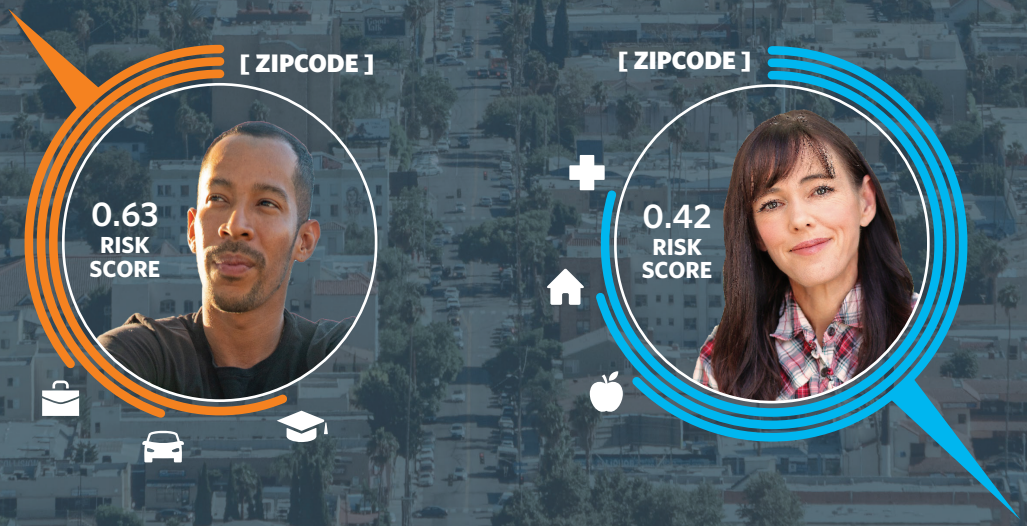
Introducing the

# Social Determinants of Health Community-Based Index

## A New Resource for Addressing the Non-Medical Factors that Influence Well-Being




Onlife® HEALTH

## Onlife Health

Onlife Health, a GuideWell company, brings end-to-end simplicity to population health and wellness, connecting and integrating people, technology, and benefit design through our user-friendly engagement platform, guiding members on the “next right thing to do” in their healthcare journey. Our unique approach – personalized, supported, connected – drives engagement and delivers value. With its built-in agility, the Onlife platform can be quickly and easily configured and scaled to serve any market, from commercial health insurance to Medicare Advantage and Individual (ACA) lines of business.

