Improving Population Health Outcomes Through Information Exchange

Phillip D. Levy, MD, MPH, FACEP, FAHA, FACC
Professor and Associate Chair for Research
Department of Emergency Medicine
Assistant Vice President for Translational Science and Clinical Research Innovation
Wayne State University
PHOENIX

"THE ANSWER"
(DAVID A. TOBIN, EDWARD GOLTSMAN)

1. MESSAGE MIX
Produced, Arranged & Mixed By
"ED THE RED" GOLTSMAN & NELSON "PARADISE" ROMAN.
Engineered by "NANCY KAY" GOLTSMAN & ED THE RED.
(keyboards by ED THE RED)
© 1993 BOTTOM LINE RECORDS
Population Health Outcomes and Information Exchange
Reducing the Blood Pressure–Related Burden of Cardiovascular Disease: Impact of Achievable Improvements in Blood Pressure Prevention and Control

Shakia T. Hardy, MPH; Laura R. Loehr, MD, PhD; Kenneth R. Butler, PhD; Sujatro Chakladar, MS; Patricia P. Chang, MD, MHS; Aaron R. Folsom, MD, MPH; Gerardo Heiss, MD, PhD; Richard F. MacLehose, PhD; Kunihiro Matsushita, MD, PhD; Christy L. Avery, PhD
### Hypertension Dashboard - Metro-Detroit (Wayne County)

Select a Vital Category to Explore: Systolic Blood Pressure (Mean)

**Tract ID:** 26163518900

- **Number of Patient Records:** 8,493
- **Mean SBP:** 137.22
- **Mean DBP:** 83.01
- **Mean HR:** 86.64
- **Median SBP:** 133.00
- **Median DBP:** 81.00
- **Median HR:** 88.00

**Census Tract Information**
- **Population:** 2,122
- **Housing Units:** 953
- **Occupied Housing Units (Households):** 843
- **Median Age:** 29.30
- **Population Age 65+:** 15.08%
- **Median Household Income:** $33,764
- **Unemployment Rate:** 35.30%
- **Uninsured Population:** 12.40%
- **Life Expectancy at Birth:** 72.10 years
- **Non-White Population:** 96.09%
- **Renter-Occupied Housing Units:** 99.29%
- **Unoccupied Housing Units:** 11.54%
- **ADI National Ranking (median of block groups within tract):** 100.00
- **ADI State Ranking (median of block groups within tract):** 10.000

### Race/Ethnicity Distribution

<table>
<thead>
<tr>
<th>Race/Ethnicity</th>
<th>Number of Records</th>
<th>Mean SBP</th>
<th>Mean DBP</th>
<th>Mean HR</th>
<th>Mean Age</th>
<th>Mean Temp</th>
<th>% of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Black/African American</td>
<td>422,654</td>
<td>135.20</td>
<td>81.98</td>
<td>89.00</td>
<td>42</td>
<td>36.76</td>
<td>76.61</td>
</tr>
<tr>
<td>White</td>
<td>82,775</td>
<td>135.72</td>
<td>80.33</td>
<td>90.02</td>
<td>46</td>
<td>36.72</td>
<td>15.00</td>
</tr>
<tr>
<td>Other Race or More than One</td>
<td>31,395</td>
<td>136.51</td>
<td>81.22</td>
<td>87.79</td>
<td>48</td>
<td>36.73</td>
<td>5.69</td>
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<tr>
<td>Unknown</td>
<td>8,950</td>
<td>134.57</td>
<td>80.85</td>
<td>90.05</td>
<td>42</td>
<td>36.77</td>
<td>1.62</td>
</tr>
<tr>
<td>Spanish/Hispanic</td>
<td>5,916</td>
<td>134.17</td>
<td>81.47</td>
<td>89.49</td>
<td>42</td>
<td>36.72</td>
<td>1.07</td>
</tr>
<tr>
<td>Grand Total</td>
<td>551,690</td>
<td>135.33</td>
<td>81.67</td>
<td>89.11</td>
<td>43</td>
<td>36.75</td>
<td>100.00</td>
</tr>
</tbody>
</table>
Prosperi et al. BMC Medical Informatics and Decision Making. 2018;18:139
<table>
<thead>
<tr>
<th>Source</th>
<th>Description</th>
<th>Level</th>
<th>Open Access</th>
</tr>
</thead>
<tbody>
<tr>
<td>MiHIN</td>
<td>Demographic, clinical information, insurance</td>
<td>Patient</td>
<td>No</td>
</tr>
<tr>
<td>OpenStreetMap</td>
<td>Point of Interests</td>
<td>City/Instance</td>
<td>Yes</td>
</tr>
<tr>
<td>Census Bureau</td>
<td>Socioeconomic data</td>
<td>Census Track</td>
<td>Yes</td>
</tr>
<tr>
<td>Detroit Open Data Portal</td>
<td>Crime and violence data</td>
<td>Census Block</td>
<td>Yes</td>
</tr>
<tr>
<td>Michigan Department of Environmental Quality</td>
<td>Environmental conditions</td>
<td>Census Tract</td>
<td>Yes</td>
</tr>
<tr>
<td>USDA</td>
<td>Food access</td>
<td>Census Tract</td>
<td>Yes</td>
</tr>
<tr>
<td>Landgrid, Loveland Tech</td>
<td>Housing security</td>
<td>Census Block</td>
<td>Yes</td>
</tr>
<tr>
<td>Bureau of Labor Statistics</td>
<td>Monthly employment, unemployment</td>
<td>Census Tract</td>
<td>Yes</td>
</tr>
<tr>
<td>Data Driven Detroit</td>
<td>Transportation, education</td>
<td>Census Tract</td>
<td>Yes</td>
</tr>
<tr>
<td>Neighborhood Atlas</td>
<td>Area deprivation index</td>
<td>Census Block</td>
<td>Yes</td>
</tr>
</tbody>
</table>
Census Tract 5141, Detroit
Lat: 42.3798303, Lon:-82.9893988
Square miles: 0.62148509
With a radius around 715.8 meters

