rapid testing work after meeting the IDx20 team at the Health Equity Forum.	
August 2021	TCP redeploys some of its budget to IDx20 to get rapid testing started. The plan is to help validate different market tests to increase market competition and promote frequent testing to manage outbreaks. Boston and Cambridge reinstitute a community mask mandate in response to increasing rates.	As a result of the Health Equity Forum, TCP recognizes the importance of supporting rapid testing. Funding for this project has not been secured from external sources. Chelsea DPH discusses the mask mandate in other cities but does not institute a mandate.

September 2021	Chelsea institutes a mask mandate in municipal buildings.	TCP and IDx20 begin to investigate where to test the rapid tests. The same population needs to be testing every week. The first site were schools and a meat packing factory. Schools already had pooled testing. The factory had its own testing program. A large outbreak is detected at one of the Housing Authority buildings.
October 2021	Contract for analysis of wastewater samples in renewed for six months with once weekly sample at two sewersheds in Chelsea; decision to go with two sites reflects in the moment consideration of budget and expected winter surge (pre-knowledge of Omicron variant) TCP and Chelsea DPH approach the Board of Health to seek approval for a mask mandate for the city.	The BOH does not vote on a mask mandate and decides to continue monitoring cases.
October 2021	Given the outbreak in the Housing Authority building and failure to deploy testing research in schools and factories, negotiations begin to launch testing in the Housing Project. Dedicated staff was hired to manage the logistics of implementing testing research in Chelsea.	TCP waited for IRB approval for launching testing.
November 2021	Negotiations begin with testing companies to provide tests for free to the study. TCP and Chelsea DPH approach the Board of Health again (Nov 16) to seek approval for a mask mandate for the city. Mask mandate instituted for Chelsea at an emergency meeting held on November 30. This meeting is convened after a significant spike is detected in wastewater.	IDx20 is still waiting for IRB approval to begin the testing study. The North Suffolk collaborative of cities Revere and Winthrop) do not institute a mask mandate.

December 2021	At home tests received by the City of Chelsea and distributed to CBOs for the holiday season. IRB is approved for the testing study. IDx20 launches their testing study in two housing authority buildings in Chelsea using 2 kinds of tests.	Omicron surge begins
January 2022	The City asks IDx20 to expand quickly in response to the Omicron surge. Additional funding is secured by TCP and testing is launched at City Hall.	Omicron spreads quickly through Chelsea and the City is overwhelmed.

Building a Team

Public health is interdisciplinary and requires the participation of diverse actors. Programs must be grounded in research and science, but must also reach communities. Program execution must be constantly monitored and evaluated for success and community relevance. These aspects should inform policy change, and those who design programs should always look both to research and outreach workers for information on best practices. All programs need funding and structure.

PUBLIC HEALTH IS INTERDISCI-PLINARY AND REQUIRES THE PARTICIPATION OF DIVERSE ACTORS.

The diversity in thinking and expertise is essential in public health programming. We have mapped out these roles from the most structured and academic spaces to outreach and innovation which succeed in spaces with little structure and connection to the community.