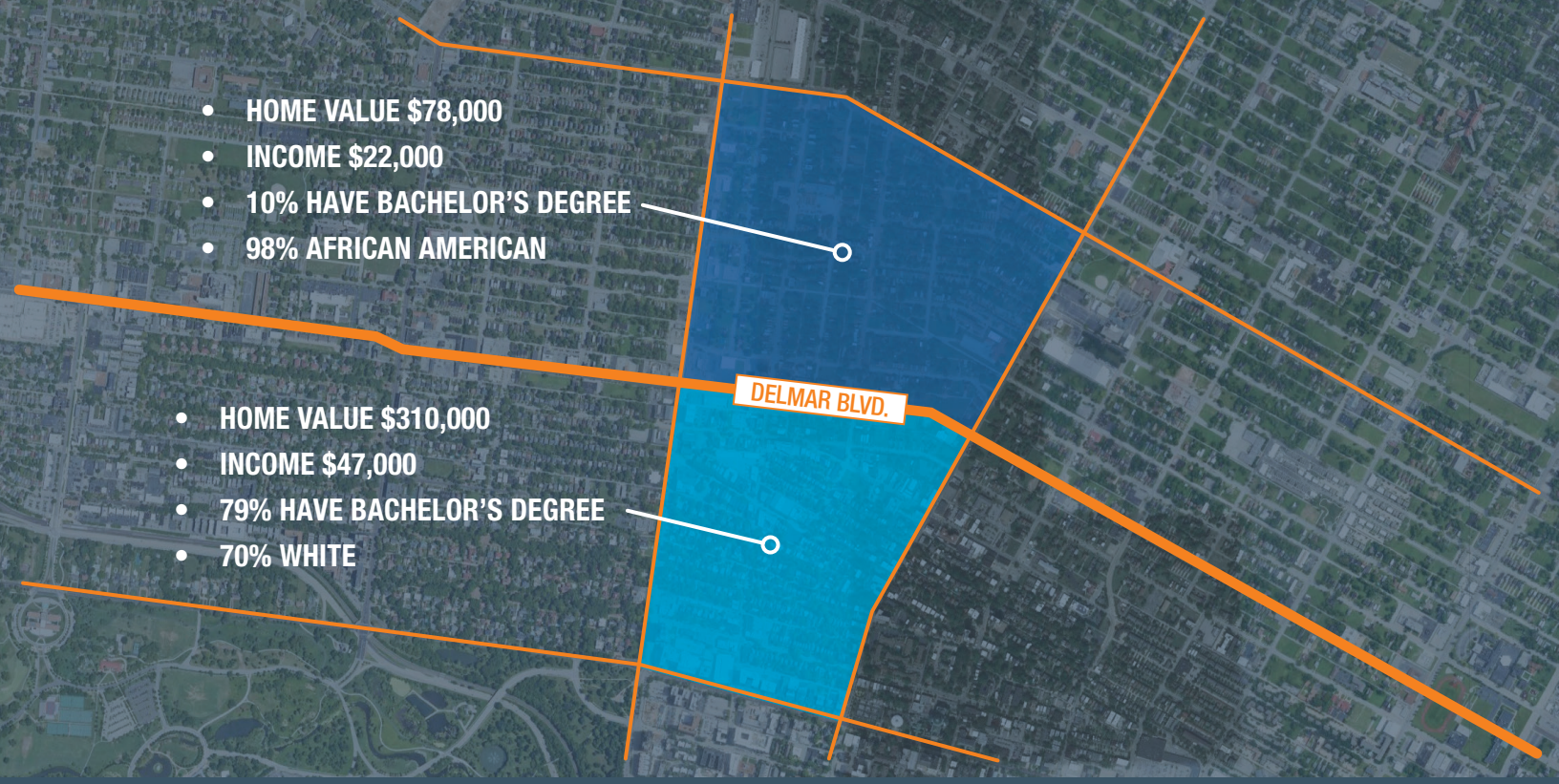
## Mapping a New American Landscape

In recent years, there's been growing recognition among health plans and employers of the major impact Social Determinants of Health (SDoH) have on the health and well-being of both individuals and entire population groups. Today, 80 percent of payers believe that addressing the SDoH of their beneficiaries should be a high priority to improve their population health programs.[1]

Recognizing and talking about the importance of SDoH is one thing, however. Establishing effective programs and innovative initiatives that address the multiple issues involving SDoH is quite another. As a first priority, what's required is a systematic way to gain an in-depth, data-based understanding of which communities and neighborhoods are adversely affected by SDoH and the specific risk factors that need to be addressed within those communities.

To meet that need, Onlife Health has developed a Social Determinants of Health Community-Based Index, a mapping tool that identifies and analyzes the SDoH vulnerabilities for communities and neighborhoods across the entire United States. In this paper, we'll examine the methodology Onlife Health used to create the Index, explain how the collected data can be analyzed to gain new insights, and then discuss how health plans and employers can employ the Index to both initiate new programs and support existing ones designed to address housing, transportation, food and other SDoH.

First, let's begin with an overview of the impact that Social Determinants have on health outcomes in the United States.




THE DELMAR DIVIDE IN ST. LOUIS, MISSOURI

## Defining the Impact of SDoH

Social Determinants of Health (SDoH) are the socio-economic conditions and physical environment of the communities where people live, learn, work, and play.

Rigorously peer-reviewed studies have empirically verified a strong connection between a person's health and well-being and their SDoH. Indeed, it's estimated that up to 80 percent of a person's health is the result of SDoH, which include education, income level, job status, access to transportation, access to healthy food, neighborhood safety, housing, and a multitude of other social factors.[2] The general public also understands the role that SDoH play in their lives. Over 80 percent say that access to safe and stable housing, nutritious food, and transportation has an impact on their ability to access medical care and be healthy.[3]

Another study, published in the New England Journal of Medicine, found that only 30 percent of the risk factors for premature death can be attributed to a person's genetics.[4] The remaining 70 percent can be attributed to risk factors that are modifiable, such as social and environmental factors, and a person's individual behavior. Researchers have also found that 68 percent of patients surveyed reported at least one SDoH vulnerability.[5]

## A Tale of Two Neighborhoods

The Delmar Divide offers a specific real-world illustration of the impact SDoH can have on population health. Delmar Boulevard, a major thoroughfare in St. Louis, Missouri, divides the city into two radically different socioeconomic neighborhoods, hence the name "Delmar Divide." In the neighborhood north of Delmar Boulevard, the population is 98 percent black, with an average income of $22,000 and an average home value of $78,000. Ten percent of the residents in this area have a bachelor's degree. In the neighborhood south of Delmar Boulevard, the population is 70 percent white, with an average income of $47,000 and an average home value of $310,000. Seventy percent of the residents in this area have a bachelor's degree. Geographically, the people living on either side of Delmar Boulevard are separated by only a few blocks, yet the rates for heart disease and cancer are dramatically higher in the neighborhoods north of Delmar Boulevard.

