Big Cities, Big Data, Big Lessons!

Leveraging Multi-Sector Data in Public Health to Address Social Determinants of Health

December 13, 2017
DASH, a national program of the Robert Wood Johnson Foundation, was launched to align health care, public health, and other sectors to compile, share, and use data to address social determinants of health.

DASH awarded 10 grants totaling $2 million to support projects that improve community health through multi-sector data sharing collaborations.

DASH is a founding partner for a national peer learning network, All In: Data for Community Health, which includes representatives from over 60 community projects from around the country.
10 DASH grantees

- Public Health - Seattle & King County
- White Earth Reservation Tribal Council
- Lutheran Social Service of Minnesota
- Chicago Dept. of Public Health
- HealthInfoNet
- Center for Health Care Services
- Parkland Center for Clinical Innovation
- Allegheny County Health Dept.
- Baltimore City Health Dept.
- NYC Dept. of Mental Health and Hygiene
60 All In Communities
Core components of DASH and *All In*

**Collaborative Partners**

**Multi-sector Approach**

**Data and Information Sharing**

**Outcomes:**
- Increased local capacity to drive community health improvement
Speakers

Karen Hacker, MD, MPH, Director, Allegheny County Health Department

Carrie Hoff, Deputy Director, Health & Human Services Agency, San Diego County

Kevin Konty, MS, Director, Research and Analytics, NYC Department of Health and Mental Hygiene

Karen Hacker, MD, MPH, Director, Allegheny County Health Department

Amy Laurent, MSPH, Epidemiologist III, Public Health, Seattle & King County

Darcy Phelan-Emrick, DrPH, Chief Epidemiologist, Baltimore City Health Department
Neighborhood Tabulation Areas: Enhancing population health improvement capacity in NYC through shared information at the small area level

Kevin Konty
New York City Department of Health and Mental Hygiene

Big Cities, Big Data, Big Lessons!
DASH-APHA Webinar
December 13th, 2017
Neighborhood Tabulation Area Project

**Objective:** to work with partners to bring together health and social determinants of health data at the neighborhood-level using a new geographic scale, the Neighborhood Tabulation Area (or NTA).

NTAs
Count = 188
Median Population = 36,600
Partners

**City Agencies**
- New York City Department of Health and Mental Hygiene (DOHMH)
- Department of City Planning (DCP)
- Center for Innovation through Data Intelligence (CIDI)
- Department of Correction (DOC)
- Department for the Aging (DFTA)
- Department of Social Services (DSS)
  - Department of Homeless Services (DHS)
  - Human Resources Administration (HRA)

**Organizations**
- The New York Academy of Medicine (NYAM)
- United Hospital Fund of New York (UHF)
- The Fund for Public Health in New York City (FPHNYC)
NTA Project Motivation

- Increased focus on Social Determinants of Health (SDOH)
- Health data often lack SDOH information
- Necessity of linking health with census and other data at census geography
- Optimal census geography for neighborhood health?

Source: https://www.healthypeople.gov/2020/topics-objectives/topic/social-determinants-of-health
Neighborhood Defined as Community District (CD)

- 59 CDs in NYC
- Benefits of CD:
  - Critical geography for community planning and decision making
  - Each CD approximates a Public Use Microdata Area (PUMA): readily available census data
  - Example: Community Health Profiles 2015
- Limitation of CD: median population of 140,000 may mask potential heterogeneity
Neighborhood Tabulation Area (NTA)

- Statistical area created by Department of City Planning
- NTA is aggregation of census tracts within the same PUMA
- “Minimum” population of 15,000
- A useful geography for assessing and analyzing neighborhood health

NTAs
Count = 188
Median Population = 36,600
Desirable Properties of Geography for Neighborhood Health Assessment and Analysis

- Granularity
- Reliability
- Correspondence to neighborhood boundaries
- Spatial congruity
- Temporal consistency
- Compared with other geographies with available census data (CD, census tract, ZIP Code), NTAs generally represent the best tradeoff among these desirable attributes
NTA is more granular than CD (PUMA)

Premature Mortality Rates by Community District (CD) in New York City, 2009-2013

Premature Mortality (CD)
Age adjusted rate per 100,000 (quantiles)
- 75 - 121
- 122 - 148
- 149 - 200
- 201 - 265
- 266 - 365
- Parks, Cemeteries, Airports

Premature Mortality Rates by Neighborhood Tabulation Area (NTA) in New York City, 2009-2013

