Introduction

Opportunity is defined as a situation or condition favorable for attainment of a goal. Opportunity is also a good position, chance, or prospect for advancement or success. Ideally, everyone should have an equal opportunity to be successful in life, but research has established that neighborhood conditions and access to opportunities can have a profound impact on an individual’s chances to succeed.

The Kirwan Institute’s Communities of Opportunity framework proposes that there are complex and interconnected opportunity structures that have a significant role in shaping an individual’s quality of life. These structures include housing, education, health care, employment, transportation, and civic engagement. Communities with high opportunity have quality schools, low crime rates, and affordable housing. Additionally, the environment of these communities promotes healthy lifestyles with such advantages as access to parks and fresh, healthy foods.

Improving opportunity requires an investment in the both the people and the community as well as the supporting linkages between the community and areas of opportunity. Opportunities can be brought back to neglected communities through strong neighborhood development initiatives, higher quality local services, and infrastructure and public health investments. The growth of human capital can be stimulated by investing in education, developing and training the labor force, creating asset and wealth building strategies, and encouraging social and political empowerment within the community. Through the investment in people, place, and linkages, the landscape of low opportunity communities can begin to transform.

Opportunity and Public Health

The opportunity structures that impact an individual’s chance to succeed are closely related to the social determinants of health. These determinants can have a substantial impact on health outcomes. Social determinants of health are the social and physical conditions of the environment where an individual is born, works, plays, learns, prays, and ages. Residents of communities who have few public transportation options, have to send their children to low performing public schools, live in communities plagued with crime and violence or live in an area of concentrated poverty are subjected to social conditions that can have a negative impact on their health. Air quality, neighborhood blight, local parks, neighborhood supermarkets, and aesthetic elements such as lighting, trees, and benches are all characteristics of the physical environment that can contribute an individual’s overall health outcomes.

What is Opportunity Mapping?

The identification of communities with poor access to opportunity can be accomplished through Opportunity Mapping. Opportunity Mapping allows for the visualization of varying levels of access to opportunities that exist within a region. Based on a methodology developed by the Kirwan Institute, indicators representing the opportunity structures (income and stability, health and safety, and education and life skills) are statistically combined to create an opportunity score. Additional data, such as population and public assistance, are used to highlight differences in opportunity based on race, ethnicity, and poverty. The data for all indicators were aggregated to the Census tract level. Census tracts were given an opportunity score of very high, high, moderate, low, or very low.

How can Opportunity Maps be used?

Realizing the important role “place” plays in health and health outcomes, Public Health - Dayton & Montgomery County (PHDMC) is committed to use these Opportunity Maps as they work to expand health opportunity across Montgomery County. As coalitions are developed, health strategies are designed, and policy decisions are made, the Opportunity Maps will be a useful tool to help define goals, missions, and outcomes. Additionally, PHDMC can use the maps identify areas where health disparities exist as well as provide insight as to the root causes of some health inequities.

Opportunity Maps can also be used as a tool for community engagement, planning, and development. These maps can be used to begin a dialogue between community members, leaders, and stakeholders as to the challenges facing their community. Additionally, they can impact policy decisions and aid in community planning and development in the areas of transportation and housing. Organizations such as the Family and Children First (FCFC) Council can use these maps and the associated data as a source of information to aid in strategic planning and the development of community priorities.
## Table 1 Indicators

<table>
<thead>
<tr>
<th>Income &amp; Stability</th>
<th>Health &amp; Safety</th>
<th>Education &amp; Life Skills</th>
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<tbody>
<tr>
<td>Unemployment Rate</td>
<td>Low Birth Weight</td>
<td>Kindergarten Readiness</td>
</tr>
<tr>
<td>Median Household Income</td>
<td>Health Insurance Coverage</td>
<td>Reading Proficiency (3rd grade)</td>
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<td>Educational Attainment (Associate's or higher)</td>
<td>Teen Births</td>
<td>Math Proficiency (4th grade)</td>
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<td>Poverty (Individual)</td>
<td>Cancer Mortality Rate</td>
<td>Ohio Graduation Test (10th grade)</td>
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<td>Public Cash Assistance</td>
<td>Heart Disease Mortality Rate</td>
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<td>Drug Overdose Mortality Rate</td>
<td>Public School Attendance (Kindergarten -12th grade)</td>
</tr>
<tr>
<td></td>
<td>Crime Rate</td>
<td></td>
</tr>
</tbody>
</table>

