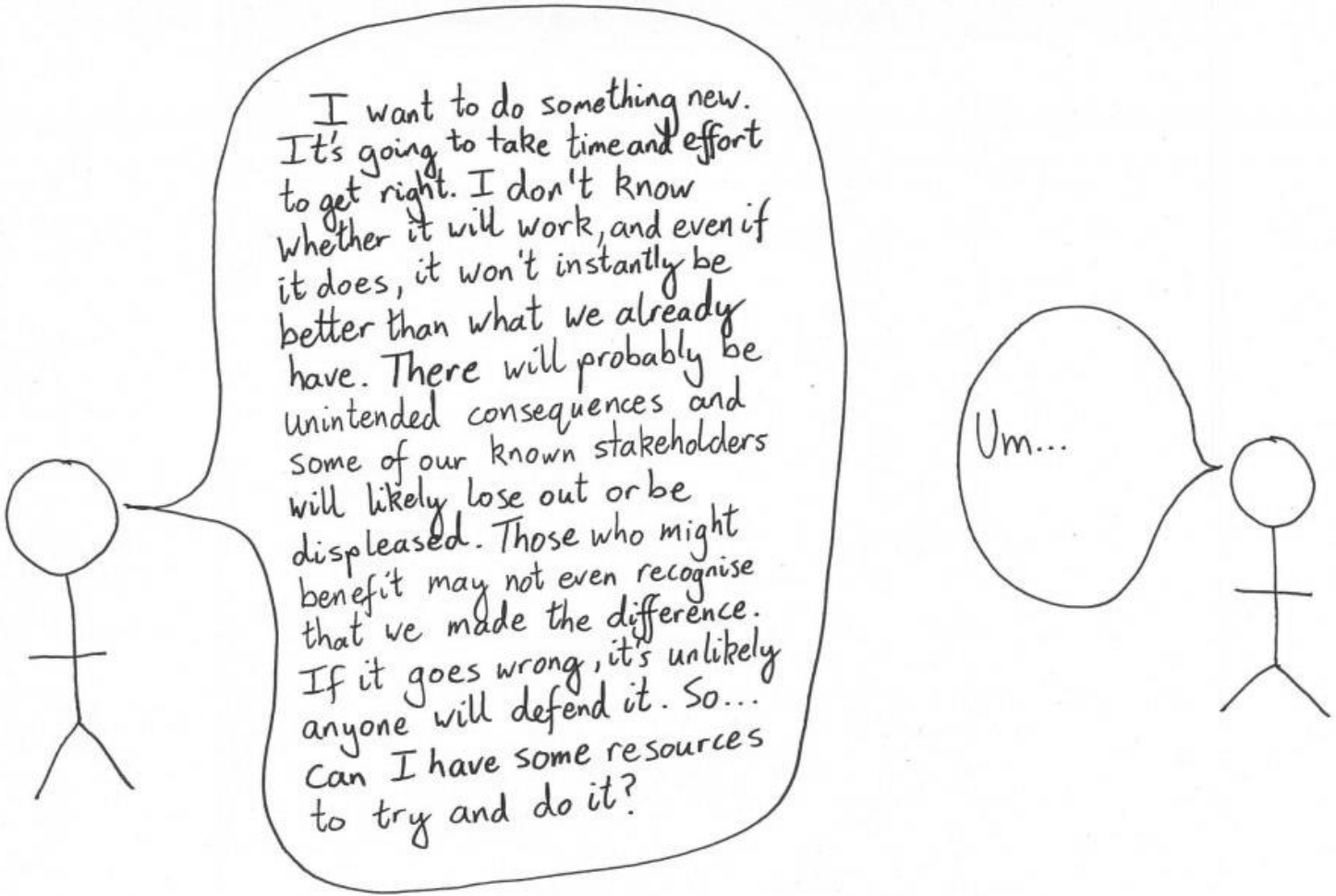
Public Health Innovation

Raed Mansour
Director
Office of Innovation



Alex Roberts, Deputy Head, Observatory of Public Sector Innovation at the Organisation for Economic Co-operation & Development

The 10 Essential Public Health Services

1. Monitor health status to identify and solve community health problems.
2. Diagnose and investigate health problems and health hazards in the community.
3. Inform, educate, and empower people about health issues.
4. Mobilize community partnerships and action to identify and solve health problems.
5. Develop policies and plans that support individual and community health efforts.
6. Enforce laws and regulations that protect health and ensure safety.
7. Link people to needed personal health services and assure the provision of health care when otherwise unavailable.
8. Assure competent public and personal health care workforce.
9. Evaluate effectiveness, accessibility, and quality of personal and population-based health services.
10. **Research for new insights and innovative solutions to health problems.**

Office of Innovation & PMQI

1. Define Innovation with an Equity Focus
2. Innovation at the table: Serve on PMQI Council & Attend PMQI Sessions
3. Operate as a Hybrid Program
4. Challenge to Develop Meaningful Key Performance Indicators (KPI)

   Organizational Capability: measuring the process of innovation to build repeatable & sustainable approaches towards an innovative culture

   - **KPI 1: Input = # Ideas**
   - **KPI 2: Output = # Innovations Operationalized**
   - **KPI 3: Rate of Innovation = Operational Innovations per 100 Ideas**
   - **KPI 4: Organic Advisory Consultations**

Prevention doesn't have a lot of pizzazz. If you prevent something from happening, it's a wonderful thing, but it's hard to measure and take credit for.

David Bellinger, MD, Boston Children's Hospital, Harvard T.H. Chan School of Public Health

2017 Definition of PH Innovation

Public health innovation refers to **the development of a new process, policy, product or program that increase quality, impact and efficiency**. This definition and the accompanying characteristics were informed by discussions with leaders in public health and innovation. PHNCI is testing the definition and characteristics and will refine them based on our learnings and input from the field. According to our working characteristics, a public health innovation:

- Is novel, new, or creative;
- Reflects the dynamic state of change inherent in public health transformation;
- Occurs by internal or cross-sector collaboration;
- Involves co-production of the process, policy, product, or program with partners, stakeholders, and/or customer;
- Has the potential to generate a new or improved means to create value;
- Lends itself to adaptation and adoption/replication and diffusion;
- Generates real-time information for evaluation and course correction; and
- If related to technology, uses open source technology (i.e., the technology is in the public domain) so as to facilitate adaption and adoption/replication.

Source: https://phnci.org/about-innovations

2019 Draft Definition of PH Innovation

Public health innovation refers to the development and/or implementation of a novel process, policy, product, or program leading to improvements that impact health and equity.

Tenets of public health innovation include the following:

- It is an iterative process – not an end point – that can be done incrementally or radically.
- It requires both collaboration (with diverse and relevant team members and partners) and co-production (with the people with lived experience who will be affected by the results of the innovation)
- It is an emerging practice that impacts the status quo and creates value in a way that lends itself to adaptation or replication by others.

Source: https://phnci.org/journal/what-is-innovation-in-public-health

Why Innovate in Public Health?

New public health threats

- Emerging infectious disease
- Opioids
- Chronic diseases
- Climate Change

Better approaches to improving public health

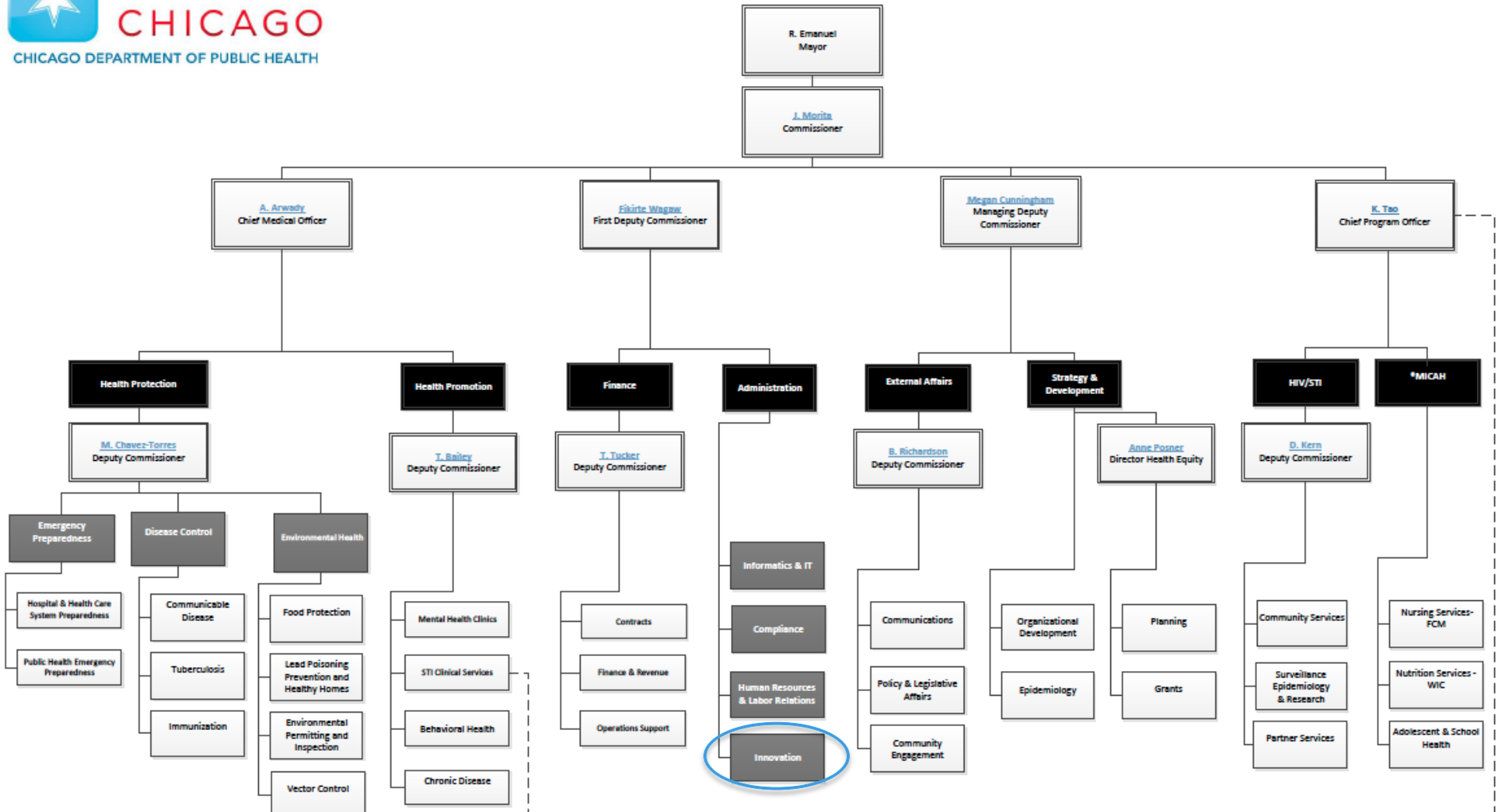
- Health Equity
- Collaborations
- Digital Transformation
- Open Data & Crowdsourcing

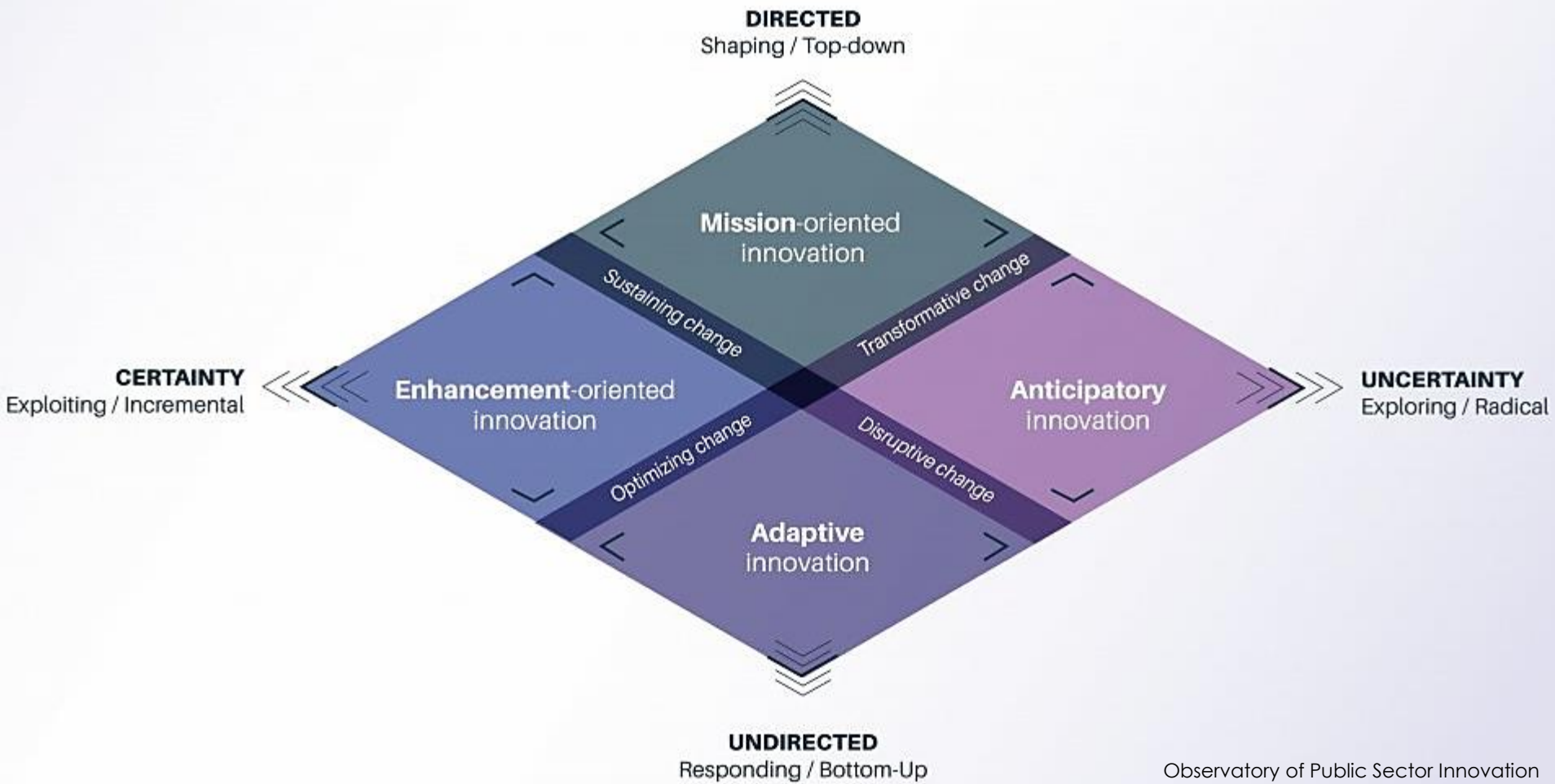
Limited Resources

- Insufficient & inconsistent funding (do more with less)