Melody Goodman, an associate dean for research at New York University's School of Global Public Health, has succinctly stated the overwhelming influence that social determinants have on health outcomes, especially for the most vulnerable populations.

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*"Your zip code is a better predictor of your health than your genetic code."*

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Clearly, traditional healthcare, which has focused far too long on treating each individual as a separate, isolated unit, needs to understand each patient's health within the larger context of his or her environment and community. Fortunately, more and more health plans are implementing new strategies to address SDoH. But if these initiatives are to succeed, they need to be precisely targeted and deliver the right resources to the right community. And that requires a data-driven understanding of the vulnerabilities that exist within local communities. Onlife's SDoH Community-Based Index serves as a catalyst to achieve that understanding, giving health plans, employers, and other organizations a sophisticated mapping tool and data analyzer to understand in detail the multiple social dynamics that impact health.

# The Five Key Social Determinants of Health

Source: HealthyPeople 2020 Campaign

## 1 Economic Stability

- Poverty
- Food Security
- Employment
- Housing Stability

## 2 Education

- High School Graduation
- Enrollment in Higher Education
- Language and Literacy
- Early Childhood Education and Development

## 3 Social and Community Context

- Social Cohesion
- Civic Participation
- Discrimination
- Incarceration

## 4 Health and Health Care

- Access to Health Care
- Access to Primary Care
- Healthy Literacy

## 5 Neighborhood and Built Environment

- Access to Healthy Food
- Quality of Housing
- Crime and Violence
- Environmental Conditions

## Creating the SDoH Community-Based Index

In early 2019, Onlife Health began developing its SDoH Community-Based Index. The Index is modeled after the CDC Social Vulnerability Index, a data bank initially created to identify those communities most vulnerable to a natural disaster.

As a first step, we aggregated publicly available data from multiple sources for 18 variables divided into five categories: Community Demographics, Socioeconomic Factors, Housing and Transportation, Healthcare Quality, and Exercise Opportunity. (**See the section titled SDoH Index Categories and Variables for a complete list of the categories and variables.**)

For each variable, we then ranked each census tract in the country and assigned it a percentile ranking (0 to 1, with 0 being the least vulnerable and 1 being the most vulnerable). A census tract is a small statistical subdivision of a county. It contains on average about 4,000 people and provides the most granular level of data available on a national scale for the purposes of the Index.

The percentile rankings for all the variables within a category were then averaged together to create a percentile ranking for each census tract. For example, to create the percentile ranking for the category Community Demographics, the percentile rankings for % Population Over 65, % Single Parent Households, % Population with Disability, and Social Association were averaged together.

Finally, the percentile rankings for each of the five categories were averaged together to create an overall SDoH Vulnerability Score.

In addition to the five categories, Onlife also created a single variable group to indicate whether a census tract was Food Insecure (1 = Food Insecure, 0 = Not Food Insecure).

All of these percentile rankings were then downloaded into a sophisticated visualization program that immediately displays the percentile rankings of any census tract in the country simply by rolling a cursor over a map containing that neighborhood. The SDoH Community-Based Index also has the ability to aggregate data and show percentile rankings for any size geographic area larger than a census tract. For example, it can provide a percentile ranking for any variable for all of the census tracts in St. Louis, for the counties surrounding St. Louis, or for the entire state of Missouri. The Index also has the ability to calculate the percentile ranking for combinations of complementary variables (for example, food insecurity and transportation).

# SDoH Index Categories and Variables

**Bold** indicates a county-level data source. All others are from a census-tract data source.

## Community Demographics

- % Population Over 65
- % Single Parent Households
- % Population with Disability
- **Social Associations**

## Socioeconomic

- % Did Not Graduate High School
- % Unemployment
- Median Household Income
- % Population with No Health Insurance
- % Households receiving SNAP benefits

## Housing and Transportation

- Average Household Size
- % Households with No Vehicle
- % Rental Units Where Gross Rent >35% of Income

## Healthcare Quality

- **Ratio of Primary Care Physicians to Population**
- **# of Poor Physical Health Days (over last 30 days)**
- **Preventable Hospital Stays**

## Exercise Opportunity

- **Access to Exercise Opportunities**
- National Walkability Index Score

## Food Desert

A Food Desert is defined as a low-income tract in which at least 500 people or 33 percent of the population live more than one mile (urban areas) or more than 10 miles (rural areas) from the nearest supermarket, supercenter, or large grocery store.

