



**RICHARD M. FAIRBANKS
SCHOOL OF PUBLIC HEALTH**

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Presenters Name: Brian E Dixon

Affiliation: IU Richard M Fairbanks School of Public Health, Regenstrief Institute,
Department of Veterans Affairs

Title: Biases in Using Geospatial-Enabled Electronic Health Records to Measure
Population Health

Organization and Meeting: PHSSR; 2015 Annual PHSSR Keeneland Conference

Date and Location: April 20-22, 2015; Lexington, KY

Background

- Community Health Assessment is a core public health function.
- Assessment enables health departments to measure disease incidence, identify community assets, and evaluate public health policies and programs.
- Assessment requires comprehensive, representative information.
- Traditional methods have relied on the following data sources
 - Public data sets
 - Behavioral surveys
 - Paper-based disease reporting
- Electronic health record (EHR) and health information exchange (HIE) systems present an opportunity to improve community health assessment processes as well as quality

Research Objective

We seek to develop and evaluate neighborhood-level indicators of population health using EHR data integrated with a community information system (CIS).

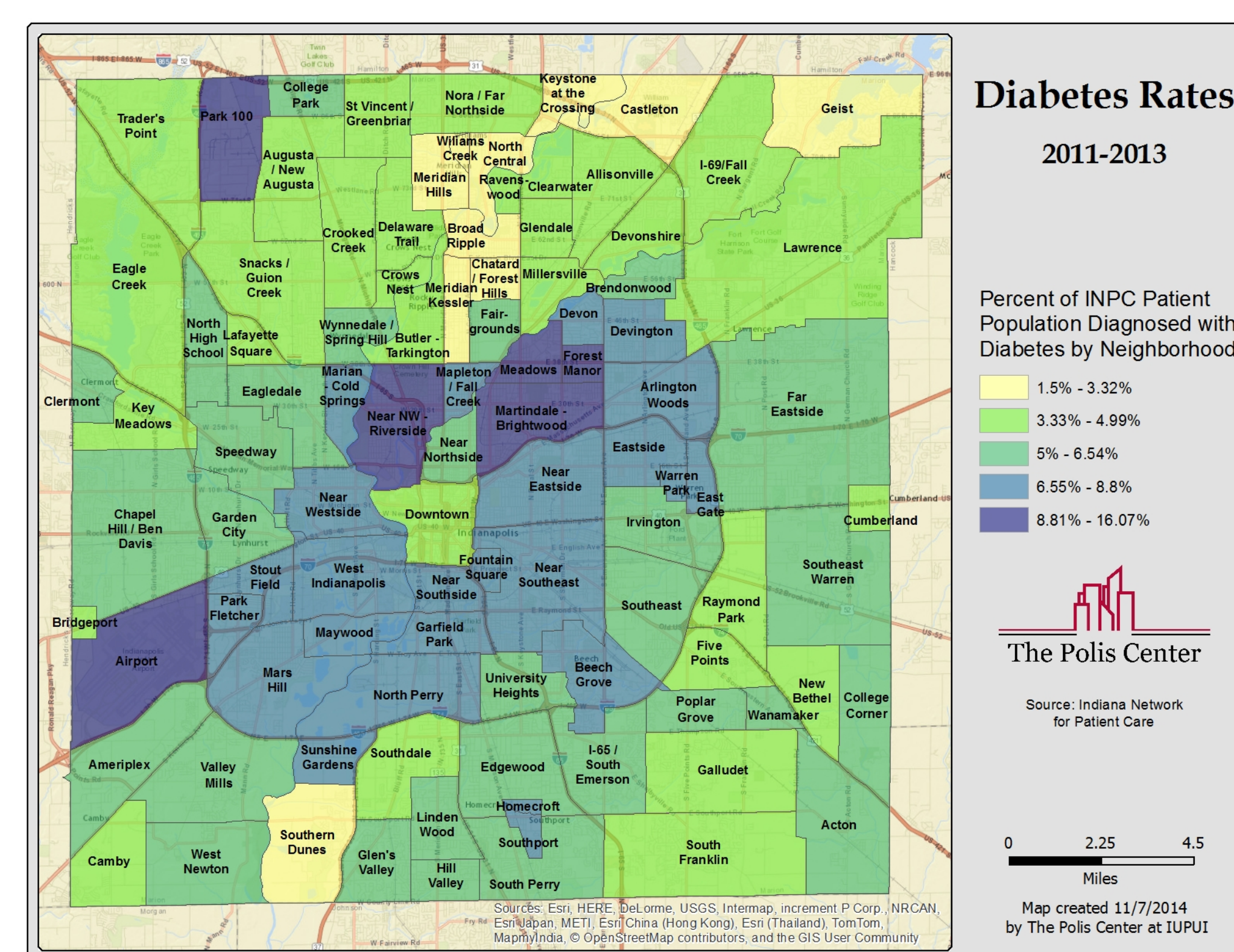
Methods

Records from the Indiana Network for Patient Care (INPC), a large health information exchange with over 5 billion clinical observations, were geocoded and combined with geographic social determinant data from SAVI, a CIS serving Indiana.

Using the linked data, we assessed

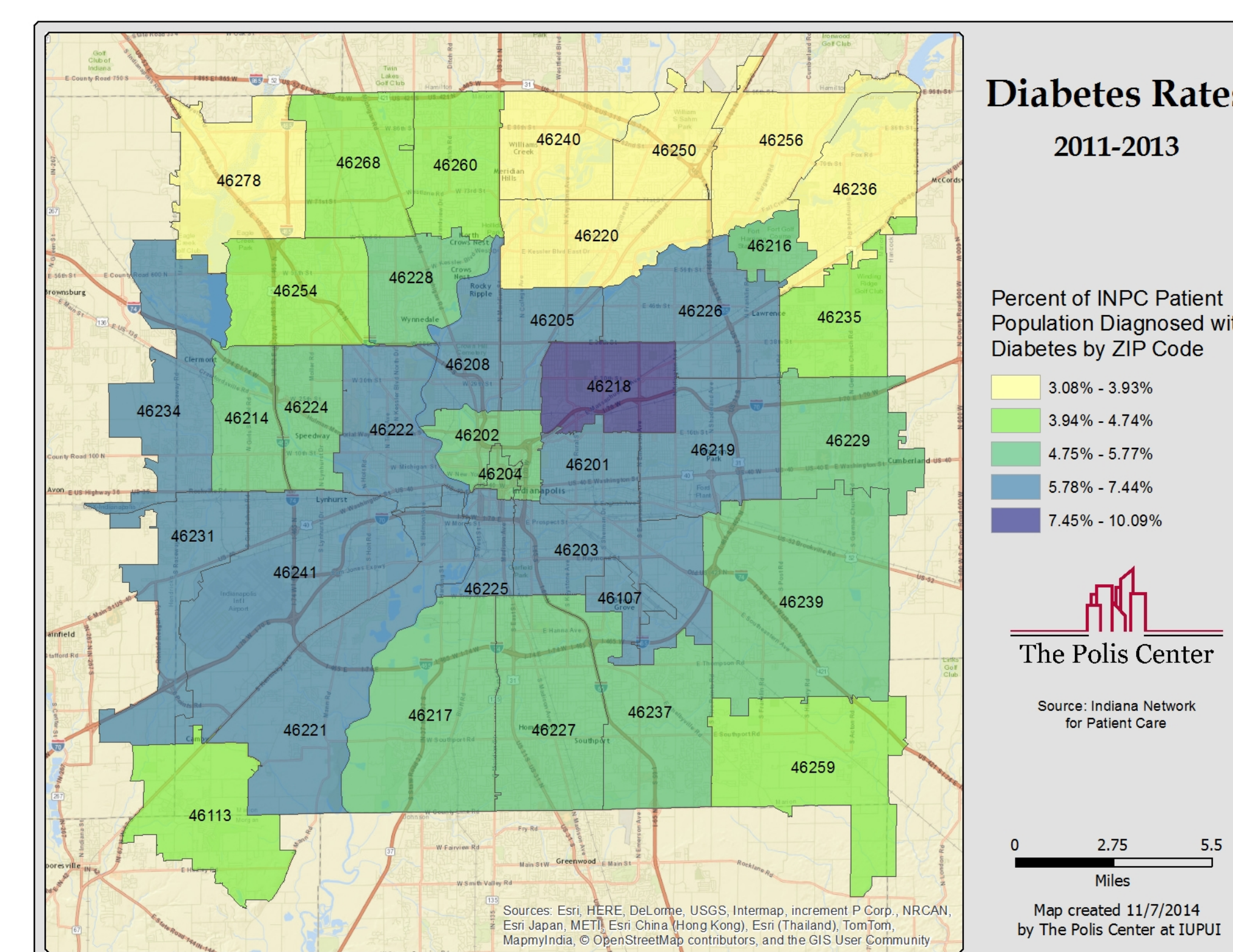
- Prevalence of diseases (e.g., diabetes mellitus type 2); and
- Calculated several HEDIS-like clinical quality indicators (e.g., number of diabetics receiving annual HbA1c testing)