HEALTHY CHICAGO

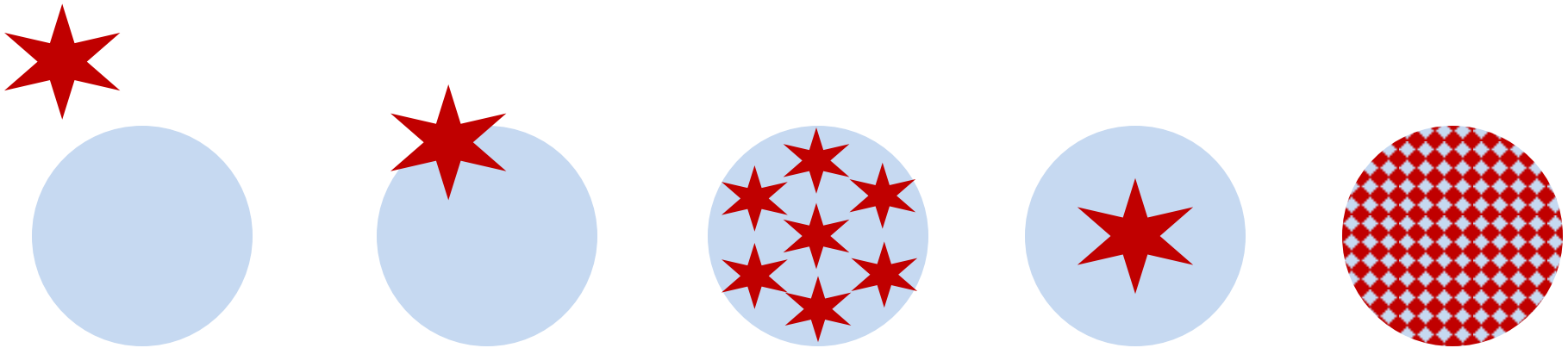
CHICAGO DEPARTMENT OF PUBLIC HEALTH





Observatory of Public Sector Innovation at the Organisation for Economic Cooperation & Development, Paris

Innovation Functions in Government



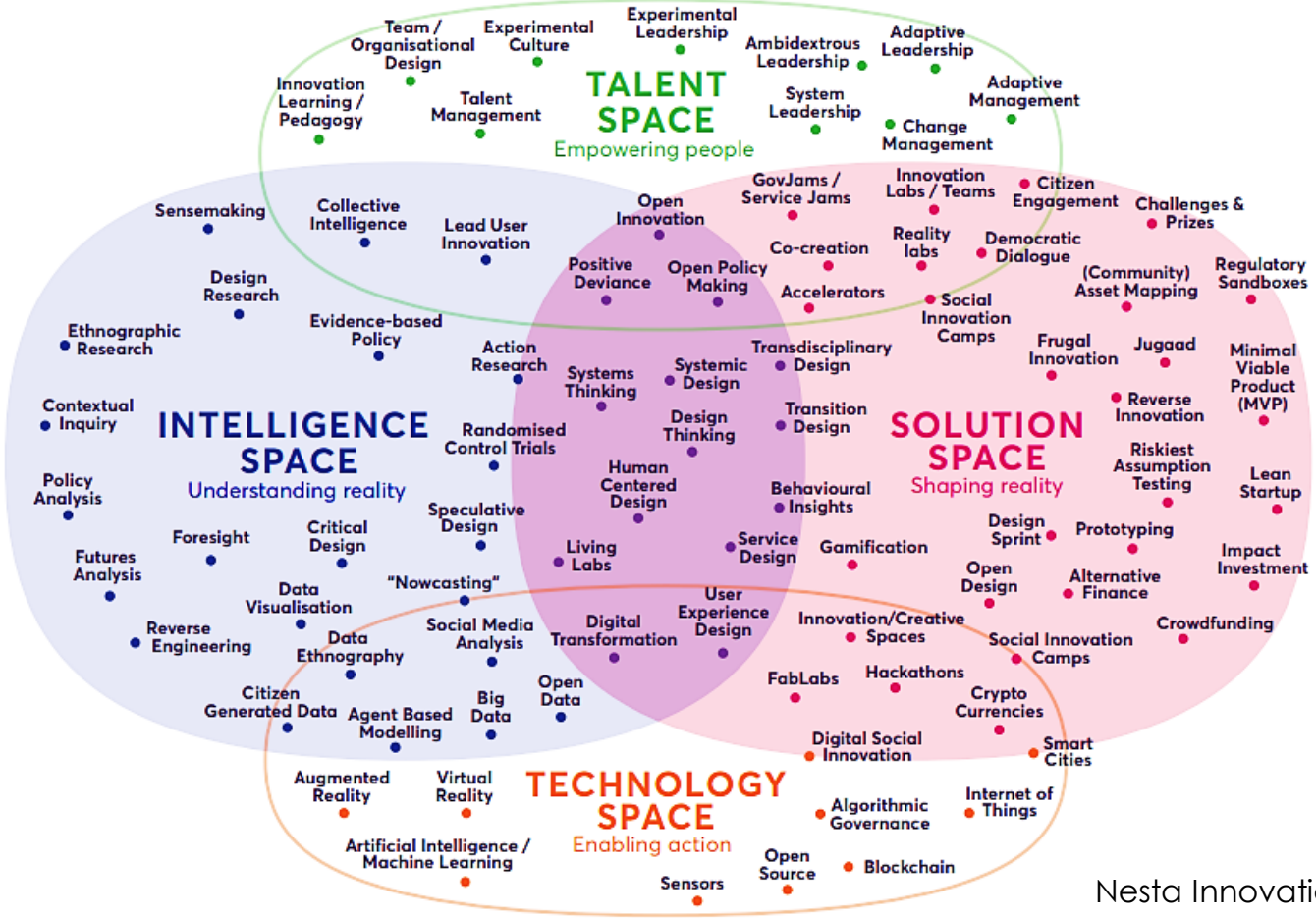
SEPARATE PERIPHERAL SCATTERED CENTRAL INTEGRATED

BUILDING A PORTFOLIO OF INNOVATIONS

Nesta Innovation Foundation, UK

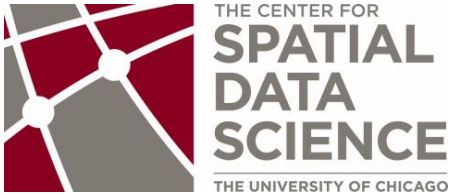
Office of Innovation Resources & Methods

Landscape of Innovation Approaches



Nesta Innovation Foundation, UK

Office of Innovation Partner Resources



4 Strategies for Learning About Tech for PH

- **Community**
  - Creating a tech solution the community doesn't need wastes time & resources.
  - Tech innovations should help solve for an unmet need.
  - Communities we serve can help ensure whether or not a technology is complementary to existing solutions, and replace them entirely if necessary.

- **Communities of practice**
  - A group of people sharing common interests to improve collective learning.
  - Opportunity to be exposed to new people and their methods and technologies.

- **Idea challenges**
  - Hack-a-thon allure of crowdsourcing solutions quickly, but short-term fixes shouldn't replace long-term needs when sustaining these technologies is an afterthought.
  - Idea challenges - nothing is built, but novel ideas given a space to be heard.

- **Sharing technology code**
  - Difficult to operationalize technology from a white paper.
  - Open source sharing platforms create blueprints with the added power of transparency and opportunity for peer review.

Source: http://www.publichealthnewswire.org/?p=22223

Non-Tech Innovations

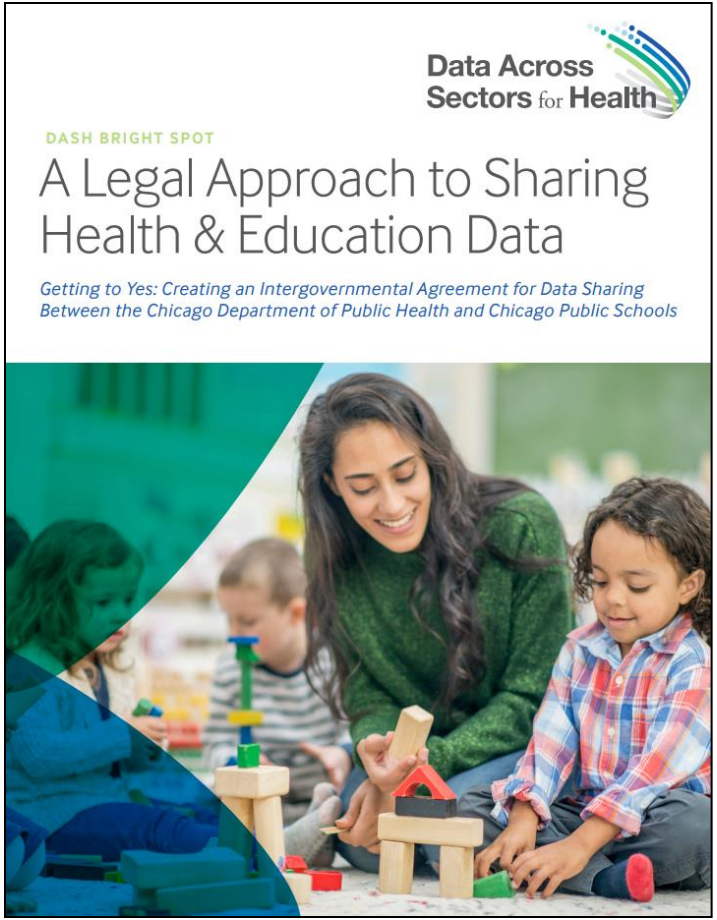
Ordinance Amended November 2017

2-112-160 Commissioner – Additional powers and duties.

The Commissioner of Health shall have the following powers and duties:

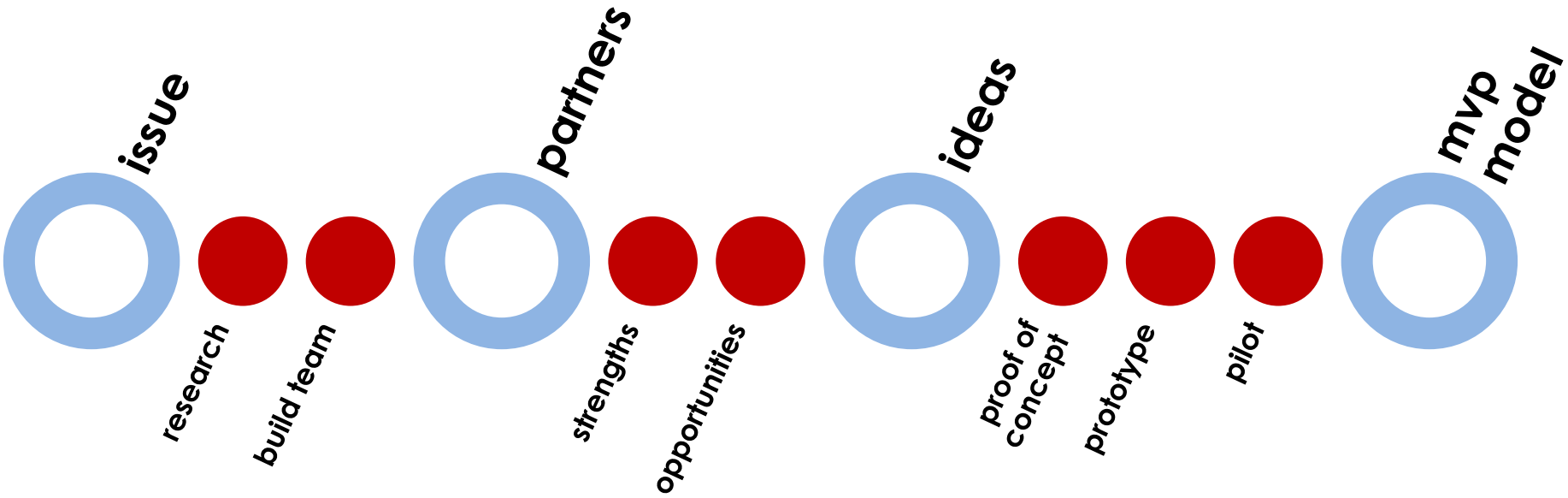
(a) Public health related powers and duties:

(8) To request, collect, receive, and maintain confidential information, records, and data, including protected health information consistent with 45 C.F.R. § 164.512(b)(1)(i), for the purpose of preventing or controlling disease, injury, or disability. The confidential information, records, and data may support activities including, but not limited to, the reporting of disease, injury, or vital events such as birth or death; the conducting of public health surveillance, public health investigations, and public health interventions; **the performance of epidemiological studies; and the application of data science methods or other analytic models that protect and promote public health.**



https://dashconnect.org/wp-content/uploads/2018/05/DASH-Bright-Spot_Chicago.pdf

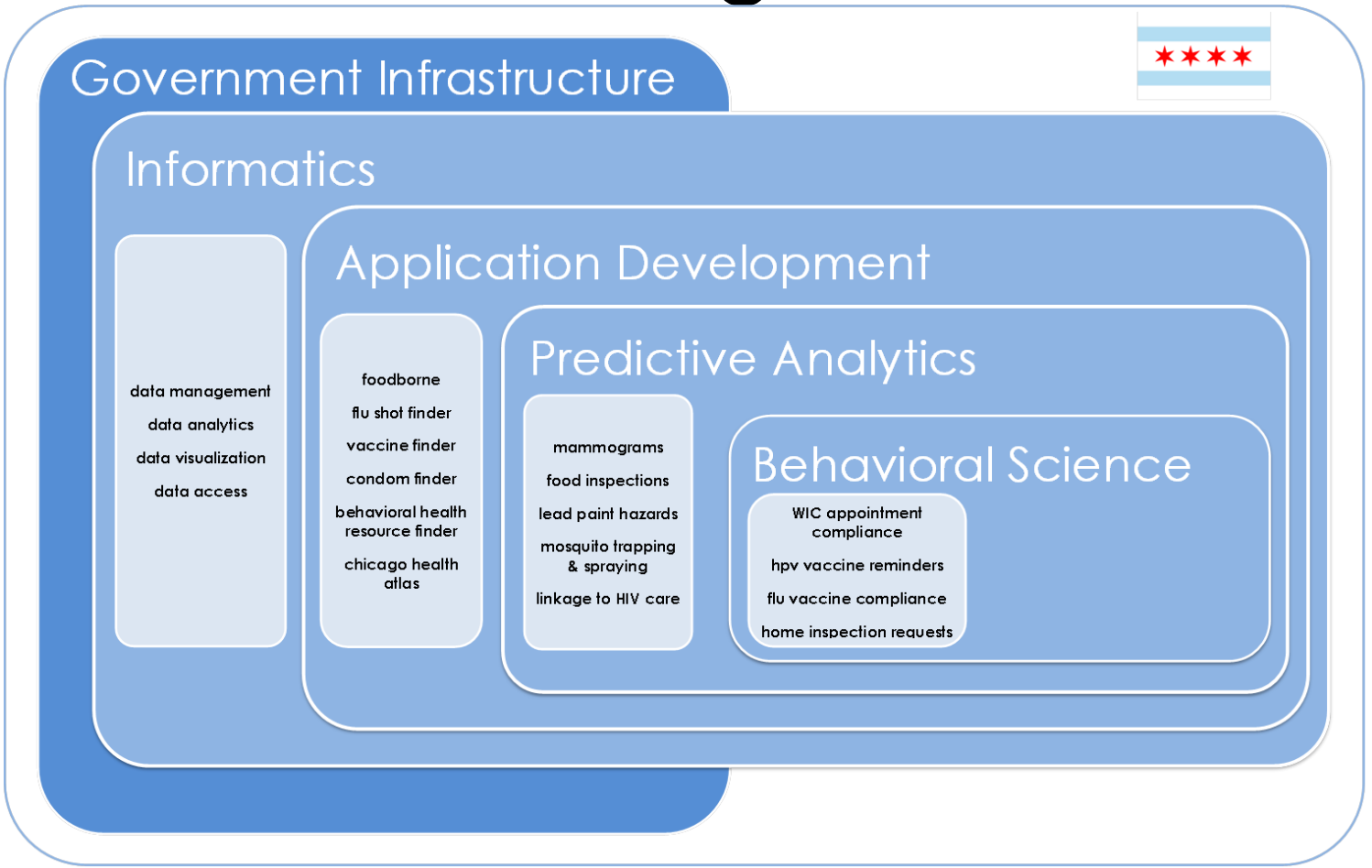
Pathways to Discovery & Development



From Innovation to Operationalization

- **What is the Normal Business Practice?**
- **What is the Minimum Viable Product?**
- **Customization to Needs of Program**
  Design? UX/UI? Dashboard? Tablet?
- **Consider Updates/Improvements/Discoveries**
- **Deployment**
  Connected Data Systems, Open and/or Private Data
- **Automation**
- **Capacity**
- **Sustainability**
- **Competing priorities**

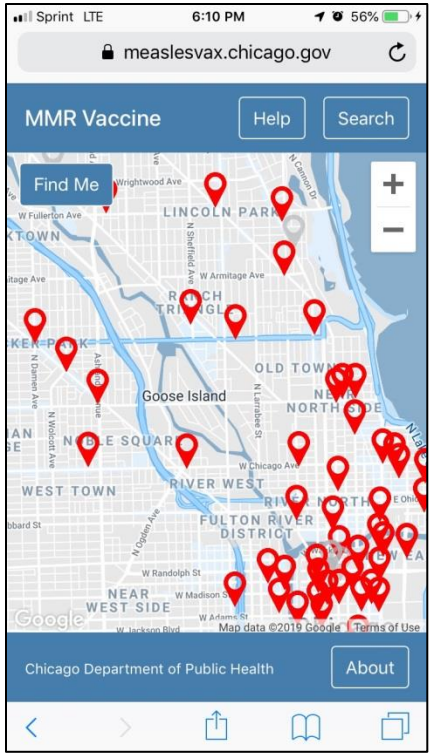
Culture of Innovating "Inside the Box"

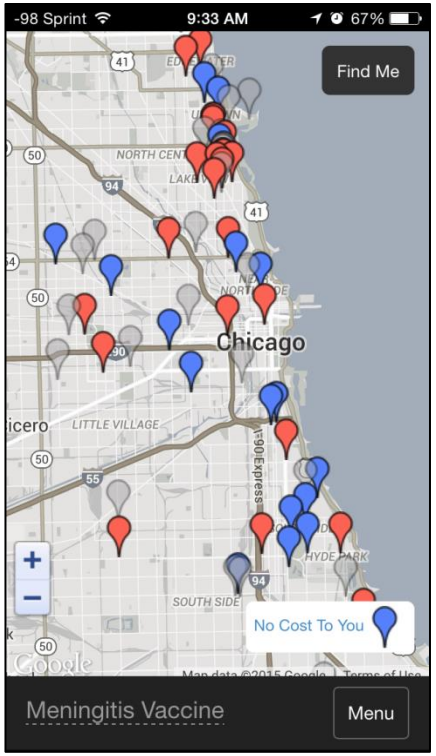


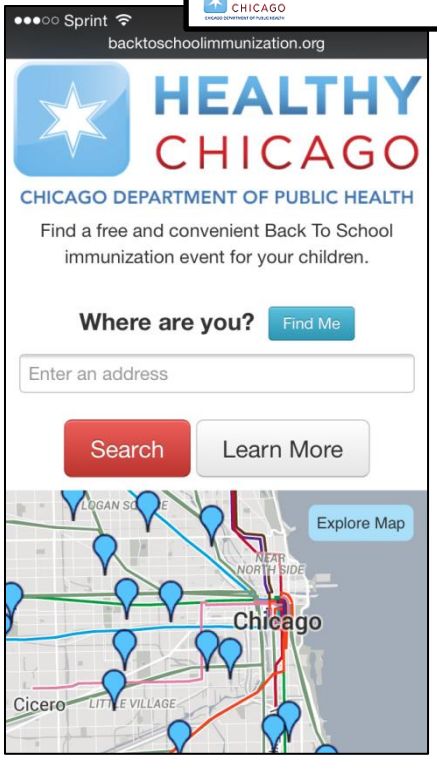
VACCINES & BEHAVIORAL HEALTH

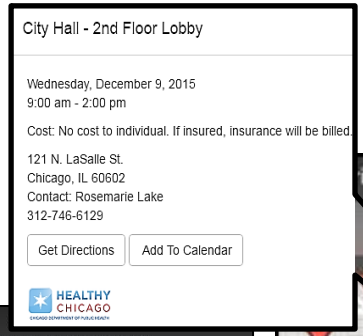
WEB APPS

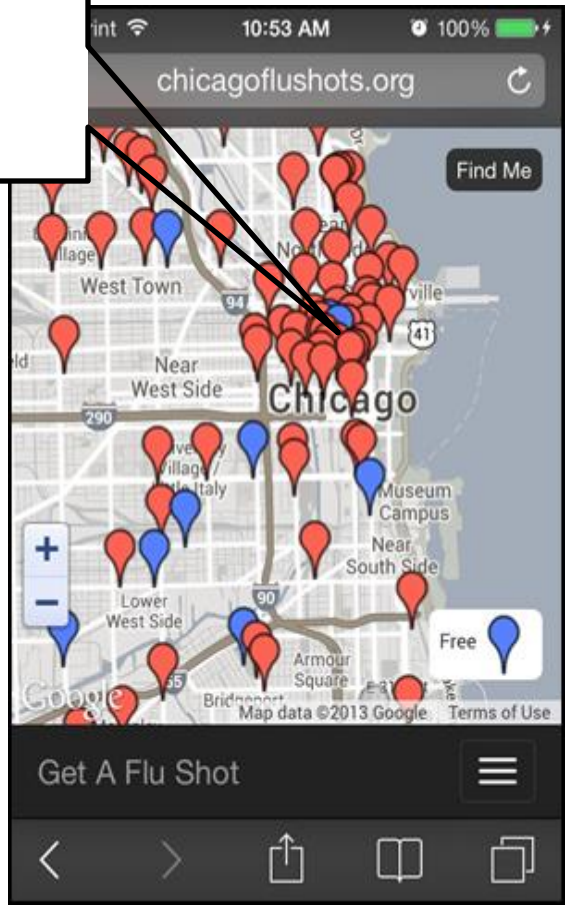
Free Vaccine Finders











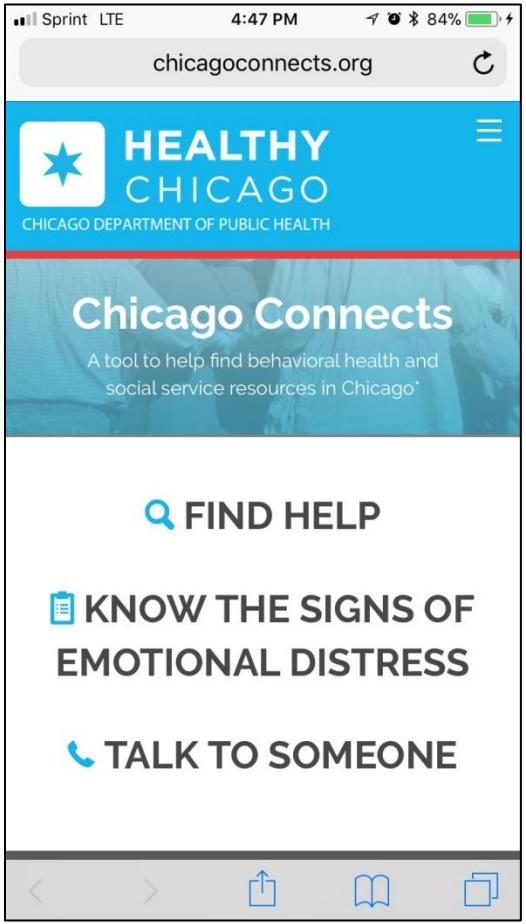
Daniel X. O'Neil
@danxoneil

Following

That's all you & Tom, Raed! Best, most productive, longest-term civic tech volunteer relationship I've ever seen.