Premature Mortality (NTA)
Age adjusted rate per 100,000
- <121
- 122 - 148
- 149 - 200
- 201 - 265
- 266+
- Parks, Cemeteries, Airports
- Community District boundary (provided for comparison)

NYC Planning Population Estimates Adapted from the American Community Survey 2009-2013.
NTA is more granular than CD (PUMA)

Premature Mortality Rates by Community District (CD) in New York City, 2009-2013

Premature Mortality (CD)
Age adjusted rate per 100,000 (quantiles)
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Premature Mortality Rates by Neighborhood Tabulation Area (NTA) in New York City, 2009-2013

Premature Mortality (NTA)
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- 266+

Age-adjusted Premature Mortality Rate in CD 313 (Brighton Beach & Coney Island)

CD 313 = 218 per 100,000
NTA estimates are more reliable than CT estimates
Unlike zip codes, NTAs correspond to historical neighborhood boundaries.

NTAs have identifiable neighborhood names.
Data Sources

- American Community Survey
- NYC Department of Health and Mental Hygiene
  - Vital Statistics
  - Disease Control
  - Environmental Health
  - A1C Registry
- Other city agencies
  - Administration for Children’s Services
  - Department of Social Services
    - Human Resources Administration
    - Department of Homeless Services
  - Department for the Aging
  - Department of Correction
  - Department of Education (YC FITNESSGRAM)
- ED/hospitalizations claims database
  - Statewide Planning and Research Cooperative System (SPARCS)
- NYC Medicaid data
- Health Data NY
- NYC Open Data

- 100+ indicators have been created and linked using the above data to assess social determinants of health
Key Project Activities

• Inclusion of 100+ indicators
• Automated geocoding routine
• DOHMH NTA population estimates
• Data Dissemination
• Development of use cases
Data Uses

• Identify health concerns and disparities at the neighborhood scale
  o Targeting, surveillance, evaluation
  o Pockets of high burden areas outside of Neighborhood Health Action Center neighborhoods

• Uncover social determinants of health in communities
  o Premature mortality and jail incarceration
  o Legionnaires’ disease and cooling tower density

• Emergency Preparedness

• Help drive community prevention planning and investments
  o TCNY Neighborhood Health Initiative investments
  o IMAGE-NYC (interactive map of aging in NYC)
  o UHF Medicaid Institute report(s)
Potential Uses

• Long-term cross-agency surveillance and reporting
  o Expansion to other agencies
  o Systemization of initial efforts

• Hierarchical/multi-level modeling efforts
  o Neighborhood context

• Ecological cost exercises

• Long term planning
  o NTAs were constructed for long term population projections

• Increased cooperation/coordination
  o Between agencies
  o With Community-Based Organizations
  o With the public
Conclusions

• NTAs represent a useful geography to organize NYC data to examine and promote neighborhood health

• Issues with incorporating survey data such as Community Health Survey represent potential limitation
Acknowledgements

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• The project was led by Tsu-Yu Tsao and the Office of Policy Planning and Strategic Data Use

• Special thanks to the Department of City Planning and the Center for Innovation through Data Intelligence who played (and will play) key roles in the success of the project.

• Please contact Tsu-Yu Tsao with questions and suggestions: ttsao@health.nyc.gov
  or me konty@health.nyc.gov
Thank You
Allegheny County Data Sharing Alliance for Health (ACDSAH)

Public health, Human services, Economic development, Health care and Transportation

**Vision**: a connected data warehouse that provides multi-source data for cross sector decision making to impact the health of the 130 municipalities and 1.2 million residents in Allegheny County.
Percent Below Poverty Level 2012

Source: US Census Bureau

Population (2013): 1,231,527
Stakeholders/Partners

- Intergovernmental Human Services, Economic Development, CountyStat
- Managed Care Organizations UPMC, Gateway, Highmark
- Advisory Coalition for ACHD
- Local organizations Jewish Healthcare Foundation, Traffic 21, RAND, University center for social and urban research, Public Health Dynamics Laboratory, American Heart Association, American Diabetes Association
Allegheny County Data Sharing Alliance for Health (ACDSAH)

GOALS:

• To merge existing cross-sector data sets for decision making

• To understand the risk of cardiovascular mortality across Allegheny County

• To integrate data into a single accurate model (FRED) to assess impact of social determinants
Allegheny County DASH Coverage

DASH Denominator / Insured Population

DASH coverage
- 9% - 15%
- 16% - 30%
- 31% - 50%
- 51% - 60%
- 61% - 100%
Cardiovascular Disease Deaths
Age Adjusted Rates & Vacant Properties