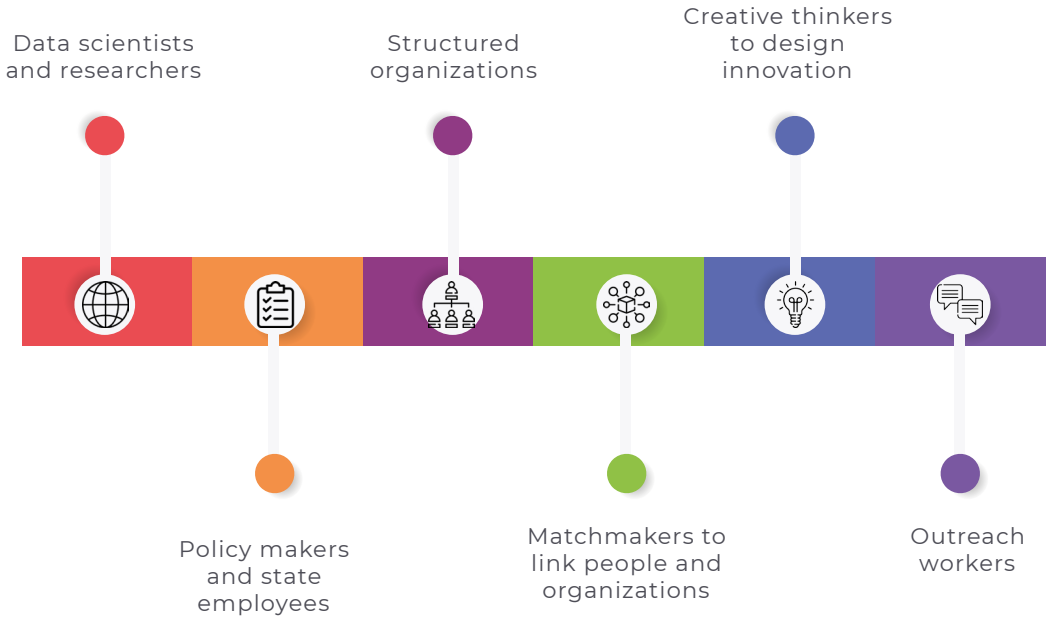


Figure 7. Participants in public health programming.

The Chelsea Project convened participants within each one of these aspects. Certain individuals held one aspect (such as being an academic researcher), and some individuals held more than one aspect (such as conducting research and shaping outreach in innovative ways). By bringing together a wide range of participants ensured a 360 degree view of the problem, diversified solutions and improved equity in program design.

As a team we would come together once a week and discuss issues related to COVID that needed to be addressed. By placing the issue at the center, we would look at it through the various lenses to glean a variety of perspectives and establish a continuum of solutions that could be applied on the ground.

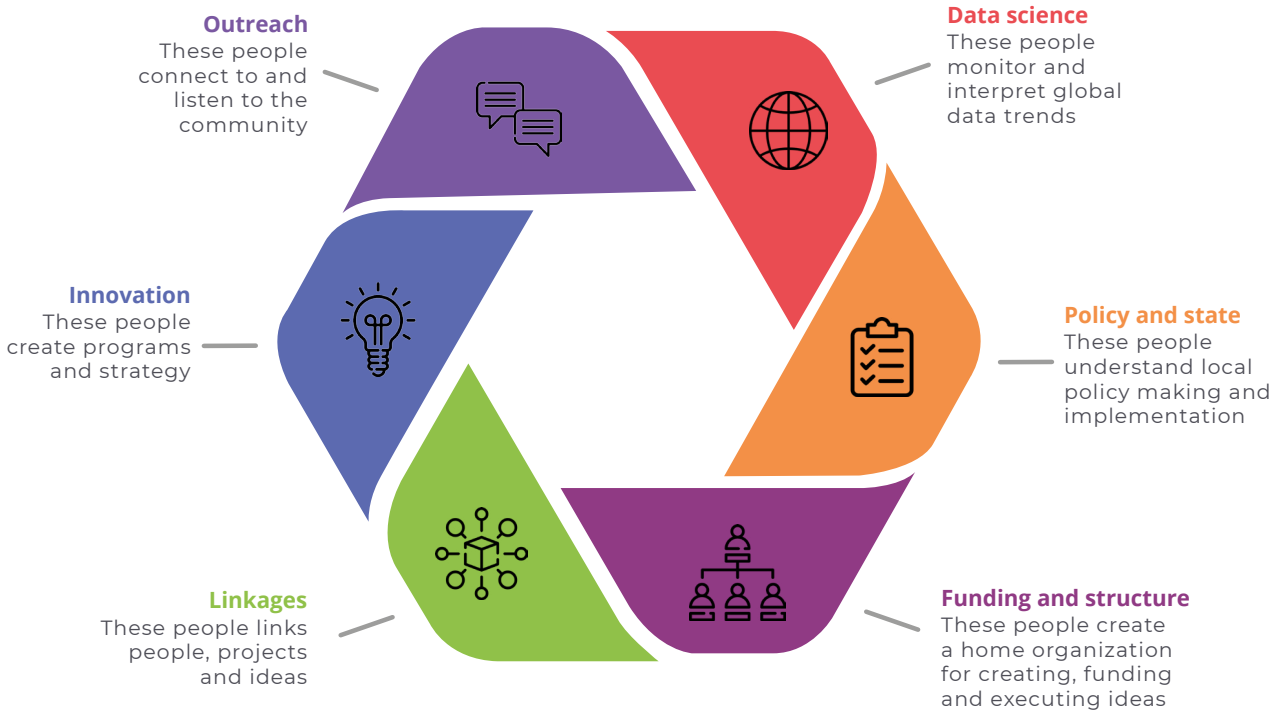


Figure 8. The Chelsea Project Team.