> **Raed Mansour** @reedmonseur
>
> Thanks to @tomkompare & @danxoneil from @SmartChicago for making chicagomeningvax.org a reality. #StopMening #MeningVax #publichealth

Behavioral Health Services



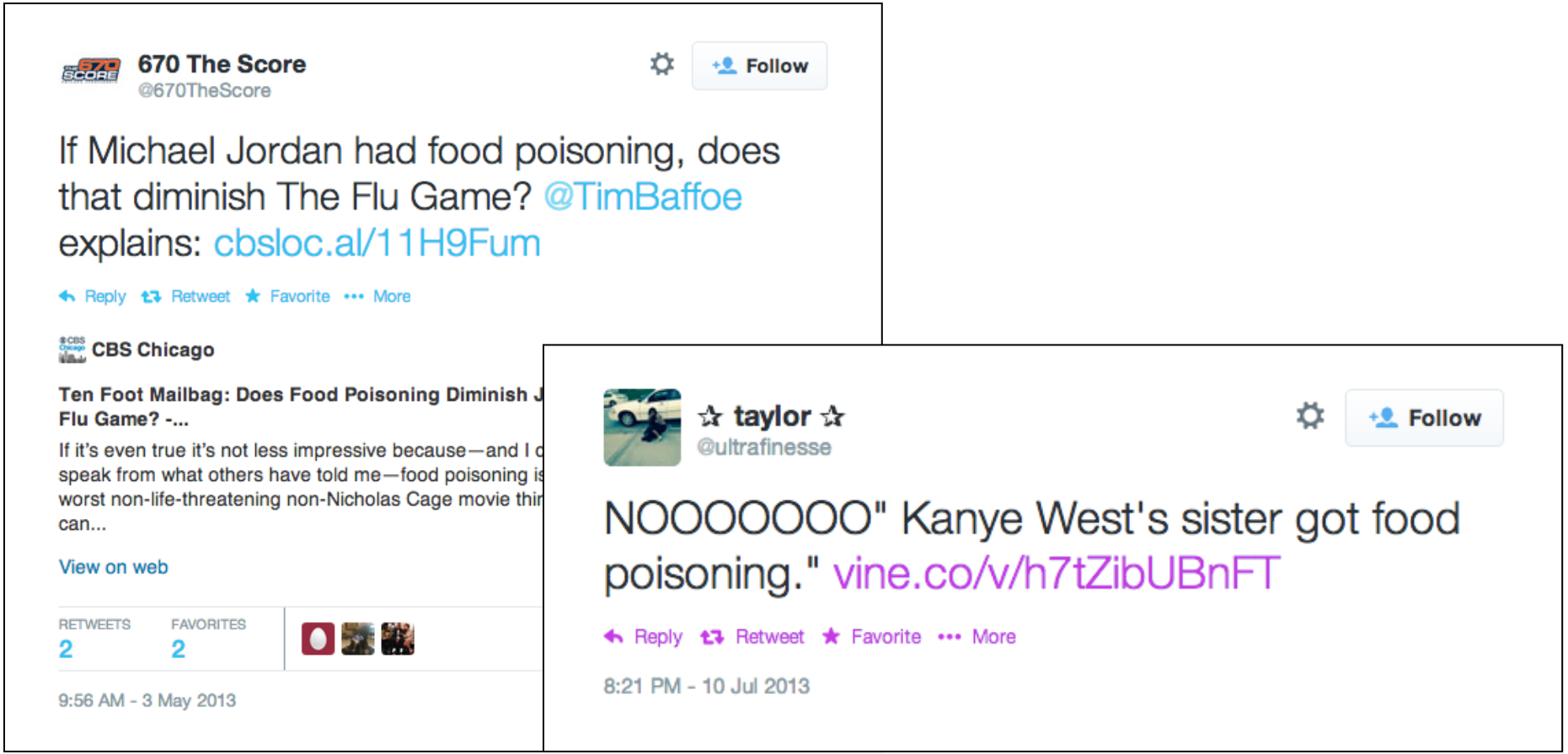
FOOD POISONING & E-CIGARETTES

SOCIAL MEDIA

MACHINE LEARNING

SOCIAL NETWORKING

Food Poisoning Tweets - Noise



670 The Score
@670TheScore
Follow

If Michael Jordan had food poisoning, does that diminish The Flu Game? @TimBaffoe explains: cbsloc.al/11H9Fum

Reply Retweet Favorite More

CBS Chicago

Ten Foot Mailbag: Does Food Poisoning Diminish J Flu Game? -...

If it's even true it's not less impressive because—and I c speak from what others have told me—food poisoning is worst non-life-threatening non-Nicholas Cage movie thir can...

View on web

RETWEETS 2 FAVORITES 2

9:56 AM - 3 May 2013

☆ taylor ☆
@ultrafinesse
Follow

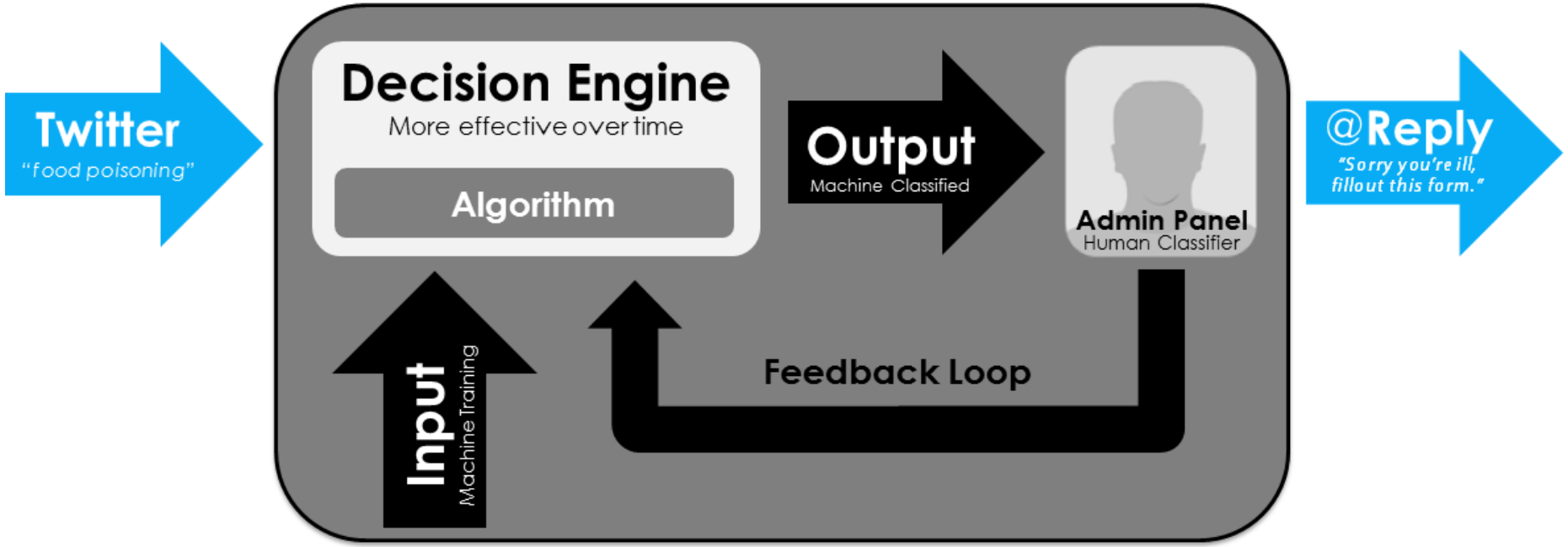
NOOOOOOO" Kanye West's sister got food poisoning." vine.co/v/h7tZibUBnFT

Reply Retweet Favorite More

8:21 PM - 10 Jul 2013

FoodBorne Chicago App

Machine Learning & Natural Language Processing



[redacted] Follow

Well food poisoning sucks.. #latetweet
pic.twitter.com/[redacted]

Reply Retweet Favorite More

Solution to finding food poisoning and taking action on Twitter

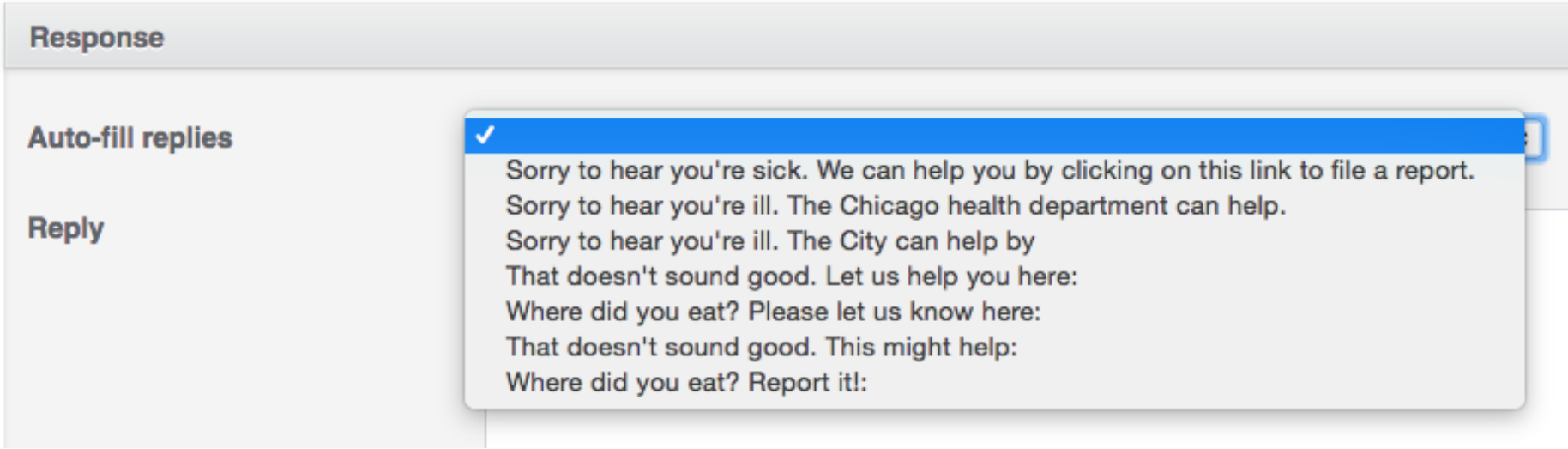
Foodborne Chicago @foodbornechi · 27 Apr 2013
@[redacted] We're so sorry to hear you're sick. We can help by clicking on this link to file a report: foodborne.smartchicagoapps.org/32800342375886
...
Details Reply Retweet Favorite More

Anatomy of a Successful Tweet

Empathy
Sorry to hear you're ill.

Authority
Chicago Health Department can help.

Call-to-Action
Click to file a report:



First 3 Most Responsive Tweets Developed Using

cdc.orau.gov/healthcommworks

2015 Top 25 Innovations in American Government Awards

NO SMOKING

WITHIN 15 FT OF ENTRYWAY

INCLUDING E-CIGARETTES

If you see someone smoking, please notify the manager.
If the problem persists, please call 311 and report it.

City of Chicago
Mayor Rahm Emanuel

HEALTHY CHICAGO
CHICAGO DEPARTMENT OF PUBLIC HEALTH

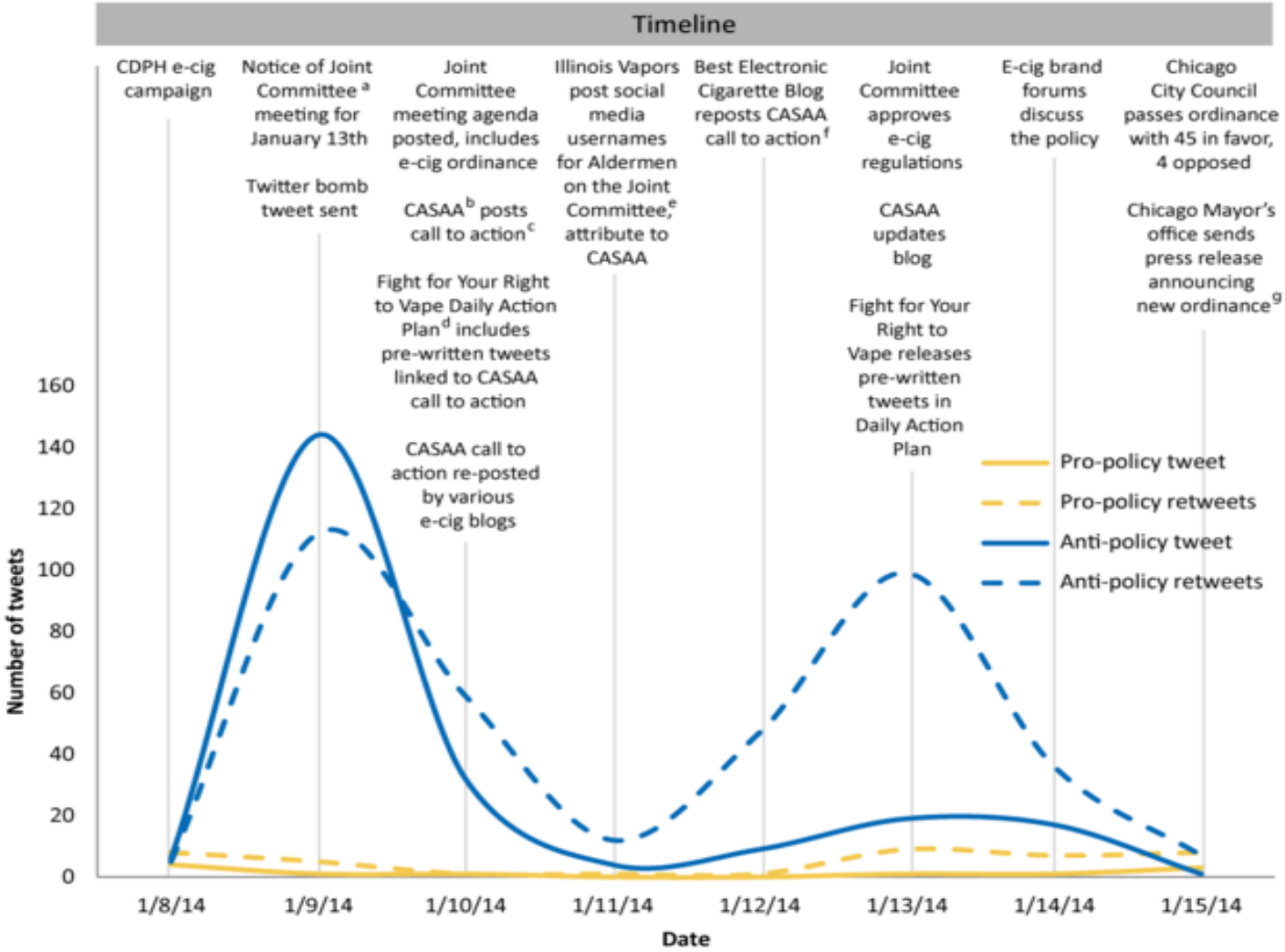
GrimmGreen
@GrimmGreen

Follow

We need to twitter bomb the hell out if @chiPublicHealth, spreading nothing but lies #kcavo #vaping… instagram.com/p/i8ETdOlOOW/

