Using Data to Frame Health, Environmental Justice, and Transportation Equity Issues

Or: What we talk about when we talk about health, environmental justice and transportation equity
Agenda

• Framing examples
  – Strategic plan
  – Health
  – Transportation
  – Environmental Justice
• What and how we measure
• Opportunities: reframing and including all voices
How did we reflect these in the Hartford Foundation 2016 – 18 Strategic Plan?

OUR VISION

All residents in the Greater Hartford region have equitable opportunity to thrive and contribute to the well-being of our region, achieved and sustained by shared commitment and partnership among the Foundation, donors, the nonprofit, private and public sectors, faith leaders and residents in our region.
Transportation and opportunity

“Connecting people to opportunity - to essential services and providing lifelines for people - is the business that transportation should be in - and we are in”  – James P. Redeker, Commissioner of the Connecticut Department of Transportation, Progress Points forum on housing and transportation
How do people connect to opportunity now?

Jobs draw people in and out of Hartford

The population of Hartford doubles each workday, as commuters travel from all over the region to jobs in the city—which tend to be concentrated in highly skilled professions such as insurance and finance. 82 percent of the region’s workers commute within the region.

Other top destinations for commuters include:

2 | East Hartford
3 | Manchester
4 | Windsor
5 | West Hartford

Source: U.S. Census Bureau, 2011

81% of all Metro Hartford workers commute alone by car
83% of the 121,000 jobs in Hartford are filled by commuters
65% of Hartford residents with jobs are employed outside of Hartford
75% of Hartford workers who commute outside of Hartford make less than $40K

Source: U.S. Census Bureau, 2011
What would it take to reduce unemployment by 1% in this zipcode?

06120 zip code (North End of Hartford)

228 people live AND work in 06120 zipcode
3.6K – live in 06120 zipcode, work outside
8.3K – work in 06120, live outside

2013 5-year Census estimates:
31.9% unemployment in 06120

(Sept. ‘15 figures for:
State: 5.1%;
Hartford: 9.6%)

2,900 people unemployed

Source: U.S. Census Bureau ‘On the Map’ and American Community Survey
Environmental justice

Source: WNPR
Health + transportation + environmental justice

The particles people breathe include a variety of metals and chemicals, depending on their source. For instance, people living near refineries are exposed to more nickel and vanadium, while those near coal-fired power plants breathe particles with higher sulfate content. Neighborhoods along busy roads have more nitrates from vehicle exhaust.

One such community is Boyle Heights, in East Los Angeles. It is more than 90 percent Hispanic and one of the poorest parts of the city.

Boyle Heights is “surrounded by freeways,” said Susan Nakamura, planning manager for the region’s South Coast Air Quality Management District, “and a lot of those freeways are used for shipping commercial goods.” Four major rail yards emit diesel exhaust nearby, and the area is home to “multiple auto body shops and chrome-platers in close proximity to neighborhoods,” she said. She is especially concerned about the particulate sources near schools.

“Unequal exposures: People in poor, non-white neighborhoods breathe more hazardous particles,” Environmental Health News

“When the country’s urban freeways were constructed, they were often routed through low income, minority neighborhoods. Instead of connecting us to each other, Foxx says many of these highways were intentionally built to separate us.” – Diane Rehm show, 3/31/16
What and how we measure
5.1 Accessibility Equations

The cumulative opportunity measure of accessibility $a_t$ estimates the number of destinations that can be reached in a given time threshold ($t$) $^3$. Accessibility is calculated as:

$$a_t = \pi \left[ \frac{V_n \cdot t}{C_t} \right]^2 \cdot \rho_{emp}$$  \hspace{1cm} (5.1)

where:

- $\rho_{emp}$ = Urban area employment density ($jobs \cdot km^{-2}$).
- $t$ = time threshold.
- $V_n$ = Average network velocity in $km \cdot h^{-1}$
- $C_t$ = Average circuitry of trips in time threshold (ex: 20-min threshold measures circuitry of trips 0-20min).