CVD Deaths
Age Adjusted Rate
- 0.0 - 211.7
- 211.8 - 287.9
- 288.0 - 365.6
- 365.7 - 481.9
- 462.0 - 656.1
- 658.2 - 1015.3

Percent of Vacant Properties
- 0.08740 - 0.1411
- 0.1412 - 0.2246
**Framework for Reconstructing Epidemiologic Dynamics**

**FRED** is an open-source, agent-based modeling platform developed by the Public Health Dynamics Laboratory at University of Pittsburgh Graduate School of Public Health

Controlling for “expected” risk

Predicted Risk  -  Actual Mortality  =  Expected-Observed

Lower than expected deaths
Higher than expected deaths

“difference” – larger negative numbers are worse
Difference Between Observed and Expected Risk by Census Tract

Modeled CVD Mortality Risk With 40% Reduction in all SDOH

Food Stamps
Obesity
Percent of housing in poor condition
Percent vacant housing
Diabetes
Hypertension
Diabetes and hypertension
Top Lessons Learned

• Data on the direct impact of social determinants on CVD is lacking

• Getting all major insurers involved is critical for coverage

• It is difficult to get agreement on a single intervention-so allow for independence
Next Steps

• Strategize with partners possible interventions
• Refocus on another outcome-asthma, opioid overdoses
• Continue to refine FRED
• Sustain data
Baltimore Falls Reduction Initiative Engaging Neighborhoods and Data (B’FRIEND)

Darcy Phelan-Emrick, DrPH, MHS

December 13, 2017

First presented at APHA Session 3157.0 on November 6, 2017

Leana Wen, M.D., M.Sc.
Commissioner of Health, Baltimore City

Catherine E. Pugh
Mayor, Baltimore City
Presenter Disclosures

Darcy Phelan-Emrick

The following personal financial relationships with commercial interests relevant to this presentation existed during the past 12 months:

No relationships to disclose
Background

In 2015, over 3 million older adults were treated for falls in emergency departments (EDs) in the US\textsuperscript{1}

Effective falls prevention includes exercise, home modification, vision screening, etc.

Health information exchanges (HIEs) can be leveraged for public health use cases, including surveillance\textsuperscript{2}

\textsuperscript{1} WISQARS, 2015, non-fatal injury query for unintentional falls among 65+ years, NEISS All Injury Program, accessed 10/30/2017;
\textsuperscript{2} PMC3052326
Sectors Involved

- Maryland’s HIE, CRISP (Chesapeake Regional Information System for Our Patients)
- Baltimore City Housing
- Baltimore City 311 System (citizen requests for service)
- Social service providers
- Hospitals
- Academic institutions
B’FRIEND Goal

B’FRIEND is a collaboration between the Baltimore City Health Department, CRISP, and many partners

Funding for infrastructure provided by RWJF DASH (ID 73348)

Goal: To decrease the rate of falls leading to an ED visit or hospitalization among older adults (65+ years) by one-third in three years in Baltimore City, Maryland
Methods

Surveillance population: Older adult residents (65+ years) of Baltimore City

Timeframe: October 2015 – Present

Data source: Maryland Health Services Cost Review Commission (ED and hospitalization case-mix data with CRISP unique identifier)

Outcome: Falls-related ED visits and hospitalizations identified by ICD codes

3 Consensus Recommendations For Surveillance of Falls and Fall-Related Injuries, Injury Surveillance Workgroup on Falls (ISW4), 2006
ZIP code 21211
Number of falls-related ED visits and hospitalizations among older adults by month, Oct 2015 – Aug 2017

Data source: Maryland HSCRC Inpatient and Outpatient Case Mix Data with CRISP EID since October 2015
ZIP code 21211
Percent sex and percent race of falls-related ED visits and hospitalizations among older adults, Oct 2015 – Aug 2017

Sex
- 31% Female
- 69% Male

Race
- 82% White
- 17% Black
- 1% Other

Data source: Maryland HSCRC Inpatient and Outpatient Case Mix Data with CRISP EID since October 2015
ZIP code 21211
Number of falls-related ED visits and hospitalizations among older adults by age group, Oct 2015 – Aug 2017

Data source: Maryland HSCRC Inpatient and Outpatient Case Mix Data with CRISP EID since October 2015
ZIP code 21211
Percent for number of visits per patient for falls-related ED visits and hospitalizations among older adults, Oct 2015 – Aug 2017

Number of falls-related ED visits and hospitalizations per patient

1
2
3
4+

Data source: Maryland HSCRC Inpatient and Outpatient Case Mix Data with CRISP EID since October 2015
Lessons Learned

Working across sectors can be more difficult than one expects

Local government bureaucracy and politics present notable challenges to innovation

Contracting
Changes in elected/appointed leaders
Legal agreements

Local and meaningful data excite partners and create momentum for real change!
Next Steps

Continue using B’FRIEND for surveillance and targeting falls prevention activities

Incorporate additional data from sources such as EMS calls for service, transportation, older adult home visiting programs, weather, etc.