RETWEETS 43 LIKES 21

12:46 AM - 9 Jan 2014


Timeline
CDPH e-cig campaign
Notice of Joint Committee [a] meeting for January 13th
Twitter bomb tweet sent
Joint Committee meeting agenda posted, includes e-cig ordinance
CASAA [b] posts call to action [c]
Fight for Your Right to Vape Daily Action Plan [d] includes pre-written tweets linked to CASAA call to action
CASAA call to action re-posted by various e-cig blogs
Illinois Vapors post social media usernames for Aldermen on the Joint Committee, [e] attribute to CASAA
Best Electronic Cigarette Blog reposts CASAA call to action [f]
Joint Committee approves e-cig regulations
CASAA updates blog
Fight for Your Right to Vape releases pre-written tweets in Daily Action Plan
E-cig brand forums discuss the policy
Chicago City Council passes ordinance with 45 in favor, 4 opposed
Chicago Mayor's office sends press release announcing new ordinance [g]
Pro-policy tweet
Pro-policy retweets
Anti-policy tweet
Anti-policy retweets
Number of tweets
0
20
40
60
80
100
120
140
160
1/8/14
1/9/14
1/10/14
1/11/14
1/12/14
1/13/14
1/14/14
1/15/14
Date

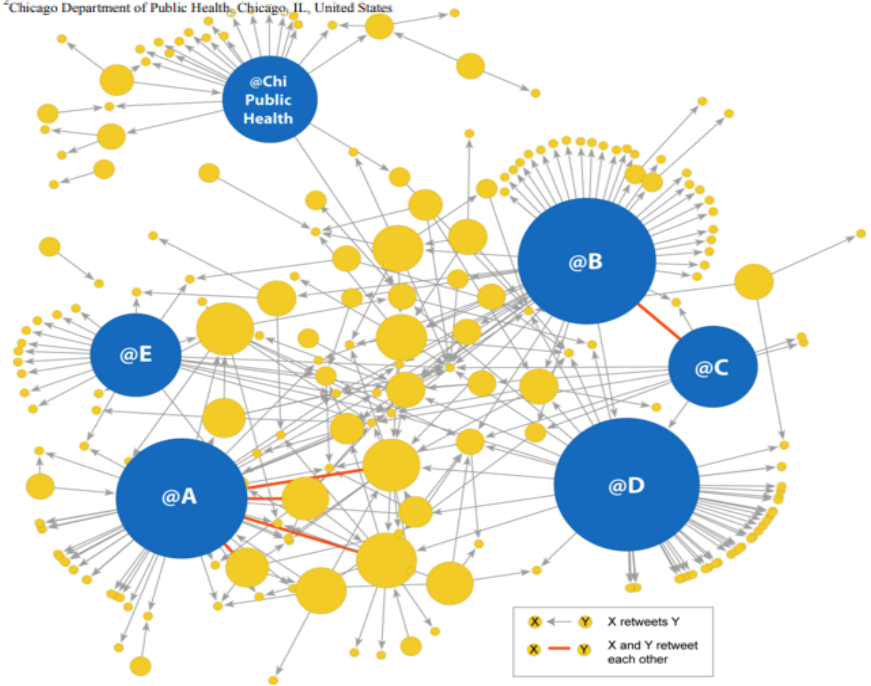
JOURNAL OF MEDICAL INTERNET RESEARCH Harris et al

Original Paper

Tweeting for and Against Public Health Policy: Response to the Chicago Department of Public Health's Electronic Cigarette Twitter Campaign

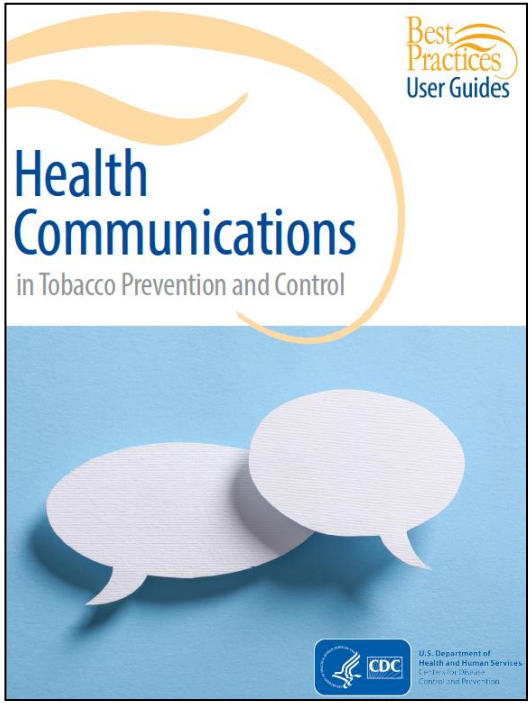
Jenine K Harris[1], PhD; Sarah Moreland-Russell[1], PhD; Bechara Choucair[2], MD; Raed Mansour[2], MS; Mackenzie Staub[1]; Kendall Simmons[1]

[1]Washington University in St. Louis, St. Louis, MO, United States
[2]Chicago Department of Public Health, Chicago, IL, United States



Source: https://www.jmir.org/2014/10/e238

Closely monitoring social media channels and hashtags can help anticipate, recognize, and respond to grassroots opposition.



ChiPublicHealth
@ChiPublicHealth

Following

City Council passes e-cig ordinance 45-4 regulating like other cigs to best protect our youth and air! #eCigTruths #healthychicago

RETWEETS 15 LIKES 4

12:15 PM - 15 Jan 2014

HBR Blog Network

How Cities Are Using Analytics to Improve Public Health

by Bechara Choucair, Jay Bhatt and Raed Mansour | 8:00 AM September 15, 2014

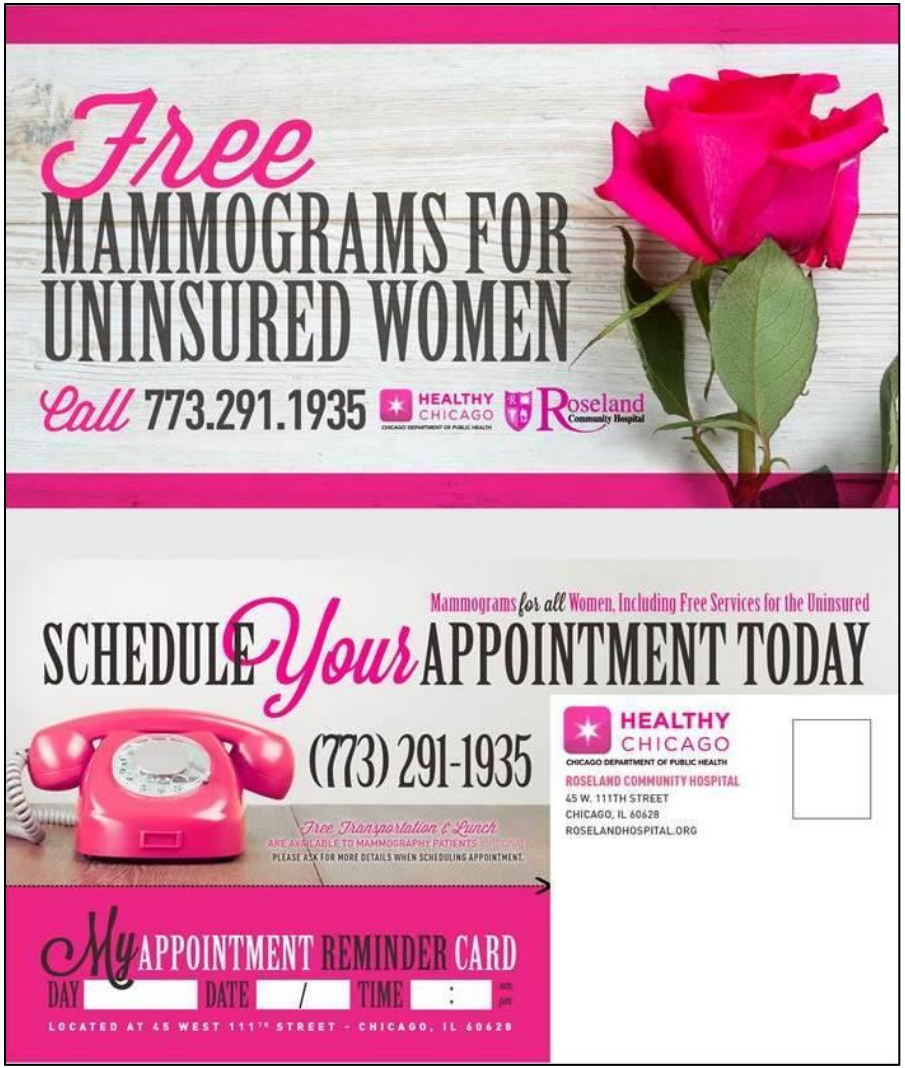
Comments (2)

From clean water supplies to the polio vaccine, the most effective public health interventions are typically preventative policies that help stop a crisis before it starts. But predicting the next public health crisis has historically been a challenge, and even interventions like chlorinating water or

MAMMOGRAPHY
PREDICTIVE ANALYTICS

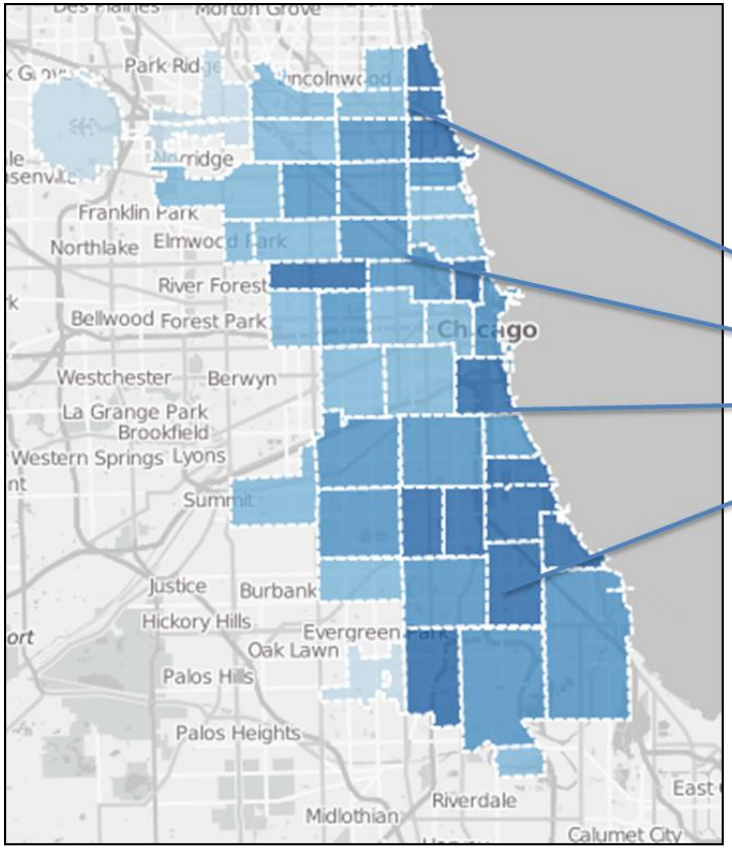
Uninsured Predictive Modeling

- ID women most likely uninsured due to various social factors
- Chicago-based analytics firm, Civis Analytics, used private and public data to locate 5,000 female residents more likely to be uninsured.