Explaining the roles:

1. **Funding and structure:** TCP was hosted within the Center of Complex Interventions. This organization provided a home base, funding, and a structure for bringing people together, understanding problems and data and implementing new ideas through the various partners. The home organization provides the container for both creating and analyzing research and implementing solutions.

2. **Data Science:** The Chelsea Project was built on creating, analyzing and interpreting science. Bench scientists monitor and interpret data emerging in other countries to predict trends in COVID-19 transmission and response, and how it will impact Chelsea. At a state level, we monitor trends in transmission rate and wastewater levels at other sites, to understand how they compare to Chelsea. At a local level we generate data by conducting surveys and qualitative research and monitoring wastewater. Data science includes several people who are dedicated to using science to describe what is happening, what will happen next, and the impact of our actions on local health and residents' lives.

3. **Linkages:** The success of The Chelsea Project relied on the recruitment and inclusion of diverse participants. The project relied heavily on knowing who was working at the different levels and projects, and bringing them together. Those who link us together were active in meetings, presentations, outreach and constantly taking the pulse of community activity.

4. **Policy:** The Chelsea Project relied heavily on partners who work within the bureaucratic structures of Massachusetts' public health systems. Successful public health means working and improving existing structures that impact the public. While we generated innovative ideas, we needed to implement these through statewide and local mandates, recommendations and actions. We also knew that one of our goals was to strengthen Chelsea's capacity to respond to public health problems beyond COVID. Implementing through the local department of public health provided an underfunded and understaffed office with additional resources to be more robust and resourceful.

THE CHELSEA PROJECT RELIED HEAVILY ON PARTNERS WHO WORK WITHIN THE BUREAUCRATIC STRUCTURES OF MASSACHUSETTS' PUBLIC HEALTH SYSTEMS.

5. **Innovation:** Innovators in The Chelsea Project question the status quo, ask the hard questions and design new interventions. Innovators look at the data, and propose new ways of reaching the public or of implementing solutions. An important success of The Chelsea Project was our capacity to innovate on data and respond on a weekly basis. Through our frequent meetings and monitoring we were able to assess what was working and what could be improved and pivot accordingly.

6. **Outreach:** None of the work we did would have been possible without a team of health promoters who knocked on doors, connected to people in food, vaccine and testing lines to ask what they needed and understand how COVID was impacting them. Outreach workers provided the connection to the community to solve problems directly, but also learn what new problems and solutions were emerging. Health promoters would provide feedback on a weekly basis on what people were talking about: whether vaccines caused infertility, where were trustworthy places to get the vaccine and how our systems were working for the community. Outreach workers included those employed by community based organizations and the City of Chelsea.

Other aspects of team diversity:

We have mapped out these roles that describe the function of individuals on the team. However, we would be remiss if we didn't mention the importance of considering implicit roles. Diversity of identities beyond professional development and personality are also critical to building a creative team. This means being intentional about recruiting people of diverse racial, sexual and gender identities and economic backgrounds.

CONSISTENCY AND PARTICI-PATION ARE KEY TO ENSURING THE THE PROJECT WILL SUCCEED

Replicating The Chelsea Project Team:

Each team is unique as it is composed of unique individuals. However, in replicating the model, we recommend you conduct a landscape analysis to map who in your community can represent the different roles needed. As the project rolls out, you will meet others who are passionate about the work and can be recruited to the team. Consistency and participation are key to ensuring the The project will succeed when it includes a range of participants, from bench scientists to outreach workers.

Figure 9. Mobile testing and vaccine vans were deployed throughout the city.

Activating the Team

Once at least two people in the team have been assembled, begin the process of instituting consistent, respectful and structured communication. The two original participants can begin conversations about the challenges and solutions and start to brainstorm who else to bring into the project. At TCP we held several meetings every week that were critical to decision making, partnership and trust building and were the cornerstones of turning data into action.

Initially meetings were random, but quickly a weekly check in was established to ensure consistency, share observations and discuss follow up. During the Omicron surge we held meetings twice a week, however we found having two meetings a week was too much and participation was inconsistent. Therefore we returned to our regular once a week meeting. All meetings were on Zoom because of social distancing requirements. We also established a Slack channel to share information, discuss insights and connect people peripheral to the project. During peak moments of the pandemic, our communication on Slack ensured daily support and activity on the ground.

Meetings had a loose agenda, that related to considering data generated in the past week or month. For example, health promoters would report back what they had heard from residents during door knocking and outreach in the past few days. We would then practice how to respond to these new trends in concerns and misinformation. Different groups of The Chelsea Project would meet regularly to address topics they were working on. The whole group would meet on Friday to review weekly data and results and strategize together on next steps. Some meetings would seem slow and unnecessary, if little changed, but keeping the ritualized space was critical to building trust and co-creating together.