**Health & Safety**

**Opportunity**

**Education & Life Skills**

- Income & Stability
- Health & Safety
- Education & Life Skills
**How are Race and Ethnicity related to Opportunity?**

- In communities with the highest opportunity, the population is 85% White and 7% Black.
- Seventy (70%) percent of the Black population live in low or very low opportunity communities while 14% live in high or very high opportunity communities.
- More than half (55%) of the White population live in high and very high opportunity communities and 27% live in low or very low opportunity communities.
- The population of Hispanics is evenly distributed among communities of all opportunity levels.
**How is Income and Stability related to Opportunity?**

- 31% of residents in low and very low opportunity communities live in poverty. This is 3.5 times more than poverty in high and very high opportunity communities.
- The medium household income in high and very high opportunity communities is more than 2 times higher than the medium household income in low and very low opportunity communities.
- Public cash assistance is used more by those in low and very low opportunity communities; 7% compared to 4% in moderate opportunity communities and 2% in high and very high opportunity communities.
- Unemployment in low and very low opportunity communities is 20%, and it is 7% in high and very high opportunity communities.
- In high and very high opportunity communities, two times more individuals earned an Associate’s degree or higher and 3 times more individuals earned a Bachelor’s degree or higher than in low and very low opportunity communities.
Opportunity related to Income & Stability

Montgomery County, Ohio

- Unemployment
- Public Cash Assistance
- Median Household Income
- Poverty
- Educational Attainment

Index
- Very Low
- Low
- Moderate
- High
- Very High

Source: American Community Survey, 2009-2013
**How is Health and Safety related to Opportunity?**

- The percentage of low birth weight births in low and very low opportunity communities is higher than in high and very high opportunity communities (11.6% vs. 6.5%).
- Births to teens between the ages of 15 and 17 are almost 4 times more in low and very low opportunity communities compared to high and very high opportunity communities.
- In high and very high opportunity communities, 8% of residents lack health insurance, but in low and very low opportunity communities 18% do not have health insurance.
- The death rate for cancer and heart disease, the two leading causes of death, is highest in the communities with the low and very low opportunity.
- The drug overdose mortality rate is 319% higher in low and very low opportunity communities than in high and very high opportunity communities.
- The crime rate for violent and property crimes is 79% higher in low and very low opportunity communities as compared to high and very high opportunity communities.
Opportunity and Heart Disease Mortality

Opportunity and Cancer Mortality

Opportunity and Drug Overdose Mortality

Opportunity and Crime Rate
Opportunity related to Health & Safety

Montgomery County, Ohio

- Low Birth Weight
- Healthcare Coverage
- Heart Disease Mortality
- Crime Rate
- Teen Births
- Drug Overdose Mortality
- Cancer Mortality

Index
- Very Low
- Low
- Moderate
- High
- Very High

Source: Ohio Department of Health and Death Certificates, 2008-2012; American Community Survey, 2009-2013
Education & Life Skills Opportunity

- Student Achievement (3rd grade reading)
- Student Achievement (4th grade math)
- Ohio Graduation Test (10th grade)
- Kindergarten Readiness
- Public School Attendance (K - 12)
- High School Graduation Rate
**How is Education and Life Skills related to Opportunity?**

- The percent of kindergartens that scored in the highest level on the Kindergarten Readiness Assessment - Literacy (KRA-L) is 82% higher in the high and very high opportunity communities compared to the low and very low opportunity communities.
- There is not a significant difference between the attendance rates among students in kindergarten through 12th grade between communities with varying levels of opportunity.
- In low and very low opportunity communities, 63% of 3rd graders passed the Reading section of the Ohio Achievement Assessment (OAA) compared to 91% in neighborhoods with high and very high opportunity.
- A little less than half of 4th graders in low and very low opportunity communities passed the Math portion of the OAA. In the high and very high opportunity communities, 86% of 4th graders passed the Math section of the state test.
- 91% of 10th graders in high and very high opportunity communities and 66% of 10th graders in low and very low opportunity communities passed the Ohio Graduation Test.
- The 4-year graduation rate is greater in high and very high opportunity communities than in low and very low opportunity communities (93% vs. 78%).