FOOD FORECASTING
PREDICTIVE ANALYTICS

Benefits for Food Protection Program



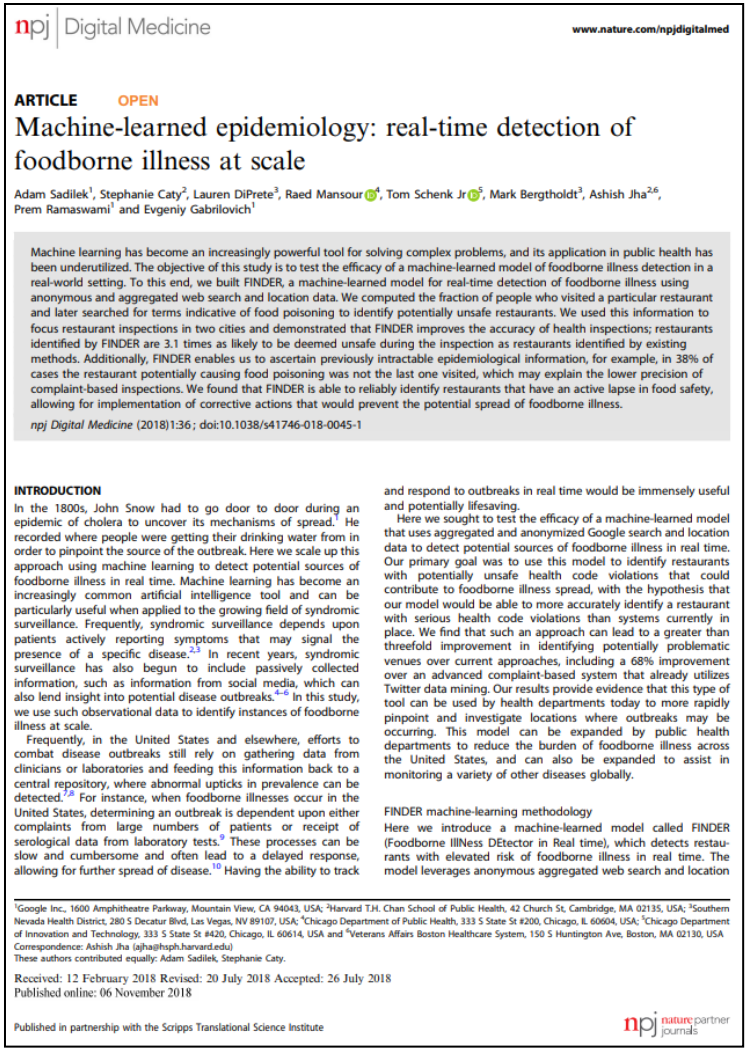
- Allocate Resources
- Prioritize Inspections
- Increase Efficiency
- Prevent Illnesses that may lead to outbreaks

2016 Innovations in American Government Awards Bright Ideas

Bright Ideas

Google AI

Machine-Learned Epidemiology: Real-time Detection of Foodborne Illness at Scale



npj | Digital Medicine

www.nature.com/npjdigitalmed

ARTICLE OPEN

Machine-learned epidemiology: real-time detection of foodborne illness at scale

Adam Sadilek[1], Stephanie Caty[2], Lauren DiPrete[3], Raed Mansour[4], Tom Schenk Jr[5], Mark Bergtholdt[3], Ashish Jha[2,6], Prem Ramaswami[1] and Evgeniy Gabrilovich[1]

Machine learning has become an increasingly powerful tool for solving complex problems, and its application in public health has been underutilized. The objective of this study is to test the efficacy of a machine-learned model of foodborne illness detection in a real-world setting. To this end, we built FINDER, a machine-learned model for real-time detection of foodborne illness using anonymous and aggregated web search and location data. We computed the fraction of people who visited a particular restaurant and later searched for terms indicative of food poisoning to identify potentially unsafe restaurants. We used this information to focus restaurant inspections in two cities and demonstrated that FINDER improves the accuracy of health inspections; restaurants identified by FINDER are 3.1 times as likely to be deemed unsafe during the inspection as restaurants identified by existing methods. Additionally, FINDER enables us to ascertain previously intractable epidemiological information, for example, in 38% of cases the restaurant potentially causing food poisoning was not the last one visited, which may explain the lower precision of complaint-based inspections. We found that FINDER is able to reliably identify restaurants that have an active lapse in food safety, allowing for implementation of corrective actions that would prevent the potential spread of foodborne illness.

npj Digital Medicine (2018)1:36 ; doi:10.1038/s41746-018-0045-1

INTRODUCTION

In the 1800s, John Snow had to go door to door during an epidemic of cholera to uncover its mechanisms of spread.[1] He recorded where people were getting their drinking water from in order to pinpoint the source of the outbreak. Here we scale up this approach using machine learning to detect potential sources of foodborne illness in real time. Machine learning has become an increasingly common artificial intelligence tool and can be particularly useful when applied to the growing field of syndromic surveillance. Frequently, syndromic surveillance depends upon patients actively reporting symptoms that may signal the presence of a specific disease.[2,3] In recent years, syndromic surveillance has also begun to include passively collected information, such as information from social media, which can also lend insight into potential disease outbreaks.[4–6] In this study, we use such observational data to identify instances of foodborne illness at scale.

Frequently, in the United States and elsewhere, efforts to combat disease outbreaks still rely on gathering data from clinicians or laboratories and feeding this information back to a central repository, where abnormal upticks in prevalence can be detected.[7,8] For instance, when foodborne illnesses occur in the United States, determining an outbreak is dependent upon either complaints from large numbers of patients or receipt of serological data from laboratory tests.[9] These processes can be slow and cumbersome and often lead to a delayed response, allowing for further spread of disease.[10] Having the ability to track and respond to outbreaks in real time would be immensely useful and potentially lifesaving.

Here we sought to test the efficacy of a machine-learned model that uses aggregated and anonymized Google search and location data to detect potential sources of foodborne illness in real time. Our primary goal was to use this model to identify restaurants with potentially unsafe health code violations that could contribute to foodborne illness spread, with the hypothesis that our model would be able to more accurately identify a restaurant with serious health code violations than systems currently in place. We find that such an approach can lead to a greater than threefold improvement in identifying potentially problematic venues over current approaches, including a 68% improvement over an advanced complaint-based system that already utilizes Twitter data mining. Our results provide evidence that this type of tool can be used by health departments today to more rapidly pinpoint and investigate locations where outbreaks may be occurring. This model can be expanded by public health departments to reduce the burden of foodborne illness across the United States, and can also be expanded to assist in monitoring a variety of other diseases globally.

FINDER machine-learning methodology

Here we introduce a machine-learned model called FINDER (Foodborne IllNess DEtector in Real time), which detects restaurants with elevated risk of foodborne illness in real time. The model leverages anonymous aggregated web search and location

[1]Google Inc., 1600 Amphitheatre Parkway, Mountain View, CA 94043, USA; [2]Harvard T.H. Chan School of Public Health, 42 Church St, Cambridge, MA 02135, USA; [3]Southern Nevada Health District, 280 S Decatur Blvd, Las Vegas, NV 89107, USA; [4]Chicago Department of Public Health, 333 S State St #200, Chicago, IL 60604, USA; [5]Chicago Department of Innovation and Technology, 333 S State St #420, Chicago, IL 60614, USA and [6]Veterans Affairs Boston Healthcare System, 150 S Huntington Ave, Boston, MA 02130, USA
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npj nature partner journals

WEST NILE VIRUS
PREDICTIVE MODELING

Crowd-Sourced WNV Challenge

- Given weather, location, testing, and spraying data, **predict when and where different species of mosquitos will test positive for West Nile virus.**

- May effectively allocate resources towards preventing transmission of virus

LEAD PAINT HAZARDS
PREDICTIVE MODELING

Changing Our Model

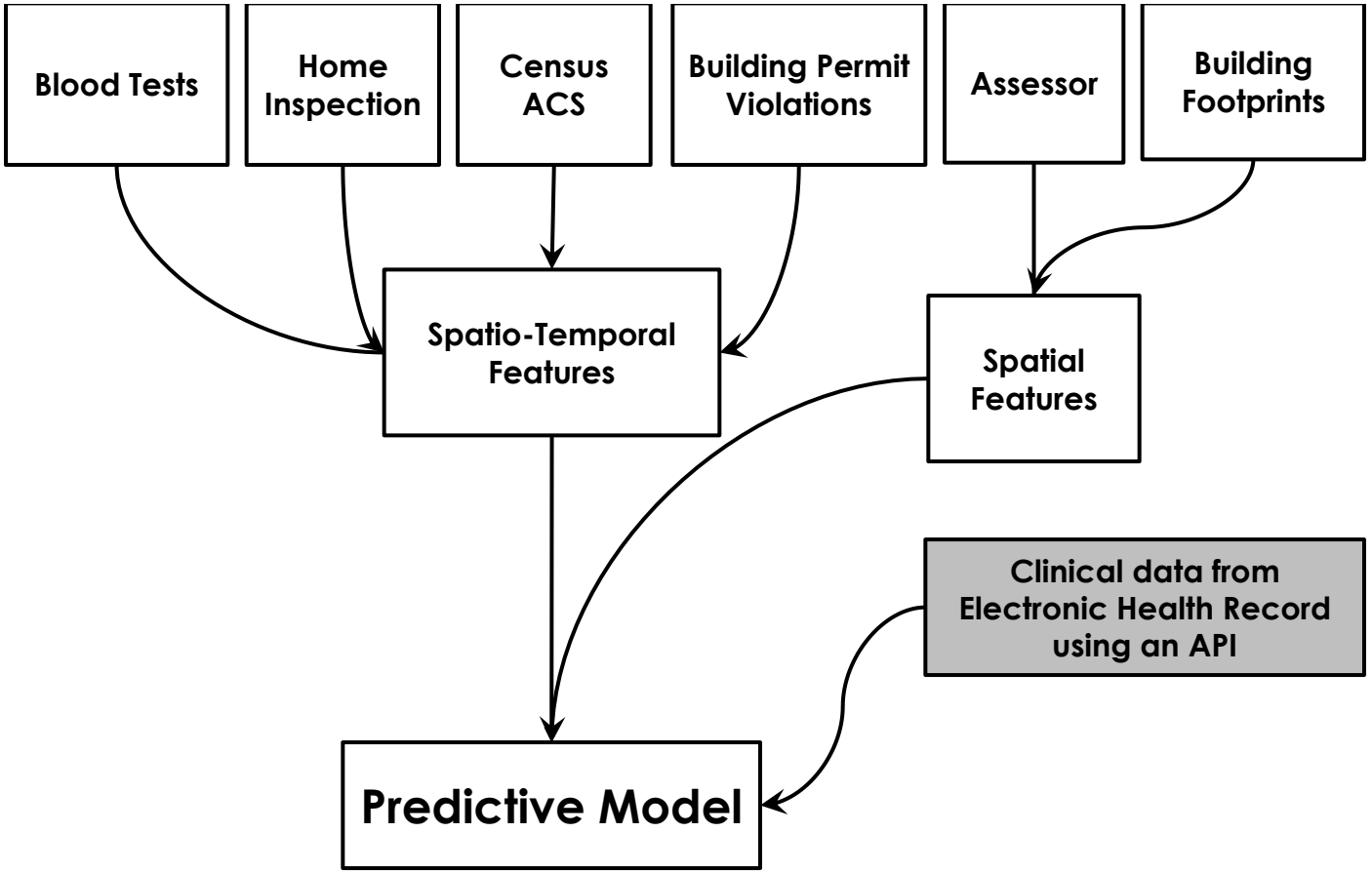
Reactive

Proactive

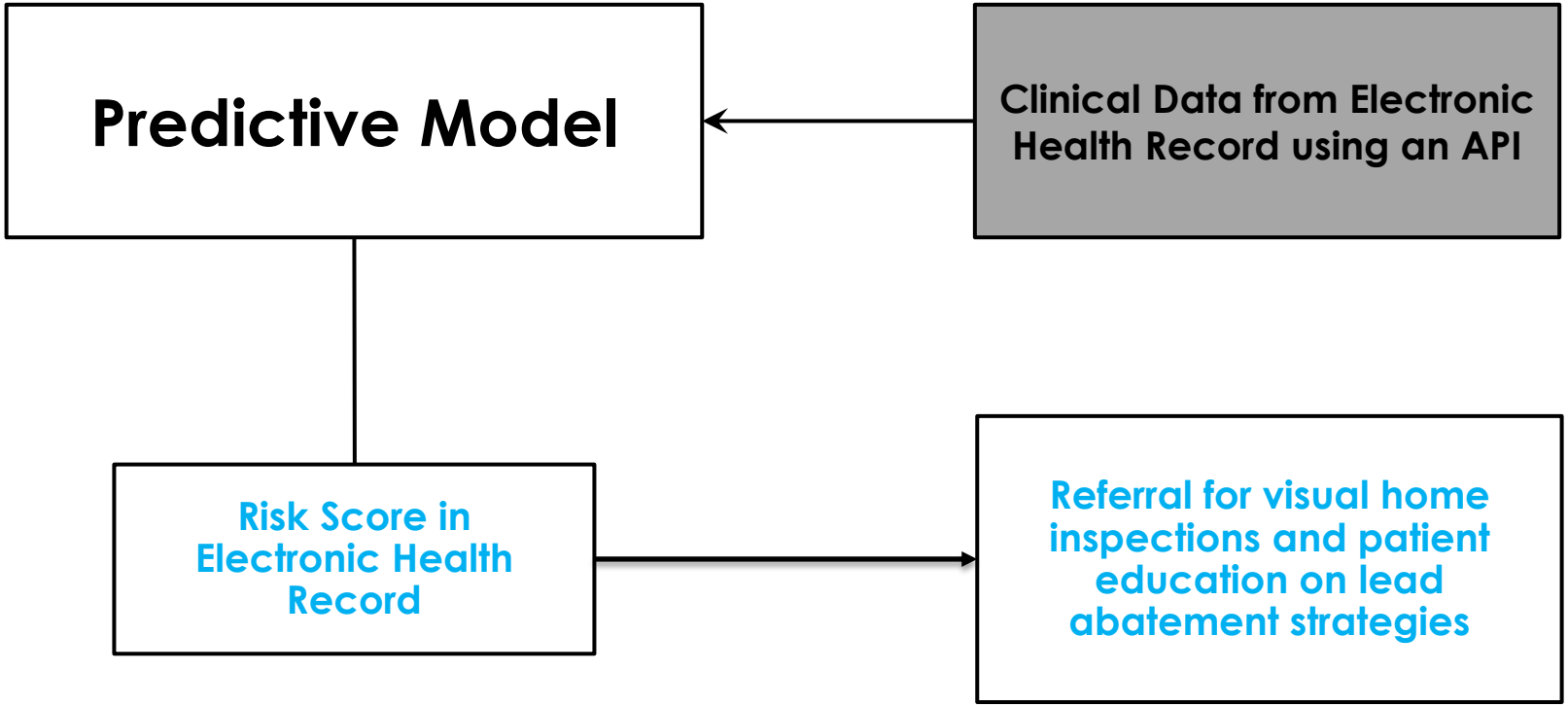
	YEARS	RECORDS	VARIABLES	OWNER
Blood Lead Level	1995 - Present	2,700,000	First name, last name, date of birth, address, blood lead level, sample type, sample date	CDPH Lead Program
Home Inspection Records Summary	1989 -Present	66,000	Date of initial inspection, lead based paint hazard (yes/no), location of lead-based paint hazards (interior/exterior/both/), date complied, address	CDPH Lead Program
Women, Infants and Children	1994 - Present	180,000	First name, last name, date of birth, address, sociodemographics	CDPH WIC Program
Building Permits	2006 - Present	400,000	Address, issue date, permit type	Chicago Department of Buildings (Chicago Data Portal)
Building Violations	2006 - Present	1,500,000	Address, violation Date, violation description, violation ordinance, inspection status	Chicago Department of Buildings (Chicago Data Portal)
Building Footprints	2015	800,000	Year of building construction, physical condition, number of units, stories (floors), vacancy status	Chicago Department of Buildings (Github)
Cook County Assessor	2013	800,000	Address, assessed property values, building classifications, building characteristics	2014 Cook County Assessor
Chicago Census Boundaries	2010	800	Shape File	Chicago Data Portal
Chicago Ward Boundaries	2015	50	Shape File	Chicago Data Portal
American Community Survey	2005 - 2014	800	Census tract variables including socio-demographics, education, health insurance, home ownership.	US Census Bureau
Frequently Occurring Surnames	2000	150,000	Census surname ethnicity	US Census Bureau