MEETINGS WERE RANDOM, BUT QUICKLY A WEEKLY CHECK IN WAS ESTABLISHED TO ENSURE CONSISTENCY

Figure 10. Health promoters encourage residents to get tested for COVID in downtown Chelsea.

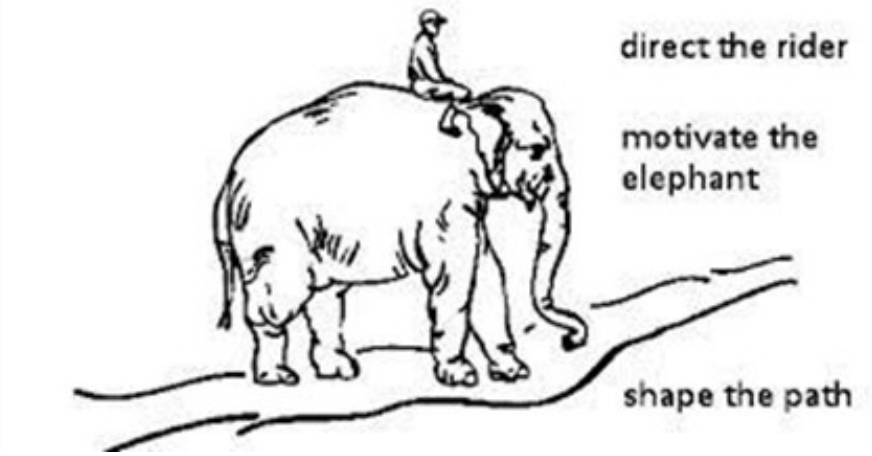
Weekly cycle of collecting, analyzing and turning data into action to keep residents informed:

Frequency	Participants	Purpose
Monday	Chelsea DPW	Wastewater samples are collected across various sites
Tuesday	Biobot	Samples are given to Biobot for analysis
Wednesday	Biobot-MAPC-TCP	Results of samples are delivered electronically to The Chelsea Project through our partners at MAPC
Thursday morning	Local DPH, City communications and CBOs	Local CBOs and DPH receive wastewater results and identify trends (upward, downward, stable). The groups monitor trends in vaccine uptake, create aligned communications strategy, solve access problems, distribute outreach areas and targets.
Thursday afternoon	Health Promoters in CBOs	Health promoters gather for training and report on what residents are talking about regarding COVID virus, vaccines, public health and access to social protections Describe trends in wastewater and design an outreach approach (both geographic and messaging) Practice difficult conversations on misinformation trends
Friday morning	TCP participants	Weekly group meeting to discuss: Wastewater trends Community outreach and involvement Testing care and support Research New areas of focus Additional items Next steps
Friday afternoon-Sunday	Health promoters in CBOs	Health promoters hit the streets to inform residents of wastewater trends, supply PPE, provide vaccine appointments, information and solve access issues. Conversations are held to solve questions and misinformation and gather data on new trends in misinformation and concerns.

Making decisions and creating change

Making change can be hard, and it involves making decisions that disrupt the existing system. Even when your idea seems like a good one, that will benefit the system and make people healthier and happier, it still involves changing the way people go about their days. Sometimes the prospect of changing a system is so overwhelming that it seems like nothing we can do will make a difference.

There are many models to guide and lead change. We use many at TCP, and have found that the Switch Change Framework has helped us initiate change in small, meaningful ways that build momentum.



THE SWITCH CHANGE FRAMEWORK HAS HELPED US INITIATE CHANGE IN SMALL, MEANINGFUL WAYS THAT BUILD MOMENTUM

Figure 11. The switch-change framework

The Switch Change Framework

This management framework and methodology was developed understanding that change requires motivating both the rational and emotional aspects of decision making. Making change in public health may make logical sense in a rational way, but the perceived exhaustion of changing behaviors, trying something new again, and pushing against inherent resistance to change can be too much. Sometimes our emotional and intuitive brain is excited and ready to take on change but our rational brain becomes too involved in the details and overthinking.

In the Switch Change Framework, change is made by establishing a goal, thinking through a clear path to get there and motivating the heart to begin the journey.

The Switch Change Framework is built on the following ideas:

There are ten main lessons derived from the Switch Change Framework:

1. Our emotions can overwhelm our rational thought. However, sole dependence on the rational side of our brain can lead to over-analysis of minor events.

