The Social Determinants of Health:
Improving Population Health With Data-Driven Insights

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Introduction

The social determinants of health (SDOH) are increasingly recognized as critical drivers of health and well-being. Social factors as diverse as income, access to transportation and healthy food, and education play a huge role in determining an individual's health risk and treatment success. SDOH data can help healthcare providers and health plans better understand and manage a variety of chronic conditions including diabetes, asthma, opioid addiction, and high-risk maternity, and is used to improve overall patient health and wellness. The key is to find the right data, understand its relevance, and apply it directly to patient care.

Together, the population health management leader ZeOmega and the nonprofit Center for Open Data Enterprise (CODE) are developing a groundbreaking new approach to using SDOH data for prevention, diagnosis, and treatment. ZeOmega is a leading provider of an integrated, whole-person population health management platform, and CODE is a nonprofit organization dedicated to maximizing the value of government data for the public good. With CODE's assistance, ZeOmega integrates publicly available SDOH data, localized enough to be combined with individual patient data, into its Jiva population health management platform. Combining this data with privacy-protected, member-level data is powering new insights on population and individual-level risk and patient care. This new approach helps health plans and providers achieve optimal health and wellness for members and patients.

What Are SDOH, and Why Are They Important?

Many health experts now believe that your ZIP code could be as crucial to your health as your genetic code. According to the Institute for Medicaid Innovation, socioeconomic and physical environmental factors that are directly linked to your local area account for 50% of overall health outcomes, with another 30% tied to health behaviors which can be affected by SDOH as well. Only 20% of total health outcomes are determined by access to quality healthcare services.

What does this mean in practice?

Individuals living in high-crime areas may not be able to get enough exercise due to a lack of safe sidewalks and streets. Others in low-income neighborhoods may find it hallenging to maintain a healthy diet because there are no full-service grocery stores in the community. People who live in areas without adequate public transportation may find it difficult to keep doctor appointments. These SDOH challenges vary based on local conditions, and can impact an individual's overall health, and are tied to life-threatening conditions, like diabetes, asthma, opioid addiction, and high-risk maternity. Data on these SDOH factors can be used to address those challenges and boost health and well-being.
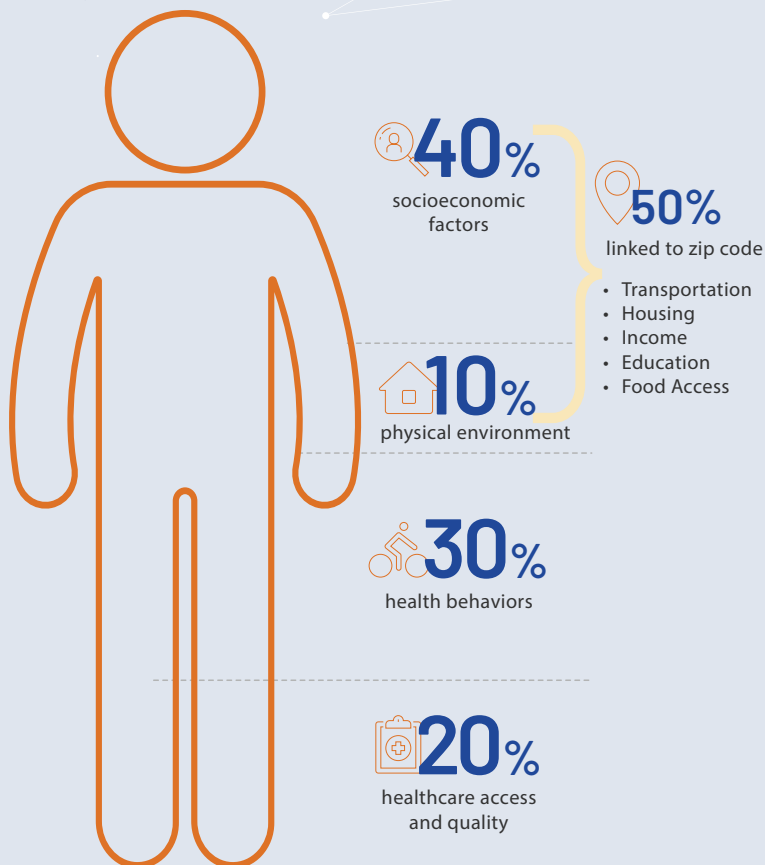
40% socioeconomic factors

50% linked to zip code
- Transportation
- Housing
- Income
- Education
- Food Access

10% physical environment

30% health behaviors

20% healthcare access and quality

Figure - A SOCIAL DETERMINANTS OF HEALTH (SDOH)