# Using the Index to Gain Insights about SDoH Vulnerabilities

## Seeing the Big Picture

One way that health plans can utilize the SDoH Community-Based Index is to acquire a big-picture, comprehensive view of its population. For example, a close analysis of the following maps can provide health plans who have members or employee clients in Tennessee with a better understanding of the SDoH vulnerabilities of their members in that state.

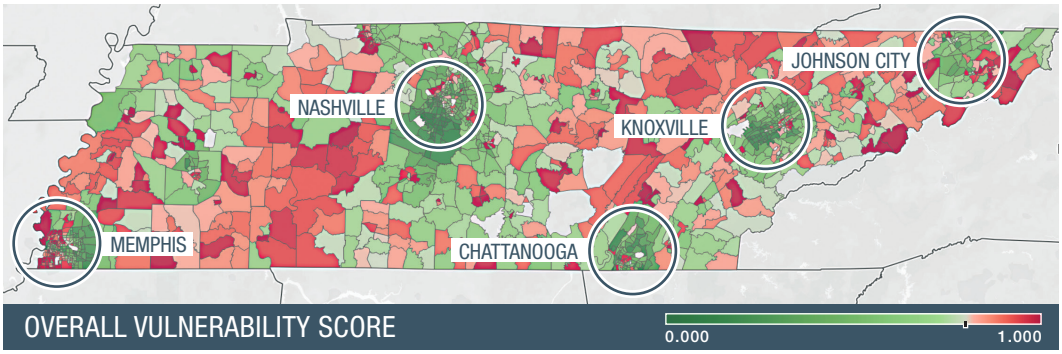
## Interesting Insights

- There is a strong correlation between high Overall Vulnerability Score and rural areas. Indeed, according to the CDC, the 46 million Americans who live in rural areas are more likely than urban residents to die prematurely from four of the leading causes of death: heart disease, cancer, chronic respiratory disease and stroke.[6]
- Rural areas also have a consistent pattern of high Housing and Transportation Vulnerability.
- There is a tight correlation between Socioeconomic Vulnerabilities and the Overall Vulnerability Score.
- Interestingly enough, however, many rural areas are not as affected by the SDoH vulnerabilities listed under Community Demographics.

## Tagging Members and Making Intelligent Recommendations

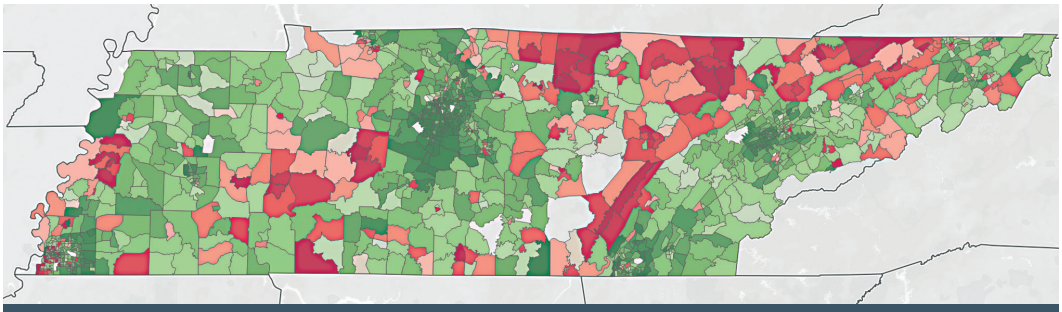
The SDoH Community-Based Index can also help health plans and employers deliver targeted communications to individual members. By combining member-level information provided by eligibility files (address and zip code) with the SDoH Index score for a member's community, Onlife can identify the most likely vulnerabilities a member may be at risk for. Using this information, we can then provide each member with personalized educational materials that address those vulnerabilities on the member's wellness home page. For example, if a member lives in a community with a high Walkability Index score and/or a high score for % of Households with No Vehicle, making it difficult to visit a park or gym, we could populate their wellness home page with articles about exercise programs that can be done at home.