The Childhood Lead Paint Hazard Data Sharing Across Sectors of Health Project

A Predictive Model

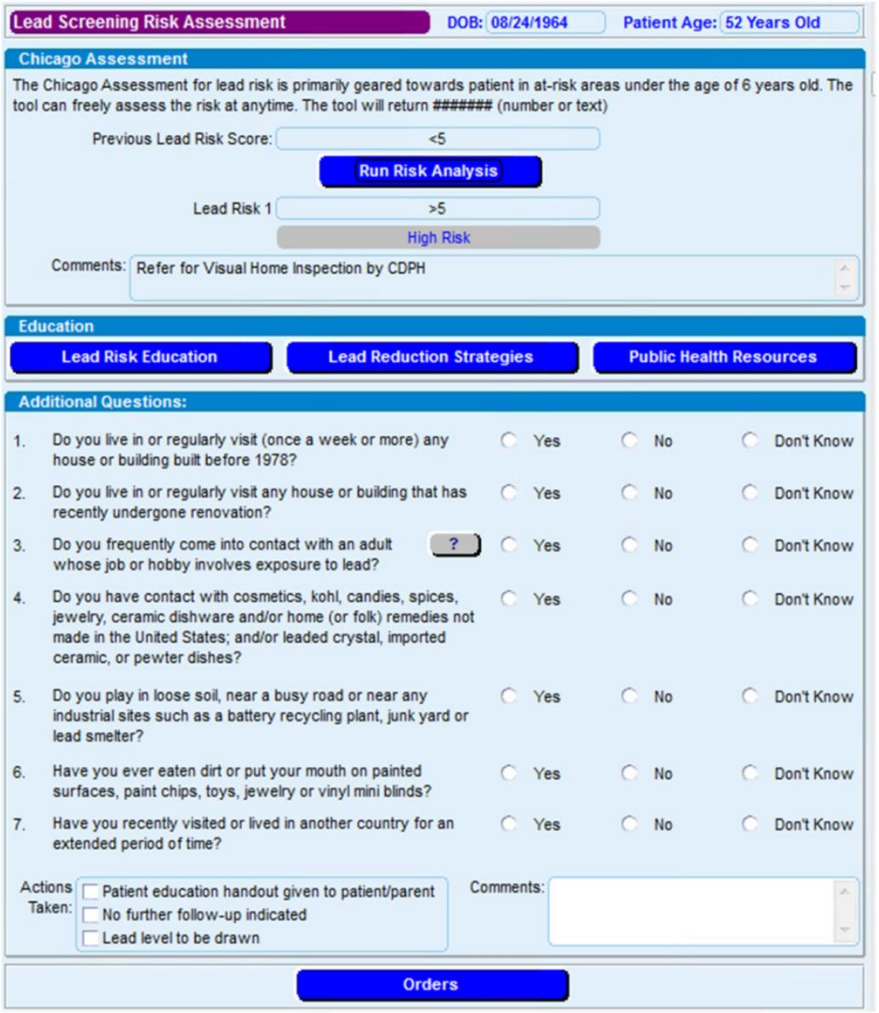


Operationalizing the Model

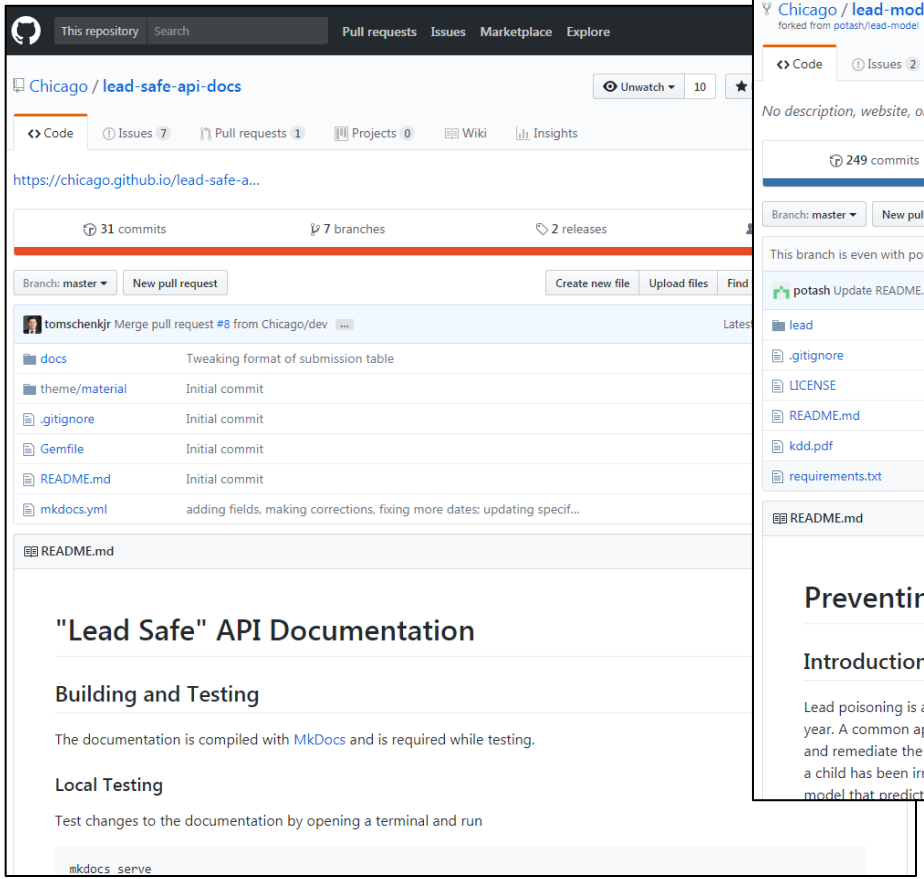


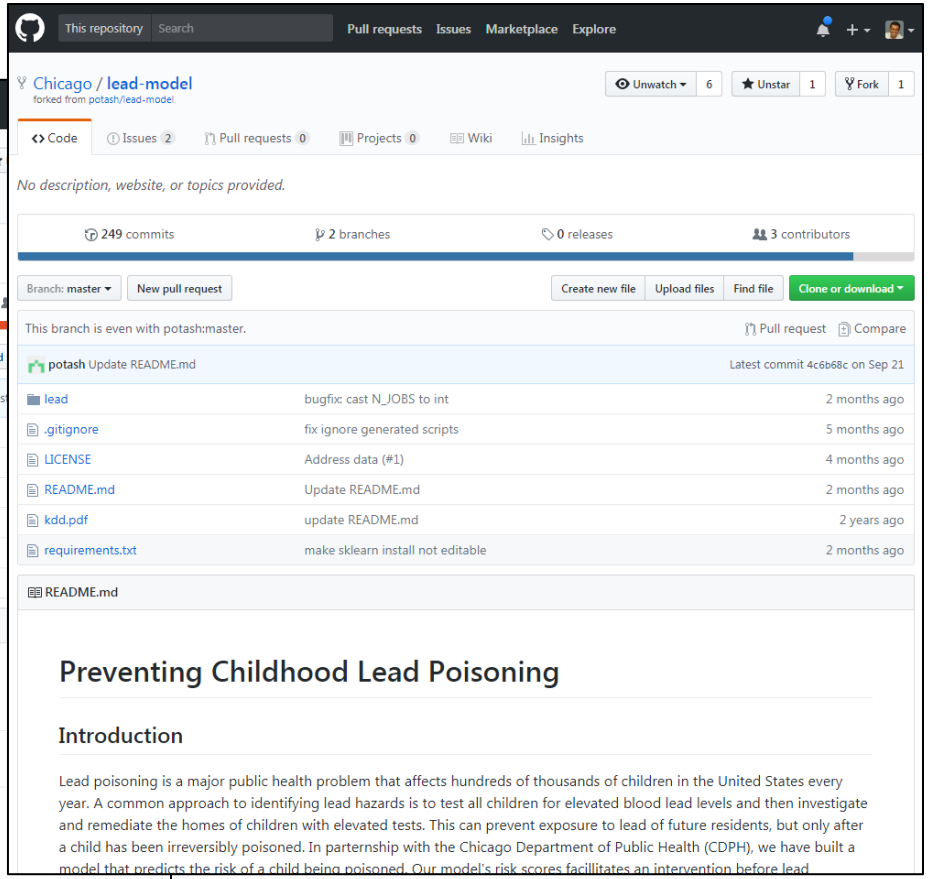
Electronic Health Record Clinical Decision Support Tool

- Access the predictive model through an EHR-based Clinical Decision Support Tool (CDST)
- The CDST can alert providers to the risk of lead exposure based on the patient's current address
- CDST provides recommendation for visual home inspections and patient education on lead abatement strategies



Open Source


This repository
Search
Pull requests
Issues
Marketplace
Explore
Chicago / lead-safe-api-docs
Unwatch 10
Code
Issues 7
Pull requests 1
Projects 0
Wiki
Insights
https://chicago.github.io/lead-safe-a...
31 commits
7 branches
2 releases
Branch: master
New pull request
Create new file
Upload files
tomschenkjr Merge pull request #8 from Chicago/dev
docs Tweaking format of submission table
theme/material Initial commit
.gitignore Initial commit
Gemfile Initial commit
README.md Initial commit
mkdocs.yml adding fields, making corrections, fixing more dates; updating specif...
README.md
"Lead Safe" API Documentation
Building and Testing
The documentation is compiled with MkDocs and is required while testing.
Local Testing
Test changes to the documentation by opening a terminal and run
mkdocs serve


This repository
Search
Pull requests
Issues
Marketplace
Explore
Chicago / lead-model
forked from potash/lead-model
Unwatch 6
Unstar 1
Fork 1
Code
Issues 2
Pull requests 0
Projects 0
Wiki
Insights
No description, website, or topics provided.
249 commits
2 branches
0 releases
3 contributors
Branch: master
New pull request
Create new file
Upload files
Find file
Clone or download
This branch is even with potash:master.
Pull request
Compare
potash Update README.md
Latest commit 4c6b68c on Sep 21
lead bugfix: cast N_JOBS to int 2 months ago
.gitignore fix ignore generated scripts 5 months ago
LICENSE Address data (#1) 4 months ago
README.md Update README.md 2 months ago
kdd.pdf update README.md 2 years ago
requirements.txt make sklearn install not editable 2 months ago
README.md
Preventing Childhood Lead Poisoning
Introduction
Lead poisoning is a major public health problem that affects hundreds of thousands of children in the United States every year. A common approach to identifying lead hazards is to test all children for elevated blood lead levels and then investigate and remediate the homes of children with elevated tests. This can prevent exposure to lead of future residents, but only after a child has been irreversibly poisoned. In parternship with the Chicago Department of Public Health (CDPH), we have built a

Predictive Modeling for Public Health: Preventing Childhood Lead Poisoning

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ABSTRACT

Lead poisoning is a major public health problem that affects hundreds of thousands of children in the United States every year. A common approach to identifying lead hazards is to test all children for elevated blood lead levels and then investigate and remediate the homes of children with elevated tests. This can prevent exposure to lead of future residents, but only after a child has been poisoned. This paper describes joint work with the Chicago Department of Public Health (CDPH) in which we build a model that predicts the risk of a child to being poisoned so that an intervention can take place *before* that happens. Using two decades of blood lead level tests, home lead inspections, property value assessments, and census data, our model allows inspectors to prioritize houses on an intractably long list of potential hazards and identify children who are at the highest risk. This work has been described by CDPH as pioneering in the use of machine learning and predictive analytics in public health and has the potential to have a significant impact on both health and economic outcomes for communities across the US.

Categories and Subject Descriptors

J.3 [**Life and Medical Sciences**]: Health; K.4.1 [**Public Policy Issues**]: Human Safety

KDD '15, August 11-14, 2015, Sydney, NSW, Australia

DOI: http://dx.doi.org/10.1145/2783258.2788629

General Terms

Machine Learning, Social Good, Lead Poisoning, Public Health, Public Policy

1. INTRODUCTION

Lead poisoning is a major public health issue, imposing lifelong health and economic costs on hundreds of thousands of children every year in the United States. Although European states banned lead paint as early as 1909 [19], political forces and vested business interests delayed bans on leaded consumer products in the United States until the late 1970s [21]. Throughout most of the 20th century, cars ran on leaded gas, houses were coated with leaded paint, and industry emitted leaded waste products directly into the environment. To this day, lead in paint remains a significant hazard. In Chicago, almost 90% of the housing stock was built before the ban [13].