An Overview of Public SDOH Data Sources

Using the Kaiser Family Foundation's 5 basic categorization of social determinants of health as a foundation, ZeOmega and CODE have collaborated to identify a concise set of SDOH indicators that can be tracked using different kinds of data from public sources.
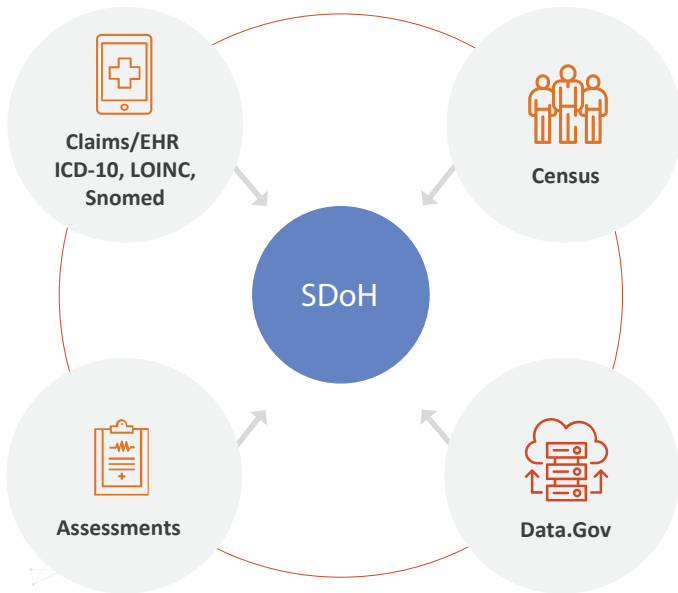
	Category	Indicators
	Transportation	Vehicle Access
	Housing	Housing Affordability Crime Rates
	Income	Income Poverty
	Education	Language High School Education
	Food Access	Distance From Nearest Grocery Store
	Healthy Behaviors	Alcohol User Tobacco Use Fitness Centers
	Community health trends	High Blood Pressure Obesity
	Social context	Mental Health
	Health Care access	Distance To Healthcare Facilities

Figure - B SDOH DATA SOURCES

ZeOmega is now integrating data from those SDOH categories into the Jiva population health management platform. Given that SDOH are a significant contributing factor for many preventable diseases and their mortality rate, recognizing social determinants at the population and individual level can help health plans and providers coordinate care more efficiently and connect patients with necessary social services. Fundamental data types in these categories include the following:

Income: Income indicators include employment, public assistance, household income, and poverty data. There is a correlation between lower incomes and higher levels of mortality as well as specific chronic conditions like diabetes. By better understanding indicators like income and poverty levels, providers and health plans can connect patients with necessary social and community services and more effectively assess risk for chronic conditions.

Housing: Housing indicators reflect both whether someone has a roof over their head and where that roof is located. In addition to housing status, other related indicators include access to parks, population density, crime, and safety. Neighborhood data can impact health in many ways – someone living in an area without parks or sidewalks may struggle to maintain adequate levels of exercise due to lack of infrastructure.

Transportation: Consistent access to transportation is a significant SDOH indicator. Limited public transportation options, inability to afford a car, or lack of access to infrastructure like public sidewalks or bike lanes, means lack of access to non-emergency transportation and may make it more difficult for people to get routine or preventive care. This is a significant issue for Medicaid enrollees.

Education: Key education indicators include literacy rates, vocational training opportunities, early childhood education, and higher education rates. These indicators can help providers and health plans understand their populations. For example, 36 percent of individuals on Medicaid have less than a high school education and low educational levels are associated with an increased risk for major disease, disability, and mortality due to poor health literacy, unhealthy behaviors, lower income, and lack of resources.

Food Access: Key food indicators include access to healthy food options, use of subsidy programs like the Supplemental Nutrition Assistance Program (SNAP), Women, Infants, and Children (WIC) programs, food deserts, dietary choices, and trends data. Food insecurity is a vital SDOH indicator because there is a strong linkage between food insecurity and adverse health issues. Adults who are food insecure are at an increased risk of developing chronic diseases and children are at-risk for developmental issues.

Individual-level health factors that are often impacted by SDOH include obesity, tobacco use, alcohol use, mental health, high blood pressure, and cholesterol. These behaviorally related factors are often linked to SDOH indicators like education and economic stability. While smoking rates have dropped significantly across all categories over the past 40 years, individuals without a high school diploma still smoke at considerably higher rates than those with a college education.

Use Cases: How SDOH Can be Leveraged to Help Address Chronic Conditions

ZeOmega is developing solutions to apply SDOH data to help healthcare providers and health plans more accurately assess population risk of developing chronic conditions and, ultimately, provide better care.

Opioid Addiction: America is in the midst of an opioid addiction crisis. Thousands of Americans die every year from opioid overdose and as of 2018, as many as one-third of Americans knew someone who was addicted to opioids. While the crisis has crossed economic and geographic boundaries, SDOH can help identify populations and individuals at risk for opioid dependence. ZeOmega's Jiva Opioid AI integrates SDOH, medical claims, and other data to assist health plans and other risk-bearing organizations identify and manage opioid abuse populations. It can identify at-risk individuals who never received a prescription for opioids but still have a statistical likelihood of overdosing based on other factors and street access.