![Opportunity and Kindergarten Readiness](image1)

![Opportunity and School Attendance Rate](image2)

![Opportunity and Reading and Math Proficiency](image3)
INCOME & STABILITY INDICATORS

Unemployment Rate
Description: The percentage of the civilian labor force who are unemployed
Data Source: American Community Survey
Date: 2009-2013 5-year estimates

Poverty
Description: Percent of people whose income in the past 12 months is below the poverty level
Data Source: American Community Survey
Date: 2009-2013 5-year estimates

Household Income
Description: Median earnings for households (in 2013 inflation-adjusted dollars)
Data Source: American Community Survey
Date: 2009-2013 5-year estimates

Educational Attainment
Description: The percent of population 25 and over that have attained at least an Associate’s degree
Data Source: American Community Survey
Date: 2009-2013 5-year estimates

Cash Public Assistance
Description: The percent of individuals receiving cash public assistance income
Data Source: American Community Survey
Date: 2009-2013 5-year estimates
HEALTH & SAFETY INDICATORS

Low Birth Weight
  Description: The percent of babies born with a low birth weight (< 2500g)
  Data Source: Ohio Department of Health, Birth Certificate Data
  Date: 2010 - 2012

Teen Births
  Description: The percent of babies born to women 15 to 17 years of age
  Data Source: Ohio Department of Health, Birth Certificate Data
  Date: 2010 - 2012

Health Insurance Coverage
  Description: The percentage of the civilian noninstitutionalized population without health insurance coverage
  Data Source: American Community Survey, U.S. Census
  Date: 2009-2013 5-year estimates

Cancer Mortality Rate
  Description: The crude cancer mortality rate
  Data Source: Ohio Department of Health, Death Certificate Data
  Date: 2008 - 2012

Heart Disease Mortality Rate
  Description: The crude heart disease mortality rate
  Data Source: Ohio Department of Health, Death Certificate Data
  Date: 2008 - 2012

Drug Overdose Mortality Rate
  Description: The crude drug overdose mortality rate
  Data Source: Ohio Department of Health, Death Certificate Data
  Date: 2008 - 2012

Crime Rate
  Description: The number of crimes committed per 100,000 people
  Data Source: National Incident Based Reporting System, FBI
  Date: 2013
EDUCATION & LIFE SKILLS INDICATORS

School Reading Proficiency
Description: The percent of 3rd graders who passed the reading section of the state test
Source: Ohio Department of Education, Ohio School Report Cards
Date: 2013 - 2014 School Year
Methodology: Each tract was assigned the average of the percentage of 3rd graders who passed the reading section of the state test of the three elementary schools nearest the tract centroid. This process also considered the school district in which the tract resides.

School Math Proficiency
Description: The percent of 4th graders who passed the mathematics section of the state test
Data Source: Ohio Department of Education, Ohio School Report Cards
Date: 2013 - 2014 School Year
Methodology: Each tract was assigned the average of the percentage of 4th graders who passed the reading section of the state test of the three elementary schools nearest the tract centroid. This process also considered the school district in which the tract resides.

Attendance Rate
Description: The percent of all students, K-12, that attended school
Data Source: Ohio Department of Education, Ohio School Report Cards
Date: 2013 - 2014 School Year
Methodology: Each tract was assigned an average rate based on the attendance records of the all students, kindergarten through 12th grade, receiving instruction in the school district in which the tract resides.