# SDoH Index Maps: Tennessee



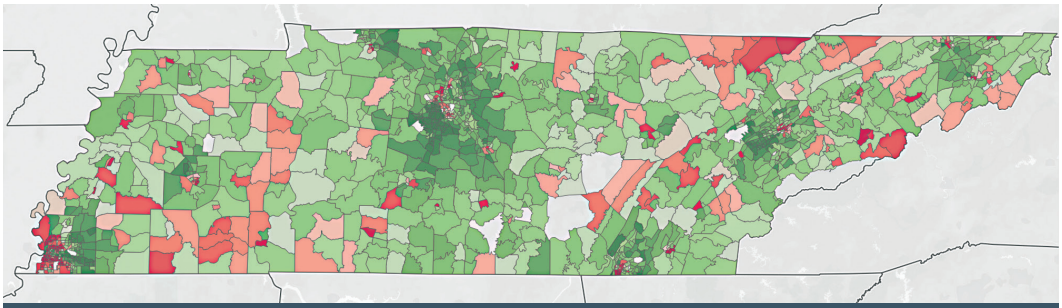

OVERALL VULNERABILITY SCORE

0.000 1.000



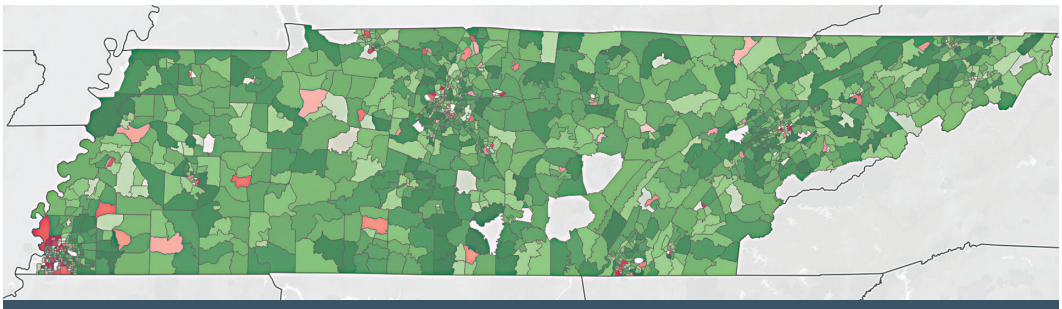
COMMUNITY DEMOGRAPHICS SCORE

0.000 1.000



SOCIOECONOMIC SCORE

0.000 1.000



HOUSING AND TRANSPORTATION SCORE

0.000 1.000


We can also advise members about local resources that are available to help them overcome the environmental and social obstacles that they're facing. (**See Connect Populations with Available Local Services on page 15 for more information.**)

Whenever resources and recommendations are communicated to a member, it's important that this information be presented in a logical order, so the members are always presented with the "next right thing to do" to improve their health. For example, it doesn't make sense to provide a member with information about menu planning or eating a healthy diet if that person lives in a food desert or lacks reliable transportation to a full-service grocery store. We need to put first things first by making intelligent recommendations that are presented in the right order given each member's specific social and environmental context and SDoH.

# Analyzing the Data with K-Means Clustering

K-Means Clustering is a technique used to find naturally occurring groups or clusters within a population based on a selected set of variables. (**See SDoH Index Categories and Variables for a complete list of the variables that Onlife used.**) This K-Means Clustering technique can be used to provide a clearer picture of a population's environment in order to provide support for these underlying wellness issues.

Once these clusters are created, they are often given a name, a persona, that captures the essence of the cluster. A persona is a fictional character that represents a group of consumers who share common characteristics, behaviors or goals.

From the national data that Onlife collected, we created the following five personas:

## VULNERABLE LOCATIONS

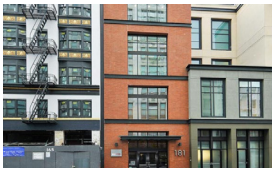
- High percent not proficient in English
- Low levels of social associations
- Good walkability

## RURAL CONNECTIONS

- Lowest income, rural
- Issues with access to healthful food and exercise
- Highest levels of social associations

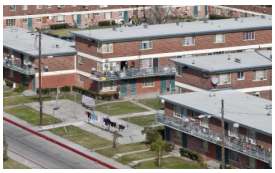
## AVERAGE SUBURBIA

- Middle of the road on many metrics
- Slightly older
- Moderate access issues (healthy food/exercise)



## ISOLATED URBANITES

- Much higher income levels, mostly urban
- Lowest levels of social associations
- Long commutes alone



## URBAN ISSUES

- Lowest income
- High SNAP usage
- Many single parent homes
- Good access to healthy food/exercise

## Interesting Insights

Rural Connections had the highest level of Social Associations, defined as a group's level of participation in community activities and involvement in religious, social, political, professional, and recreational organizations. In contrast, Vulnerable Locations and Isolated Urbanites had the lowest level of Social Associations. Low Social Associations can be a strong indicator of social isolation, which can increase the risk for a host of medical issues, including dementia, depression, heart disease, and stroke.