Current Maps



Percent of HIE population diagnosed with diabetes by neighborhood

Percent of HIE population diagnosed with diabetes by ZIP Code



CVD Prevalence

Health Planning Area (HPA)	CVD (N)	Population for HPA	Ratio (%)	HIE 3 Year Count	HIE 3Y Ratio (%)	HIE 5 Year Count	HIE 5Y Ratio (%)
Allisonville Corridor	1413	47466	2.98%	36893	3.83%	41072	3.44%
Central Northside	874	44380	1.97%	34355	2.54%	38022	2.30%
Central Southside	2807	64475	4.35%	59326	4.73%	65905	4.26%
East Center	2267	45385	5.00%	45821	4.95%	52283	4.34%
Greater Beech Grove	2280	51581	4.42%	46413	4.91%	51890	4.39%
Greater Eastside	2535	45888	5.52%	39137	6.48%	43461	5.83%
Inner Pike	804	44871	1.79%	36255	2.22%	41228	1.95%
NE Lawrence	2002	55996	3.58%	44276	4.52%	48739	4.11%
NW-Downtown-SE Center	1845	42861	4.30%	40561	4.55%	47496	3.88%
North Center	2226	35614	6.25%	36343	6.12%	40590	5.48%
North Warren	1829	45571	4.01%	41192	4.44%	46277	3.95%
North Wayne	1525	40036	3.81%	37026	4.12%	42810	3.56%
Outer Pike	857	42649	2.01%	35599	2.41%	40339	2.12%
SW Washington	1019	40449	2.52%	32885	3.10%	37265	2.73%
South Lawrence	1738	46934	3.70%	41359	4.20%	46662	3.72%
Southeast	2493	65933	3.78%	58989	4.23%	64423	3.87%
Southwest	2272	55753	4.08%	49612	4.58%	54966	4.13%
Wayne/Center	1939	43211	4.49%	39476	4.91%	45116	4.30%
West Wayne	1779	44340	4.01%	36380	4.89%	40773	4.36%

Potential Sources of Bias

EHR data appear to have three potential biases:

- EHR data represent the portion of the population which seeks health care services;
- Linked EHR data may be biased based on the algorithm used to match patient records; and
- The completeness of the data in the Indiana HIE varies by hospital/clinical system; for example, proportionally more data are available from low income patients given inclusion of safety net providers and local health department clinics.

Future Directions

We continue to explore ways to adjust rates and correct these biases so they do not overestimate burden of disease and poor care quality in inner-city neighborhoods due mainly to over-representativeness of low-income populations.

We are exploring adjustments based on:

- Race;
- Income;
- Age, especially Medicare population;
- Insurance, especially Medicaid and Medicare;
- Education

Acknowledgements

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