2. There are better ways to make a change than probably what most think, and the majority of these superior strategies rely on setting a change-related goal. More importantly, these goals should be attainable and realistic.

3. What looks like a people problem is often a situation problem. While it is difficult, at many different levels (i.e., individual, organizational, societal) change begins when people start to change their behaviors.

4. What looks like laziness is often exhaustion. It is very rarely the case that the rational and emotional sides of our brain are on the same page when it comes to achieving our goals, and engaging in rational discipline can be emotionally draining. Eventually, individuals become more vulnerable to straying away from the path towards their goals because they are resource depleted.

5. The rational side of our mind has many strengths. For example, the rational part of our brain can develop a plan for a more productive and profitable company. However, the rational side of our brain can also scrutinize and ruminate over events, especially when it comes to misfortunes and issues rather than positive occurrences. This type of thinking can be just as counterproductive towards accomplishing successful change.

6. We are all human but sometimes we tend to follow the default plan or the plan that was originally laid out for us. However, following this intuition might not always produce positive results because sometimes our initial reactions can be misleading.

7. Make sure the goals the organization sets are reachable and specific. Smaller increments towards a larger goal is a much more productive way to create lasting change because as each step is conquered, individuals in the organization feel as though progress is being made. If the initial goal is too big or the step is too much to handle, employees are much more likely to get discouraged.

8. In highly successful change efforts, people find ways to collaborate and help others see a problem in a different way, which can lead to solutions that can impact the emotional and rational side of our brains. Said differently, change is most productive when the rational and emotional mind agree and work toward a common goal that is comprehensible when thinking in both styles.

9. The gates of large goals are lined with small accomplishments. Any step towards completing the change effort should be celebrated. External motivation will help to keep the organization on the path it is on.

10. Any new quest, even one that is ultimately successful, is going to involve failure. In other words, not every task will be done successfully. Because the emotional side of the brain can get very discouraged by failure, it is important to begin the change effort with the expectation that something will not go right. In this way, the failure does not create a shock that disrupts the change effort and the organization remains motivated rather than demoralized when failure occurs.

ANY NEW QUEST, EVEN ONE THAT IS ULTIMATELY SUCCESSFUL, IS GOING TO INVOLVE FAILURE

The Switch Change Framework can be applied using this template. Below we explain how we applied this framework in a situation in The Chelsea Project.

DIRECT THE RIDER	MOTIVATE THE ELEPHANT	SHAPE DE PATH
1. Find Bright Spots	4. Find the Feeling	7. Tweak the Environment
Change to dificult because we don't know what to change to. Replicate successes.	You can't analyze change exactly, but you must instead feel excited about change.	Make the path to success smoother instead of blaming people.
• List successes to replicate	• List ideas for creating excitement	• List ways to tweak the environment
2. Script Critical Moves	5. Shrink Change	8. Build habits
Make sure everyone knows how to change.	Make the change easier by making many smaller goals to achieve.	Make the change habitual so there is less conflict.
• List how you will help people move toward change	• List how you will shrink the larger change into smaller pieces	• List how you will build habits
3. Point to Destination	6. Grow Your People	9. Rally the Herd
Make sure you know what the end goal of change is.	Appeal to an identity that makes people feel strong and competent.	Make sure everyone is onboard with the change because otherwise, they may follow others.
•List your destination and how you will point to it	• List how you will train and develop people	• List how you will rally people around the change

Figure 12. Mapping an intervention through the switch-change framework.

(Source: https://praxie.com/switch-change-framework-online-tools-templates/)

Applying the Switch Change Framework to The Chelsea Project

DIRECT THE RIDER:

The Rider (rational brain) will notice every problem, complication and resistance to the project plan and implementation. While listing problems is useful in preparing implementation, the underlying motivation of this part of the brain is to protect against change and stay in known territory (even when change is needed).

1. Find the bright spots: Replicate successes

A good place to start is to list successes. These can be of similar projects, or within your own project. At The Chelsea Project we would find it useful to remember previous successes. For example we might remind ourselves:

A GOOD PLACE TO START IS TO LIST SUCCESSES.

- While Chelsea residents were resistant to testing against COVID, when we directed health promoters to door knock in areas where COVID rates were detected to be high in the wastewater, and sent a testing van to the area, we would see testing rates increase.