Through data analysis, we also gained the following insights into how each persona engages with Onlife's personalized engagement platform. These insights help us create a more engaging experience for members within each persona.

### VULNERABLE LOCATIONS

Far less engaged with coaches - they are about half as likely to have set a goal compared to the rest of the population.

### RURAL CONNECTIONS

These members are 1.4x more likely to have ever started a course than the rest of the population and nearly 3x as likely to have called a coach.

### AVERAGE SUBURBIA

Suburban members are 1.2x as likely to have messaged a coach than the rest of the population.

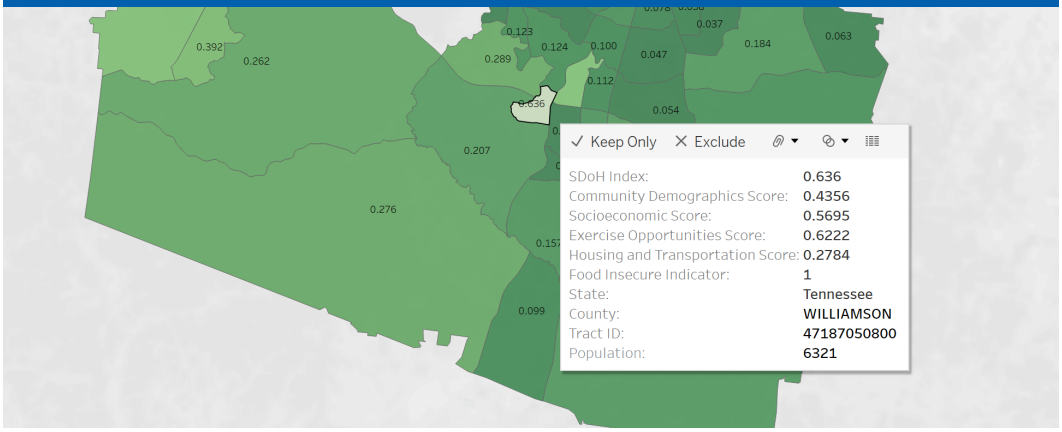
### ISOLATED URBANITES

These urbanites are 1.3x as likely to complete the HA, which is often the first step in a wellness program.

### URBAN ISSUES

The rest of the population is 1.2x more likely to have completed the HA than those in Urban Issues areas.

# MINI CASE STUDY




The following case study illustrates how the SDoH Community-Based Index can be used to identify the vulnerabilities associated with a specific census tract and then provide recommendations as to how to address those vulnerabilities effectively.

- **Census Tract 47187050800**
- Williamson County
- Franklin, Tennessee
- Franklin Estates Neighborhood

This census tract has a relatively mild SDoH Vulnerability score of 0.6336 compared to rest of the United States. But compared to the rest of Williamson County, the most affluent county in Tennessee, with an SDoH Vulnerability score 0.1622, its score of 0.6336 is nearly four times higher. Consequently, when looking at Williamson County, this census tract could easily be overlooked and not recognized as a vulnerable area.

## Key Findings for Census Tract 47187050800

- Is Food Insecure
- % of Census Tract with No Vehicle in Household: 75th percentile
- % Population with no High-School Diploma: 73rd percentile
- % Population over 65: 78th percentile
- National Walkability Index: 50th percentile
- Lack of Access to Exercise Opportunities: 70th percentile

# MINI CASE STUDY

## Recommended Actions

Given these vulnerabilities, the population of this particular census tract has a higher risk of health complications and poor medical outcomes. To address the lack of access to healthy foods and the high percentage of this older population that does not have access to a vehicle, a first step would be to make members aware of the following local resources:

- Meals on Wheels
- Free Ride-Share Service to Grocery Stores

In addition, the personalized wellness portal for members living in this census tract could be populated with the following educational articles:

- How to Get to the Doctor Without a Car
- How to Get Involved with A Community Garden
- How to Start a Walking Group

## 3 Practical Real-World Applications

The goal for any program designed to address SDoH vulnerabilities is to connect the right content and the right resources to the people who would benefit the most from those services and information. Here are three examples illustrating how the Index can provide throughput support to supplement and enhance existing SDoH programs as well as provide the data insights to create new initiatives.