Exposure to lead has been found to be associated with premature birth and early neurological development issues such as edema, herniation, atrophy, and white-matter degeneration [12, 10]. Lead can cause vomiting; convulsions; paralysis; and, in high concentrations, death [14]. Elevated blood lead levels are associated with lower IQs in children. A retrospective study by Mazumdar *et al* [20] shows that, on average, a 1 μg/dL increase in blood-lead level is associated with a decrease of 1 IQ point among six-month-olds and 2 IQ points among 10 year olds.

Because of the permanent damage it can inflict, lead poisoning imposes significant indirect costs on society. Based on its well-documented effects on IQ and contributions to neuropsychiatric disorders such as ADHD, lead poisoning has been estimated to significantly lower lifetime earnings for individuals and greatly increase the costs of crime prevention and special-education programs for the government. Lead-related child health issues conservatively cost over $40 billion annually [18]. Completely eliminating lead in the United States could indirectly save $200 billion dollars per year [22], ten times more than needed for removal.

HEALTH DATAPALOOZA

2017 Milbank Memorial Fund and AcademyHealth State & Local Innovation Award

Childhood Lead Paint Hazard Data Sharing

SMART 50 AWARDS

2018 Smart Project in Digital Transformation

Lead Safe API

LEAD PAINT HAZARDS
BEHAVIORAL SCIENCE

Reminder Letter

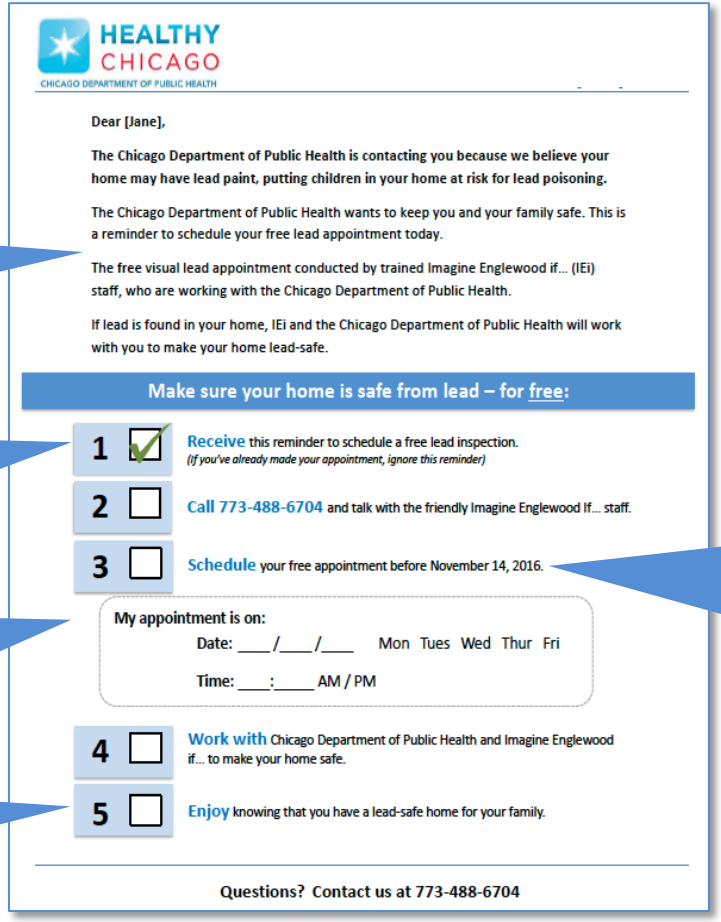
Test whether reminder is effective in getting people to schedule an appointment.

Explain briefly why they are getting this reminder.

First box checked to encourage inertia to completing the task.

Make it easy for people to write the appointment time down.

Reminder that the goal is safety for family.



HEALTHY CHICAGO
CHICAGO DEPARTMENT OF PUBLIC HEALTH

Dear [Jane],

The Chicago Department of Public Health is contacting you because we believe your home may have lead paint, putting children in your home at risk for lead poisoning.

The Chicago Department of Public Health wants to keep you and your family safe. This is a reminder to schedule your free lead appointment today.

The free visual lead appointment conducted by trained Imagine Englewood if... (IEi) staff, who are working with the Chicago Department of Public Health.

If lead is found in your home, IEi and the Chicago Department of Public Health will work with you to make your home lead-safe.

Make sure your home is safe from lead – for free:

1 ☑ **Receive** this reminder to schedule a free lead inspection.
(If you've already made your appointment, ignore this reminder)

2 ☐ **Call 773-488-6704** and talk with the friendly Imagine Englewood If... staff.

3 ☐ **Schedule** your free appointment before November 14, 2016.

My appointment is on:
Date: ___/___/___ Mon Tues Wed Thur Fri
Time: ___:___ AM / PM

4 ☐ **Work with** Chicago Department of Public Health and Imagine Englewood if... to make your home safe.

5 ☐ **Enjoy** knowing that you have a lead-safe home for your family.

Questions? Contact us at 773-488-6704

Provide deadline to schedule appointment within a week, not leave it open- ended.

PREDICTIVE HEAT & VULNERABLE POPULATIONS

PREDICTIVE ANALYTICS

People & Organizations
Missions & Projects
Publications
Today's Science
Highlights
Calendar
Awards
FAQ
Research Opportunities
Goddard Applied Sciences
NASA Food Security
Comment Form

Quick Links

NASA Earth
NASA Earth Twitter
NASA Earth Facebook
NASA Earth Observer
NASA Worldview
NSPIRES Research Opportunities
NASA Science Learners
Student Opportunities
Goddard Employee Orientation
Arctic-Boreal Workshop 2012

GODDARD APPLIED SCIENCES

Upcoming Events

6.17.19 @ 3pm *B33:H114*	Goddard Applied Sciences Seminar **Using satellite remote sensing for the prediction and forecasting of Vibrio parahaemolyticus in the Chesapeake Bay** *Nicole Deluca, Johns Hopkins University - Department of Earth and Planetary Sciences*
6.18.19 @ 2pm *B33:E108*	**Climate Applications Group Meeting**
6.25.19 @ 9-5pm *Washington, DC*	**NASA Harvest Outreach Day** - *Holiday Inn Washington Capital*
7.2.19 @ 11am *B28:W111*	**Chesapeake Bay Group Meeting**
7.3.19 @ 1pm *B33:A128*	**Mission Applications Group Meeting**

Overview

Goddard Applied Sciences connects NASA researchers with end users, supports interagency activities, and develops external partnerships to facilitate practical and innovative uses of Earth observations for societal benefit.

Groups

- Air Quality & Health
- Chesapeake Bay
- Climate Applications
- Disasters
- Food Security
- Mission Applications

Applied Sciences Resources

Seminar Series

- Goddard Applied Sciences

Partnerships

- NASA-Rio de Janeiro
  English | *português*

Additional Resources

Contacts

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Applied Sciences Coordinator:
Brendan McAndrew

Communications:
Jamie Dulaney

Urban Environmental Data Dashboard

Pilot project focused on enhancing urban planning and emergency response to extreme heat, with local stakeholders including the Chicago Department of Public Health, the Office of Emergency Communications and ComEd.

Urban Environmental Data Dashboard tool will provide city with historic and real-time weather and climate information from ground observations, local sensor deployments, MODIS and Landsat datasets, and model-based products such as NASA's MERRA-2 reanalysis.

Landsat image of the Chicago area.

DEVELOPING ACTION 43 | Conduct the Urban Heat Response Pilot Project

FLAGSHIP

OWNER
City Tech Collaborative

PARTNERS
Microsoft, NASA, National Oceanic Atmospheric Administration (NOAA), ComEd, University of Illinois Urbana-Champaign (UIUC), Mayor's Office, OEMC, CDPH, DPD, DFSS, MOPD

TIMELINE
1-5 years

LINK TO VISION

- Government connected to residents
- City government connected and collaborating
- Regional government connected and working together

DESCRIPTION
Exposure to dangerously high temperatures is a significant public health risk that is increasing with climate change. Recent research revealed that the frequency, duration, and intensity of heat waves in 50 large U.S. cities rose significantly from 1961 to 2010, and today, extreme heat events are responsible for more annual fatalities in the U.S. than any other form of extreme weather.

The Midwest heat waves of 1995 and 1999 together claimed more than 1,300 lives, with an estimated 739 in Chicago alone.

During past extreme heat events, Chicago's ability to respond has been hindered by its lack of available data. Present day challenges persist due to gaps in data, isolated datasets, and other issues surrounding data accessibility. The Urban Heat Response pilot project will bring together a broad coalition of stakeholders to explore data-based approaches to mitigate the negative impacts of extreme heat events. The pilot will inform and improve decisions on near-term planning as well as long-term planning regarding infrastructure and resilience investments.

Phase 1 of the pilot will focus on use case definition, data gathering, and value definition to generate a detailed framework for implementation. For example, this could focus on quantifying the impacts of specific investments in green roofing on the reduction of urban heat island effects. Phase 2 of the pilot will commit to building a minimum viable product necessary to drive decision-making regarding future extreme heat episodes. For instance, this could entail generating a clear rationale for the prioritization of additional green roofing or other investments to ensure risk is sufficiently mitigated in the most heat-vulnerable communities.

NEXT STEP
Convene stakeholders to finalize Phase 1 and establish the use case scenario for the pilot. ■

POTENTIAL KEY INDICATORS

① Reduction in urban heat island effects from specific investments, e.g. in green roofing

② Number of wellness checks related to heat risks

③ Number of heat-related illnesses or other incidents reported

EQUITY IMPACTS

The Urban Heat Response pilot will benefit heat-vulnerable populations, e.g. senior residents, youth, outside workers, people with disabilities, and those with chronic medical conditions.

AIR QUALITY
ChicagoHealthAtlas.org
DATA VISUALIZATION
SPATIAL ANALYSIS


Partnership for Healthy Cities
Bloomberg Philanthropies
Vital Strategies
THE CENTER FOR SPATIAL DATA SCIENCE
THE UNIVERSITY OF CHICAGO
HEALTHY CHICAGO
CHICAGO DEPARTMENT OF PUBLIC HEALTH
CityTech Collaborative

Objective

Develop and implement *replicable and sustainable* baseline air quality and weather.

- **Open Data:** NASA satellites, US EPA sensors, USGS, NOAA, and Neighborhood indicators of air pollution sources (e.g. traffic, buildings, industrial facilities, etc.)
- **Impact:** Creating a first-of-its-kind system to collect, analyze, and disseminate air pollution information, the City and other stakeholders, like community based organizations, can be better informed to develop strategies and interventions to improve air quality together.

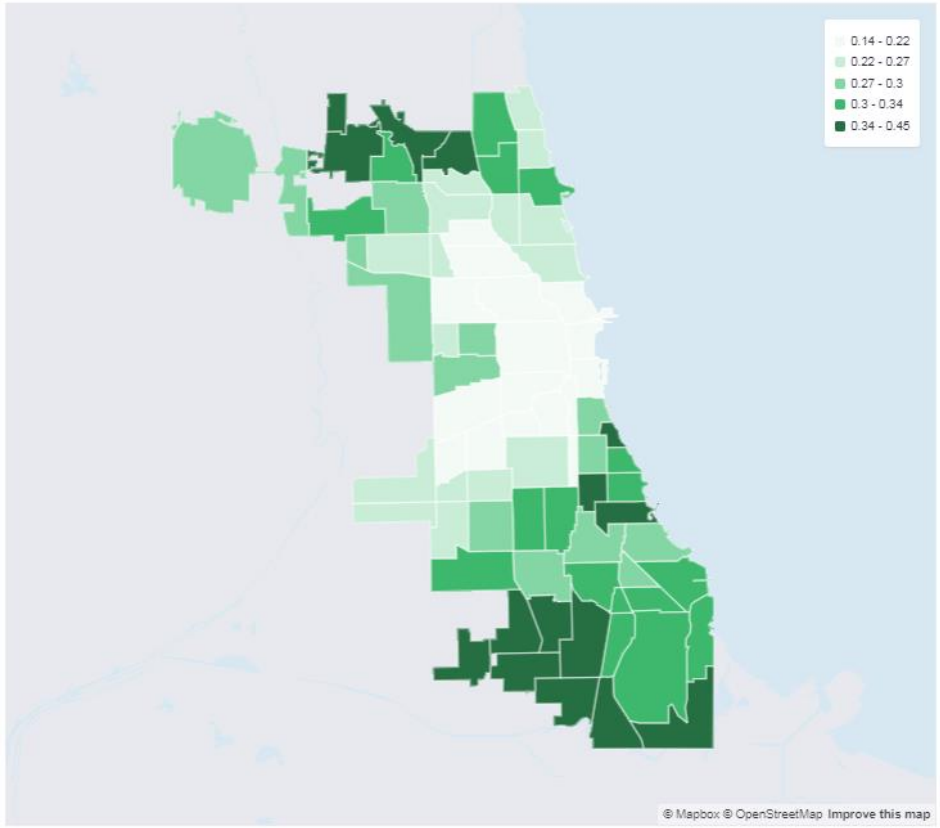
Vegetation Index

VEGETATION INDEX (NDVI) FROM SATELLITE IMAGES

SUMMARY | DISPARITIES | TRENDS OVER TIME | MAP

Year

2017



Public Health Innovation Award, National Network of Public Health Institutes

Chicago Department of Public Health (CDPH)

Thank You!