Conduct further epidemiologic and geospatial analyses (“hot spots”)
King County Data Across Sectors for Housing and Health

Amy Laurent, Epidemiologist
Life expectancy in King County by census tract varies by 24 years.

75% of adults who live in public housing also receive Medicaid.
Public Health
Seattle & King County

Partners

- Seattle Housing Authority
- King County Housing Authority
- Washington State Health Care Authority
To help public housing authorities have a better understanding of the health conditions of their population; enable program and policy development and evaluation

- Task 1: Link Medicaid claims data with PHA resident data
  - Medicaid claims hold the information from a medical encounter with a provider (doctor, hospital, procedure, prescription)
  - PHA resident data from the Moving To Work (MTW) 50058 form

- Task 2: Provide PHAs a de-identified dataset and visualizations with coded health conditions for enhanced in-house ability for assessment and evaluation

- Task 3: Sustain this process for regular exchange

Allows PHAs to take a deeper dive into the data and start to answer questions that previous static linkages have raised.
**Short term**

- PHAs gain understanding about health
- PH gains understanding about housing
- Integrated system for regular and routine linkage
- Health status of PHA resident report
- Participation in King County Accountable Community of Health

**Intermediate**

- Increase datasets being linked
- Use for program planning and evaluation
- Share programming across ACHs
- Elucidation of housing-health relationships
- Partnership structure to build on for other cross-sector work

**Long term**

- Decreased health inequities
- Potential for care coordination
- Return on investment
- Triple Aim
Raw KCHA files 2004-2016

Link, append, and reshape

KCHA data¹
35,377 households
94,932 individuals

Align formats, append

PHA data
63,671 households
149,401 individuals
361,037 records

Deduplication, remove those who exited prior to 2012

103,494 individuals
103,494 records

Raw SHA files 2004-2016

Link and append

SHA data¹
38,084 households
85,986 individuals

Inner join on SSN

88,351 individuals
89,289 records

Raw Medicaid files 2012-2016

Restructure to have start and end date

Restrict to most recent data for each individual

Raw Medicaid files 2012-2016

864,843 individuals²
1,150,021 records

88,351 individuals
89,289 records

764,207 individuals²
764,207 records

864,843 individuals
89,289 records

1 Households identified by unique HH SSN Individuals identified by unique combos of SSN and DOB for both PHAs

2 Defined as a unique Medicaid ID and SSN combo
PHA and Medicaid enrollment over time
Maps to identify enrollment opportunities

We can use the combined housing and Medicaid data to identify PHA populations that may be eligible for Medicaid but are not enrolled.
• Data are under review before release

• PHAs serve a Medicaid population with higher rates of
  • Chronic disease
  • Injury
  • Adult asthma

• We see different distributions of disease and opportunities for programming across the PHAs

• Avoidable ED use remains off target

• Rates of prevalence computed using claims fall below the general population measures for many chronic diseases

• There may be room for improvement on enrollment into Medicaid
• Bringing the right data people to the table is essential
• The importance of partnering and discussion can’t be dismissed
  • Housing tends to look at their analysis units at the household level; public health at an individual
  • Large datasets require a lot of clean up and discourse, even when using “standardized” data
  • DSA among the PHAs
• When possible, fund the partner to do to their data work
• Valuable insights from the data
• Opportunities for partners to drill down into their data
• Complexities in working with claims data
• Continued analytics
• Share code for processing the HUD 50058 form
• Non-federally funded low-income housing data
• Identified Medicare data
• Refine code and continue to make publically available via Github
• Revisit the data extract from PHA; perhaps non-50058 information may be helpful for data accuracy
• Project funded by RWJF
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• Washington State Health Care Authority
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Questions?

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Keep in Touch and Join the Network

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- Follow @DASH_connect on Twitter

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Upcoming Webinars: dashconnect.org/calendar