### 1. Identify Opportunities for Ride-Share Services

The SDoH Community-Based Index can identify specific neighborhoods where people struggle to find reliable transportation, which can result in missed medical appointments and inconsistent care. Offering ride-share services in these locales for non-emergency medical transportation can significantly reduce no-shows and provide access to services and programs that promote health and well-being across the continuum of care, from visiting a primary care physician or the pharmacy to going to a fitness center or visiting a food bank.

### 2. Promote Telehealth Services

According to the CDC, more than 46 million Americans live in sparsely populated areas, often hours away from an urban center, making it difficult for this population to access all types of health care, even primary care.[7] By using the Index to identify those geographic regions of the country that are far removed from primary care services, health plans can then develop programs and promote care through digital formats, such as online well-being classes or telehealth medicine, that overcome barriers by bringing health care telephonically to rural residents.

## 3. Connect Populations with Available Local Services

Once the Index has identified a neighborhood which is negatively influenced by SDoH and determined the specific SDoH risk factors that need to be addressed, the next step is to connect people in those communities with available local resources. If the health plan's wellness engagement is personalized, notifications can be posted on the website to inform each member about the community resources that can meet their specific needs. Emails can be sent to provide information about a host of local services:

- EAPs (Employee Assistance Programs)
- Food Banks
- Recreational Opportunities
- Physician Referral Services
- Community Clinics
- Farmer's Markets
- Free Screenings
- Substance Abuse Programs
- Adult Day Care Programs
- Affordable Housing
- Dietitians, Health Educators and Trainers

For example, if a member lives in one of 25 ZIP codes in Chicago or 15 ZIP codes in Dallas, their wellness engagement program could provide content about foodQ, a healthy food delivery service sponsored by Health Care Service Corporation (HCSC) and the Blue Cross Blue Shield (BCBS) Institute. The service offers consumers easy access to affordable, nutritious foods to improve their health outcomes, particularly for diet-related chronic conditions, while reducing avoidable emergency room visits and hospital admissions. Any consumer living in an eligible ZIP code where HCSC operates health plans can participate regardless of their health insurance status or insurance carrier.[8]

## Key Takeaways

Social Determinants of Health (SDoH), the socio-economic conditions and physical environment of the communities where people live, learn, work and play, have a profound impact on the nation's healthcare system, contributing up to 80 percent of a person's health.

If health plans and employers are to effectively address the vulnerabilities created by SDoH in their population, they must first gain an in-depth, data-based understanding of which communities and neighborhoods are adversely affected by SDoH and the specific risk factors that need to be addressed within those communities.

To achieve that data-based understanding and complement the data platforms already developed by health plans, Onlife created the SDoH Community-Based Index, a sophisticated mapping tool and data analyzer that provides detailed information about the multiple social dynamics that impact health and well-being.

# Appendix

## Resources for Data Acquisition

Data acquisition is the key starting point for developing a strategy designed to address the SDoH vulnerabilities and risk factors that are present within a specific population or community.

Fortunately, there are quite a few publicly available data sets that are free to download and use. These data sources are particularly effective in providing valuable insights about your population before any interactions have occurred, providing the opportunity to engage with each member more effectively from the beginning of the relationship. Here are four public data resources used and recommended by Onlife Health.

### Overall Vulnerability Index

This CDC data set provides statistics on social, economic, housing, and demographic characteristics for a selected geography, giving a comprehensive view of a particular geography.

https://www.census.gov/data/developers/data-sets.html

https://www.census.gov/acs/www/data/data-tables-and-tools/

### Food Access and Insecurity

Created by the USDA Economic Research Service, the Food Access Research Atlas presents a spatial overview of food-access indicators for low-income and other census tracts using different measures of supermarket accessibility.

https://www.ers.usda.gov/data-products/food-access-research-atlas/download-the-data/

### Walkability Index

Developed by the U.S. EPA Smart Growth project, the National Walkability Index uses smart location mapping to create a nationwide geographic data resource that ranks each block according to its relative walkability. The national dataset includes walkability scores for all block groups as well as the underlying attributes that are used to rank the block groups.

https://www.epa.gov/smartgrowth/smart-location-mapping#walkability

### County Healthy Rankings

The Rankings, developed by County Health Rankings and Roadmap, are based on a model of population health that emphasizes the many factors that, if improved, can help communities become healthier places to live, learn, work, and play.

https://www.countyhealthrankings.org/explore-health-rankings/rankings-data-documentation

It's important to realize, however, that publicly available data sets do not have the necessary granularity, the level of detail within the data structure, to support individual recommendations. Typically, publicly available data only "drills down" to the county or census-tract level, where there can still be a great deal of variation in both the type and degree of SDoH vulnerabilities among individuals.