- Anticipating resistance to vaccine uptake, we directed health promoters to door knock and conduct street outreach giving people an appointment at the vaccine clinic directly. This allowed for their questions and concerns to be answered in the moment, by a trusted peer and linked it to a concrete time and place to get the vaccine. This made people feel they had committed to the vaccine through a personal invitation, and facilitated a quick uptake.

Figure 13. Community Health Workers distribute free COVID antigen tests.

2. Script the critical moves: Define the project charter

Reducing ambiguity is critical to tempering the logical brain. List what will and will not be part of the project scope. A project charter can be as detailed as a business plan or logframe for a multiyear, or as brief as making the decision to begin wastewater testing in two sites in the city. The charter ensures everyone is on the same page, sets the terms for the project and defines how the team will know the project is moving in the right direction and completed. The Chelsea Project defined the project charter by stating a new problem in COVID-19 response and exploring solutions:

- In January 2022 we convened to discuss that while children under 16 had access to vaccines, the uptake rates were stagnant and were falling far behind the rates for the rest of the Boston area. We decided that we needed to focus on increasing vaccine uptake among people 5 to 16.

- In March 2022 we recognized that the city of Chelsea had "COVID-19 exhaustion" and the Social Determinants of Health that had impacted COVID-19 spread 2 years prior, were still significant. We decided to convene a Second Health Equity Forum to bring together public health and healthcare stakeholders to define a strategic plan for tackling social determinants of health, mirroring the successes of COVID-19 response.

THE CHELSEA PROJECT MET ON THURSDAYS WITH THE CITY AND COMMUNITY BASED ORGANIZATIONS TO DISTRIBUTE TASKS RELATED TO OUR COMMON GOAL

3. Point to the destination: Outline roles and responsibilities

Discuss the steps that are needed to reach the goal, situating each organization and the timeline of activities. Ensure clarity and consensus around the goal and what things will look like when the project is completed. The Chelsea Project met on Thursdays with the City and Community Based Organizations to distribute tasks related to our common goal:

- Using the wastewater map to COVID-19 levels, we would decide where to send the different groups of health promoters to target vulnerable neighborhoods, and ensure homes were not approached twice, but also not ignored.

- We would discuss key messages to be communicated by health promoters, on social media and in other spaces, such as facebook live interviews and other outreach efforts.

- The following Thursday we would evaluate the perceived impact and response to our strategies and adjust accordingly.

MOTIVATE THE ELEPHANT

The elephant is the emotional side of the brain. Implementing change requires motivating this side and enabling it to believe that change is possible.

4. Find the feeling: generate excitement

Often a picture of the future will generate excitement as project participants can see and connect to the change once it is implemented and how it improves people's lives. The Chelsea Project envisioned residents connecting with services quickly and seamlessly to inspire trust and for residents to tell their friends and family to get tested or vaccinated.

- When vaccines were approved for young people (over 16) in the summer of 2021, we envisioned health fairs where young people could get vaccinated, get tested, but also have fun, dance, and connect with their peers. We brainstormed stands with fun activities, such as tie-dye, temporary tattoos and different kinds of food, and lots of music.

5. Shrink change: Focus on what can be done now

We had a huge goal of saving lives and reducing COVID-19 transmission in Chelsea. However, that goal felt insurmountable. Therefore we focused on what we needed to do that month, and sometimes that week.

WE HAD A HUGE GOAL OF SAVING LIVES AND REDUCING COVID-19 TRANSMISSION IN CHELSEA

- We designed a bot to monitor vaccine rates on a weekly basis. With this data, we would target a specific age cohort that was lagging behind other cohorts in vaccine uptake. Every week we would decide on what age-group to focus on and tailor messaging and outreach methods to reach that specific age-group.

6. Grow your people: identify the team as experts

We worked with health promoters who were mostly women residents of Chelsea. They were recruited to the project through 2 community organizations and the City. We met with them regularly, sometimes weekly, to provide on-going training in the face of ever changing COVID rates, solutions and trends in misinformation.

- Health promoters met every Thursday to look at wastewater data and translate findings into a strategy for door knocking and street outreach for the weekend. We would hold a "gossip circle" where health

promoters would share comments and questions they had heard on the street the previous week. Together they would practice responses to these concerns. For example: one health promoter might say she heard women concerned that the vaccine might affect their fertility. Other health promoters would explain how to best manage that concern. The project coordinator would provide scientific facts around why the vaccine does not affect fertility, but the promoters themselves would practice developing responses that were meaningful and useful to the community. This way, the team became experts on health promotion and education in Chelsea and elevated them as critical to the project's success.