Ohio Graduation Test (OGT) - 10th grade
Description: The average percent of 10th graders who passed the math, reading, science, social studies, and writing sections of the OGT
Data Source: Ohio Department of Education, Ohio School Report Cards
Date: 2013 - 2014 School Year
Methodology: Each tract was assigned an average percent based on the OGT passing rate for all 10th graders receiving instruction in the school district in which the tract resides.

Kindergarten Readiness
Description: The percentage of students scoring in Band 3* on the Kindergarten Readiness Assessment - Literacy (KRA-L) Test
Data Source: Ohio Department of Education, Ohio School Report Cards
Date: 2013 - 2014 School Year
Methodology: Each tract within a school district was assigned the percent of students scoring in Band 3 of the KRA-L test.
*Band 1 - broad intense instruction, Band 2 - targeted intervention, Band 3 - enriched instruction

Graduation Rate
Description: The 4-year high school graduation rate
Data Source: Ohio Department of Education, Ohio School Report Cards
Date: 2013 - 2014 School Year
Methodology: Each tract was assigned the graduation rate of the high school within the district or an average of all high schools within the district.
ADDITIONAL DATA

Population Count
  Description: The number of individuals by race and ethnicity
  Data Source: American Community Survey
  Date: 2009-2013 5-year estimates

Education Attainment - Bachelor’s degree or higher
  Description: The percent of population 25 and over that have attained at least an Bachelor’s degree
  Data Source: American Community Survey
  Date: 2009-2013 5-year estimates
**METHODOLOGY**

Calculating Opportunity Scores

Data related to the three categories (income and stability, health and safety, and education and life skills) were collected and analyzed by the census tracts in the Dayton, Ohio area. The census tract level data for an indicator was then standardized through the use of “z-scores.” A z-score is a statistical measure that quantifies the distance (measured in standard deviations) a data point is from the mean (or average) of a data set. A positive z-score indicates that the data is above the mean while a negative z-score indicates the data falls below the mean. A z-score of zero would indicate that the data is equal to the mean.

An opportunity score for each category can be obtained by averaging the z-scores of each indicator. A final overall opportunity score for each census tract is based on the average z-score for all the indicators in all five categories. A level of opportunity (very low, low, moderate, high, and very high) is assigned to each census tract by sorting the opportunity scores into quintiles. Census tracts that have very high opportunity represent the top 20% of scores, and the very low opportunity census tracts represent the lowest 20% of scores.

Calculating z-scores

In order to calculate a z-score, you must first determine the average and standard deviation of your data. In the example below, the average cancer mortality rate is 219.7 with a standard deviation of 26.3. The z-score is calculated using the formula:

\[
\text{z-score} = \frac{\text{Raw score} - \text{Average}}{\text{Standard deviation}}
\]

In the case of negative indicators, just as cancer mortality, the final z-score must be multiplied by “-1” so that all indicators are compatible.

<table>
<thead>
<tr>
<th>Census Tract</th>
<th>Cancer Mortality Rate</th>
<th>z-score</th>
<th>Final z-score (multiply by -1)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>167.5</td>
<td>-1.9856555</td>
<td>1.98565551</td>
</tr>
<tr>
<td>2</td>
<td>228.1</td>
<td>0.3182067</td>
<td>-0.31820671</td>
</tr>
<tr>
<td>3</td>
<td>193.0</td>
<td>-1.0162085</td>
<td>1.016208535</td>
</tr>
<tr>
<td>4</td>
<td>208.8</td>
<td>-0.4155316</td>
<td>0.415531586</td>
</tr>
<tr>
<td>5</td>
<td>251.3</td>
<td>1.2002134</td>
<td>-1.20021337</td>
</tr>
<tr>
<td>6</td>
<td>236.9</td>
<td>0.6527610</td>
<td>-0.65276096</td>
</tr>
<tr>
<td>7</td>
<td>215.4</td>
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<tr>
<td>8.01</td>
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</tr>
<tr>
<td>8.02</td>
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<td>0.320487765</td>
</tr>
<tr>
<td>9</td>
<td>251.9</td>
<td>1.2230239</td>
<td>-1.22302389</td>
</tr>
</tbody>
</table>

No weight was applied to the various indicators; all indicators were treated as equal in importance.