To acquire the member-level data needed to make individual recommendations, we recommend that health plans incorporate SDoH questions into their member Health Assessment. Another way to obtain member-level data is to conduct an ad hoc survey of members and ask about their living situation, food insecurity, economic security, access to transportation access and other socially determined barriers to better health.

# Endnotes

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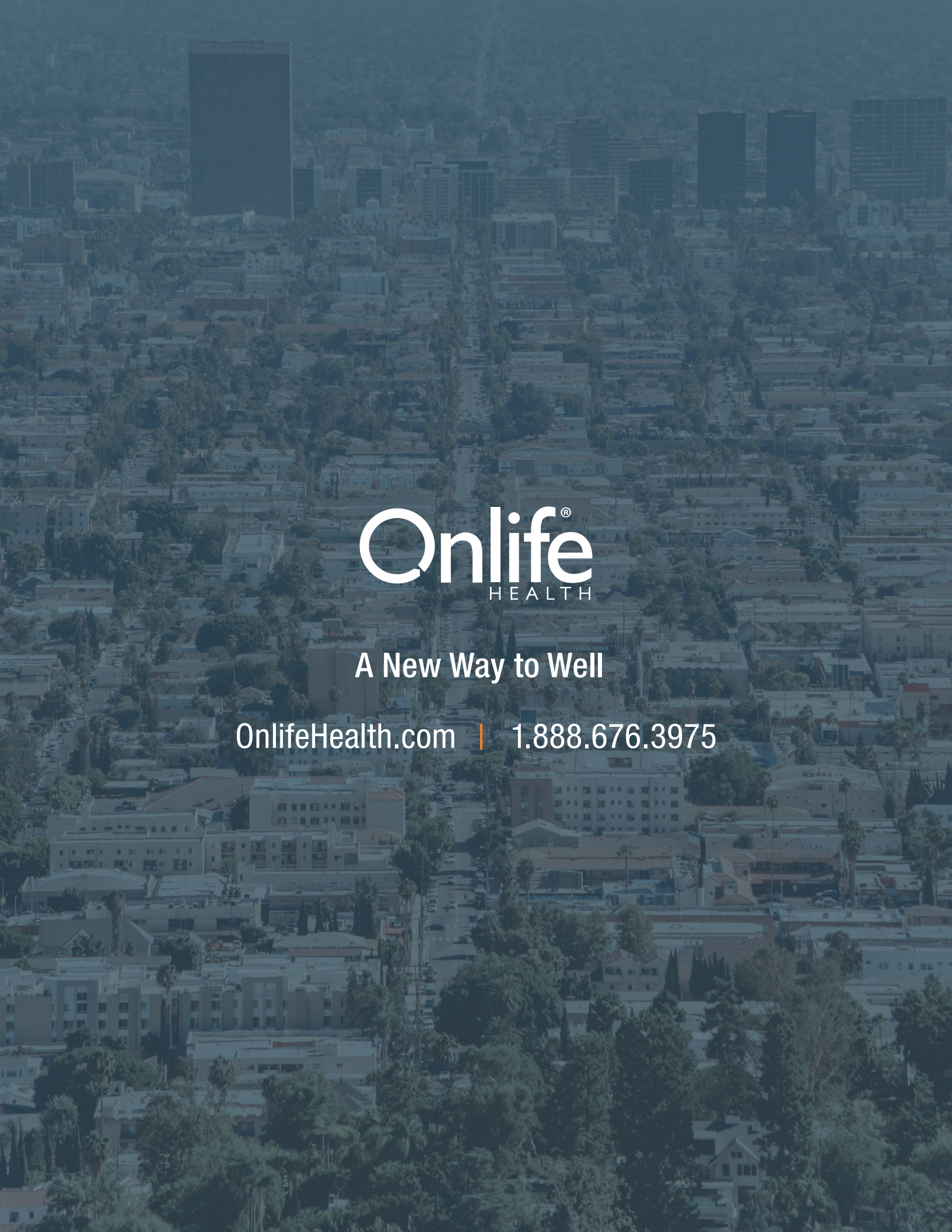
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