THE BEST WAY TO BUILD TRUST IS TO HAVE FREQUENT AND MEANINGFUL CONTACT WITH TRANSPARENT COMMUNICATION.

SHAPE THE PATH

7. Tweak the environment: create a system that facilitates change

The environment in which we try to make change happen has a huge impact on the capacity of change to be implemented. At TCP we work hard to create an internal environment of trust and mutual co-creation. The best way to build trust is to have frequent and meaningful contact with transparent communication. While a lot of external factors to the Chelsea, North Suffolk and state environment are out of our control, we can manage our internal environment.

- The Chelsea Project meets every Friday for one hour with a loose agenda of items to cover. Participants tend to be a core group that has met every week for the past year and a half. Each participant is honored for their unique qualities and expertise they bring to the group (Grow your people), but it is the collective environment that makes The Chelsea Project work as well and efficiently as it does.

Figure 14. The team of community health promoters and vaccine outreach workers work together to encourage COVID testing.

8. Build habits: make change a habit

Humans thrive off structure and ritual. We have discussed the importance of our different weekly meetings and training which created an environment where everyone came together consistently and respectfully to discuss what the problem was at the moment, and how to address it in the next week or month. By doing so, we made a habit of making changes.

- An important habit we have at TCP is to review data on a weekly basis. The wastewater and vaccine rates are shared on a slack channel so participants can review and see changes. Constant data analysis and interpretation occurred individually as a group, and data was used as a platform to monitor if the work we were doing was sufficient, or needed any changes. It has become a habit for us to collect data, interpret it, and use it to drive interventions.

THE ENERGY THAT PARTICIPANTS BRING IS PART OF THE NECESSARY DIVERSITY OF A SUCCESSFUL TEAM.

9. Rally the herd: everyone's an influencer

Projects are very sensitive to the individual and collective energy of the group. Influencers can be negative, by consistently bringing downer energy and discouraging the group. They can also be positive by getting the group excited about next steps and impact. Both kinds of influencers are critical to keep the momentum going within the project, by keeping things real but moving forward. It is important that the group be composed of both negative and positive influencers. Too much of any level of energy will make the project either become paralysed with doubt, or nor be realistic enough to be implemented. The energy that participants bring is part of the necessary diversity of a successful team.

- Through using the steps described in this framework, we have kept ourselves motivated and excited about our work. At times we have felt overwhelmed and discouraged, but we return to the framework and inevitably connect back into the motivation and the logic that keeps the project moving forward.

The Chelsea Project as an example of the PDSA cycle

A key framework in quality improvement initiatives is the PDSA cycle. Plan, Do, Study, Act was developed to test the impact of change. The purpose of a PDSA cycle is to enable flexibility and impact assessment. While we may have great ideas of what changes should be implemented, some of these will work really well, and others won't work at all. Using a PDSA cycle allows us to understand what changes work and adjust activities accordingly.

The following diagrams illustrate how to use the PDSA cycle:

Plan: plan the test, including a plan for collecting data.

- State the question you want to answer and make a prediction about what you think will happen.
- Develop a plan to test the change, (who? What? When? Where?
- Identify what data you will need to collect.

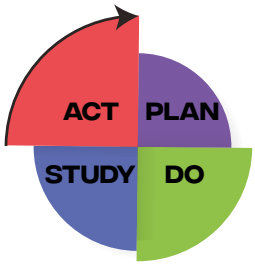
Do: Run the test on a small scale.

- Carry out the test.
- Document problems and unexprected observacions
- Collect and begin to analyze the data.

THE PURPOSE OF A PDSA CYCLE IS TO ENABLE FLEXIBILITY AND IMPACT ASSESSMENT.

Study: Analyze the results and compare them to your predictions.

- Complete, as a team, if possible, your adalysis of the data.
- Compare the data to your prediction.
- Summarize and reflect on what you learned.



Act: Based on what you learned form the test, make a plan for your next step.

- Adapt (make modifications and run another test), adopt (test, the change on a larger scale), or abandon (don't do · another test on this change idea).
- Prepare a plan for the next PDSA.

Figure 15. Activating the Plan-Do-Study-Act cycle for quality improvement.

Key to the success of TCP was the constant implementation of the PDSA cycle on a weekly and monthly basis. This cycle was critical to turning data into action and is explained below.