Accessibility $a_t$ was estimated for each study area using a combination of the above estimated circuitry, the employment density of the urbanized area in (persons/$km^2$), and network speed, but is constrained not to exceed the actual employment of each metropolitan area ($E$):

$$a_c = \min \{a_t, E\}$$  \hspace{1cm} (5.2)

In the weighted average of accessibility, destinations reachable in shorter travel times are given more weight. Here time is differentiated by thresholds to get a series of donuts (e.g., jobs reachable from 0 to 10 minutes, from 10 to 20 minutes, etc.).

$$a_w = \sum_{t} (a_t - a_{t-10}) \cdot e^{-bt}$$  \hspace{1cm} (5.3)

where:

- $b = -0.08$ based on previous work \(^4\), and
- $t - 10$ denotes the next smaller 10-minute time threshold.

Source: “Access Across America: Access to Destinations,” David Levinson, Dept. of Civil Engineering, University of Minnesota
How does the Health Equity Index Work?

The Health Equity Index is based on seven social factors (determinants) that are linked to health status:

- Civic Involvement/Political Access
- Community Safety and Security
- Economic Security
- Education
- Employment
- Environmental Quality
- Housing

Each determinant is comprised of a number of components; within each component are a number of Indicators or measures that have been identified, and when combined, form the core index. A methodology is employed to standardize scoring among the determinants and to adjust for the varying number of Indicators for each Determinant.

Based on the data collected, a reference is determined (statewide mean and median) and a ten point measurement scale developed. Each neighborhood receives a score for each Indicator, Component, Determinant, and an overall Index Score. These scores are then tested for significance and strength of correlation with demographic variables and health status/outcomes, all also measured at the neighborhood level. Health outcomes such as incidence/prevalence of illness, disease and injury, mortality, and years of potential life lost are examined. Each indicator has an explicit definition, reference, data source, and rationale.
Environmental health index for Hartford region
Environmental health index methodology

8. Environmental Health Index

Summary

The environmental health index summarizes potential exposure to harmful toxins at a neighborhood level. The index is a linear combination of standardized EPA estimates of air quality carcinogenic (c), respiratory (r) and neurological (n) hazards with i indexing census tracts.

\[ EnvHealth_i = \left( \frac{c_i - \mu_c}{\sigma_c} \right) + \left( \frac{r_i - \mu_r}{\sigma_r} \right) + \left( \frac{n_i - \mu_n}{\sigma_n} \right) * -1 \]

Where means (\(\mu_c, \mu_r, \mu_n\)) and standard errors (\(\sigma_c, \sigma_r, \sigma_n\)) are estimated over the national distribution.

Interpretation

Values are inverted and then percentile ranked nationally. Values range from 0 to 100. The higher the index value, the less exposure to toxins harmful to human health. Therefore, the higher the value, the better the environmental quality of a neighborhood, where a neighborhood is a census block-group.

Data Source: National Air Toxics Assessment (NATA) data, 2005
Related Template Tables/Maps: Table 12; Map 14
References:
http://www.epa.gov/ttn/atw/natamain/
“Composite indicators can send misleading policy messages if they are poorly constructed or misinterpreted. Their ‘big picture’ results may invite users (especially policy-makers) to draw simplistic analytical or policy conclusions. In fact, **composite indicators must be seen as a means of initiating discussion and stimulating public interest. Their relevance should be gauged with respect to constituencies affected by the composite index.**”

- OECD Handbook on Constructing Composite Indicators
Opportunities: Reframing transportation, health and environmental equity issues by:

- Engaging and listening to all voices

- Making the connection with Connecticut’s state and municipal fiscal challenges
The main drivers for municipal costs are:

- Unemployment
- Jobs per capita
- Private sector wages
- Population density
- Miles of roads

But these factors often don’t follow municipal boundaries

Where are the opportunities?

We have an imbalance as a region: both high and low opportunity areas coexist. How do we continue to build on our strengths and fully utilize the assets that the region already has? Can we reduce the imbalances in a way that provides access to opportunity for all?

47% of the region’s labor force live in high or very high opportunity neighborhoods.

31% of children under age 5 in our region live in very low opportunity neighborhoods, more than in any other type of community.

53% of people of color in our region live in very low opportunity neighborhoods.

Source: Open Communities Alliance, Connecticut Fair Housing Center, Kirwan Institute.