Extraction: pois_from_point([lat,lon], radius)
Return with different radius values

radius = 500
parking
place_of_worship
school
fuel
ice_cream
doctors
bus_station
marketplace

radius = 715.8
parking
place_of_worship
school
fast_food
social_facility
restaurant
fire_station
marketplace
bench
fuel
ice_cream
doctors
bus_station
car_wash
college

radius = 1500
Oluwaseyi Donald

MRN: 12345678
AGE: 54
EMPLOYER: General Motors
ROLE: Manufacturing - Welding
LOCATION: Detroit, Michigan

**SOCIAL DETERMINANTS OF HEALTH**
- Economic Stability: Fair
- Livability: Above Standard
- Education: Below Regional Standards
- Food Access: No 'healthy' options within 5 mi

**HYPERTENSION**
- Prior BP: SYM 156, DIA 95
- Current BP: SYM 155, DIA 95
- Next Visit BP: SYM 148, DIA 82
- ASCVD Target BP: SYM 117, DIA 77

**PULSE**
- Prior: 80
- Current: 74
- Next Visit: 70
- ASCVD Target: 22

**ORDER HISTORY**
- Lab Results: 01/07/2019 - BP 165/99
  - Lab: Blood Urea Nitrogen 20 mg/DL, Glucose 102 mg/DL, Creatinine 1.3 mg/DL, Urine Albumin/Creatinine 30 mg/L
- Lisinopril: 01/07/2019 - BP 170/104
- Nutritionist: 01/14/2019 - BP 162/96
- Exercise: 01/21/2019 - BP 155/92
- Lisinopril: 01/28/2019 - BP 156/95
- Support Group: 02/04/2019 - BP 155/95
- Support Group: 02/11/2019 - BP --

**BEHAVIORAL RISKS**
- Low Physical Activity
- Poor diet adherence
- Missed medical encounters
- Alcohol Risk
<table>
<thead>
<tr>
<th>Referrals</th>
<th>Next Available Date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Check</strong> HFHS Smoking Cessation Program</td>
<td></td>
</tr>
<tr>
<td>Community Center - 9464 Main St</td>
<td>Mon. 3/4/2019 9:30 am</td>
</tr>
<tr>
<td>Learn about the effect of cigarette smoking on</td>
<td></td>
</tr>
<tr>
<td>you BP</td>
<td>Mon. 3/4/2019 10:45 am</td>
</tr>
<tr>
<td></td>
<td>Thur. 3/7/2019 1:30 pm</td>
</tr>
<tr>
<td></td>
<td>Thur. 3/7/2019 4:45 pm</td>
</tr>
<tr>
<td><strong>Check</strong> HFHS Diabetes Prevention Program</td>
<td></td>
</tr>
<tr>
<td>GW Hospital - 9464 Main St</td>
<td>Mon. 3/4/2019 9:30 am</td>
</tr>
<tr>
<td>Better glucose management; Better BP management</td>
<td>Thur. 3/7/2019 1:30 pm</td>
</tr>
<tr>
<td></td>
<td>Thur. 3/7/2019 4:45 pm</td>
</tr>
<tr>
<td><strong>Check</strong> Fitness Workshop @ FitnessWorks</td>
<td></td>
</tr>
<tr>
<td>Community Center - 9464 Main St</td>
<td>Mon. 3/4/2019 9:30 am</td>
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HEALTH SYSTEMS, PROVIDERS, PAYERS & INVESTIGATORS

- Advanced Access
- Intermediate Access
- Basic No-Cost Access

HEALTH INFORMATION EXCHANGE
- Admission Discharge Transfer
- Continuum of Care Data
- Test Results

USER FACING CLOUD ENVIRONMENT
Geographic-level deidentified data or anonymized/synthetic patient-level cohorts are uploaded to the cloud server. Users login and use embedded tools to access health information.

- Robust/Custom Data & Advanced Statistical Analyses
- Targeted Data & Basic Statistical Analyses
- Interactive Mapping & Basic Geographic Comparisons

IBio/MEDIDATA SOLUTION

SECURE DEVELOPMENT ENVIRONMENT
- Algorithms pull EHR data, strip identifiers and ensure and quality criteria are met for different use-case scenarios
- Data are aggregated to census block based on patient address and linked with social determinants information from administrative datasets
- Algorithms are used to ensure anonymization at census block level for specific use-case scenarios
- Census block level MASTER cohort is assembled and new records are iteratively added
- Synthetic data and de-identified patient-level cohorts are assembled

No-Cost "Hot Spot" Reporting Directly to Public Health & Social Service Agencies

ADMINISTRATIVE DATASETS
- Social Determinants Of Health
- Natural, Built and Policy Environments
plevy@med.wayne.edu