Stage	Day	Activity
Plan	Monday	Wastewater samples were collected at various sites across Chelsea
	Tuesday	Samples were analyzed for amount and type of COVID-19 virus
	Wednesday	Results were sent to TCP team
	Thursday	Results were shared with the health promoters who mapped out outreach routes and strategies for the weekend
Do	Friday-Wednesday	Health promoters targeted neighborhoods where COVID-19 rates were increasing or highest for distributing PPE, public health messaging, including wastewater results, answering questions about the virus, vaccines and social protections available to residents. They also provided vaccine appointments from February to June 2021 (when walk in vaccination became available)
	Friday-Wednesday	Health promoters were deployed to high risk neighborhoods
Study	Monday-Wednesday	Repeat wastewater samples were collected at various sites across Chelsea. Results provided feedback on the impact of public health interventions in the last 2 weeks.
	Thursday	Health promoters provided feedback on conversations with residents around new information, misinformation and concerns about COVID
Act	Thursday	Health promoters were trained on responding to new concerns and practiced responses
		Depending on trends, health promoters brainstormed on new and improved strategies for COVID-19 prevention (and vaccine access).
	Friday-Wednesday	Health promoters targeted neighborhoods where COVID-19 rates were increasing or highest with adjusted interventions and information

At the peak of the pandemic, we were able to implement weekly PDSA cycles to ensure:

1. Data was informing outreach

2. Outreach was impacting residents, through data

This rapid cycle of data and action are unique and were brought about by the complexity and diversity of our team.

Lessons learned

Below we have listed our favorite moments of TCP as a way to highlight our impact: .

1. **Reinstating the mask mandate:** The first time that wastewater monitoring directly impacted a policy decision was when we approached the Chelsea BOard of Health to reinstate the mask mandate. Throughout the fall of 2020 and all of 2021, we were using wastewater monitoring to direct testing efforts by identifying areas in the city where there was likely increased COVID transmission. The city was also keeping an eye on wastewater to get a sense of the prevalence of COVID in the city, but the conversation with the Board of Health in December 2021 was the first time that the wastewater data was used to make a policy decision. As wastewater analysis becomes more sophisticated and capable of detecting more diseases/substances (not just COVID), we believe wastewater surveillance will become a standard tool in public health decision making and this was the first example of that.

2. **The first Health Equity Forum:** This forum organized in July 2021 also stands out as a turning point for The Chelsea Project because it was the first time we convened everyone who contributed to the COVID response in Chelsea. The meeting had a lot of positive energy and provided an opportunity for everyone to appreciate their own role in the response and understand and acknowledge the key roles played by others. The meeting also spurred new connections, such as the collaboration between the Chelsea Project and IDx20 to launch the rapid testing study in fall of 2021.

3. **Adaptability and experimental mindset to launch ideas:** When we wanted initiate wastewater sampling, we rented samplers for 3 months which got us off the ground in a critical period. This gave us the capacity to understand the value of wastewater sampling, which enabled us to later buy samplers.

THE CITY WAS ALSO KEEPING AN EYE ON WASTEWATER TO GET A SENSE OF THE PREVALENCE OF COVID IN THE CITY.

4. **Working with unexpected partners:** TCP brought together a lot of people and organizations that had never worked together before. The diversity of participants and collaboration involved a lot of moving parts and responsibility, and proved to be critical to our success.

5. **Supporting the professional development of the promotores:** Being witness to the transformation of local women, essential workers and residents of Chelsea become advocates of public health strategies, make key decisions on outreach messaging and location was very exciting. The promotores became empowered to shape messaging and strategy, and see themselves as vital to the intervention. The promotoras feedack on local concerns drove our understanding of what were the key issues affecting residents and where we needed to focus our efforts.

6. **Learning through trial and error:** We learned the importance of studying the impact of our actions. We learned that most of our interventions were designed from assumptions, and sometimes they worked and sometimes they did not. When an initiative didn't work, we would try something else, until we found a solution that worked. As our ideas became more successful, we became more skilled at learning from our results and pivoting quickly.

Conclusion

The weekly cycle of learning created by TCP taught us that public health initiatives can be informed by multiple sources of data, while also responding actively to changes in behavior and concerns. This was only achievable by the partnerships between individuals and institutions that came together to solve a common problem.

WE LEARNED THE IMPORTANCE OF STUDYING THE IMPACT OF OUR ACTIONS

The tenants of the continuum of research into action through diverse stakeholders could inform the design and implementation of other projects. TCP was unique in Massachusetts in sharing results of data collected with those most impacted by a disease, which in turn empowered them to make decisions for their health in trusted spaces. In a time of increased urgency to design equitable responses, TCP provides a blueprint for improving the lives of the most vulnerable.

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