Diabetes: More than 30 million Americans have diabetes, with 90 to 95 percent of those cases being type 2, or adult-onset diabetes. The incidence of type 2 diabetes is clearly correlated with income level – people in the lowest income categories have twice the risk of those with the highest income.
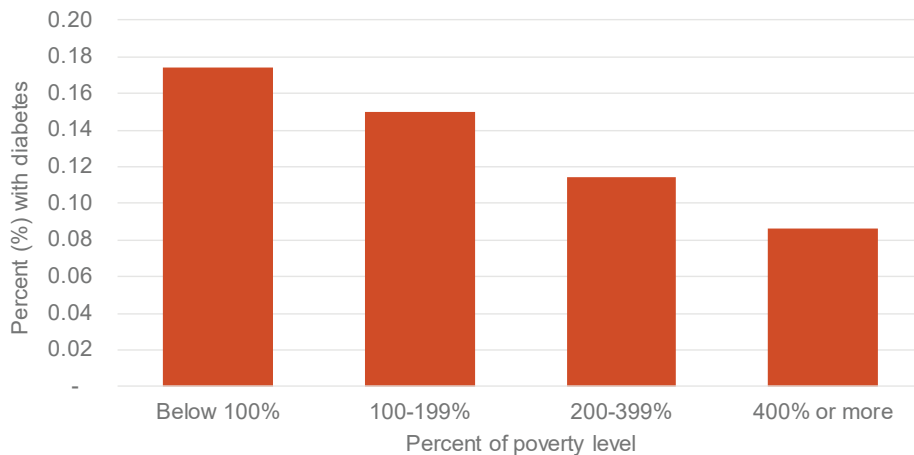
Figure - C DIABETES PREVALENCE (2001-2014) (BY INCOME LEVEL) [10]

Hospitalization rates for diabetes patients are 30 percent greater in high-risk areas. SDOH data on economic stability can be used to identify populations facing a higher risk of developing Type 2 diabetes. Combining this economic data with individual-level data can help target the most at-risk populations and develop community-level prevention strategies and individual-level care plans. SDOH data can be used to measure how effectively communities embrace interventions aimed at improving diet and exercise.

Asthma: More than 25 million Americans have asthma. SDOH data are already helping us understand who those people are and how to treat or prevent their disease. Neighborhood, income, climate, and environmental factors may all play a role.

Asthma among children under age 18 (by income level)
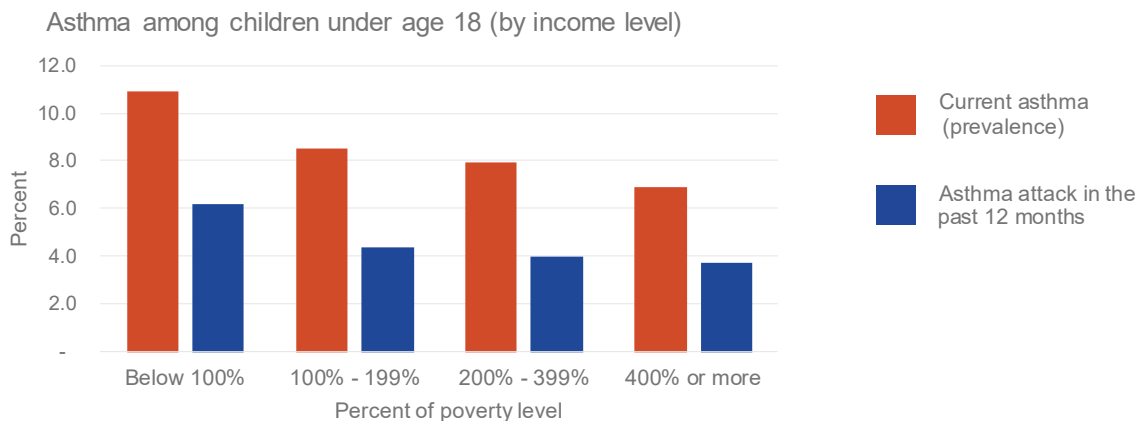
Figure - D ASTHMA AMONG CHLIDREN UNDER AGE 18 (BY INCOME LEVEL) [11]

There are clear links between income and asthma prevalence and severity, and income levels are linked to a number of other SDOH factors that can have a direct impact on those with asthma. Individuals with lower incomes tend to live in areas with poor air quality and lack the resources to buy air filters, replace old carpeting, pay for mold remediation, or take other steps that may lower the risk of developing asthma.

High-Risk Maternity: Preterm births affect one out of every ten infants born in the United States and the rate of preterm births rose every year between 2015 and 2018. As of 2018, America's infant death rate was higher than that of 44 other countries. The impact of SDOH on these numbers cannot be ignored. SDOH factors that have been linked to maternal, infant, and child health outcomes include income, education, and access to medical care. The American College of Obstetricians and Gynecologists (ACOG) 1 recently acknowledged the powerful role that SDOH play in women's health outcomes and issued specific recommendations for how to integrate local-area factors into patient-centered care.

Applying SDOH Data at the Local-Area Level (Census Tract)

Health plans and providers can gather data on SDOH through member surveys, accessing local data from public sources, or both. The challenge is finding high-quality, local-area data that can be used on its own or linked to patient-level data. Most public health programs are administered at the county or state level, while data is often collected and tracked at the ZIP code level. Ultimately, data on SDOH is most useful when available at the census tract level, which is much more granular than ZIP code or county level data.

Total Risk

- Null
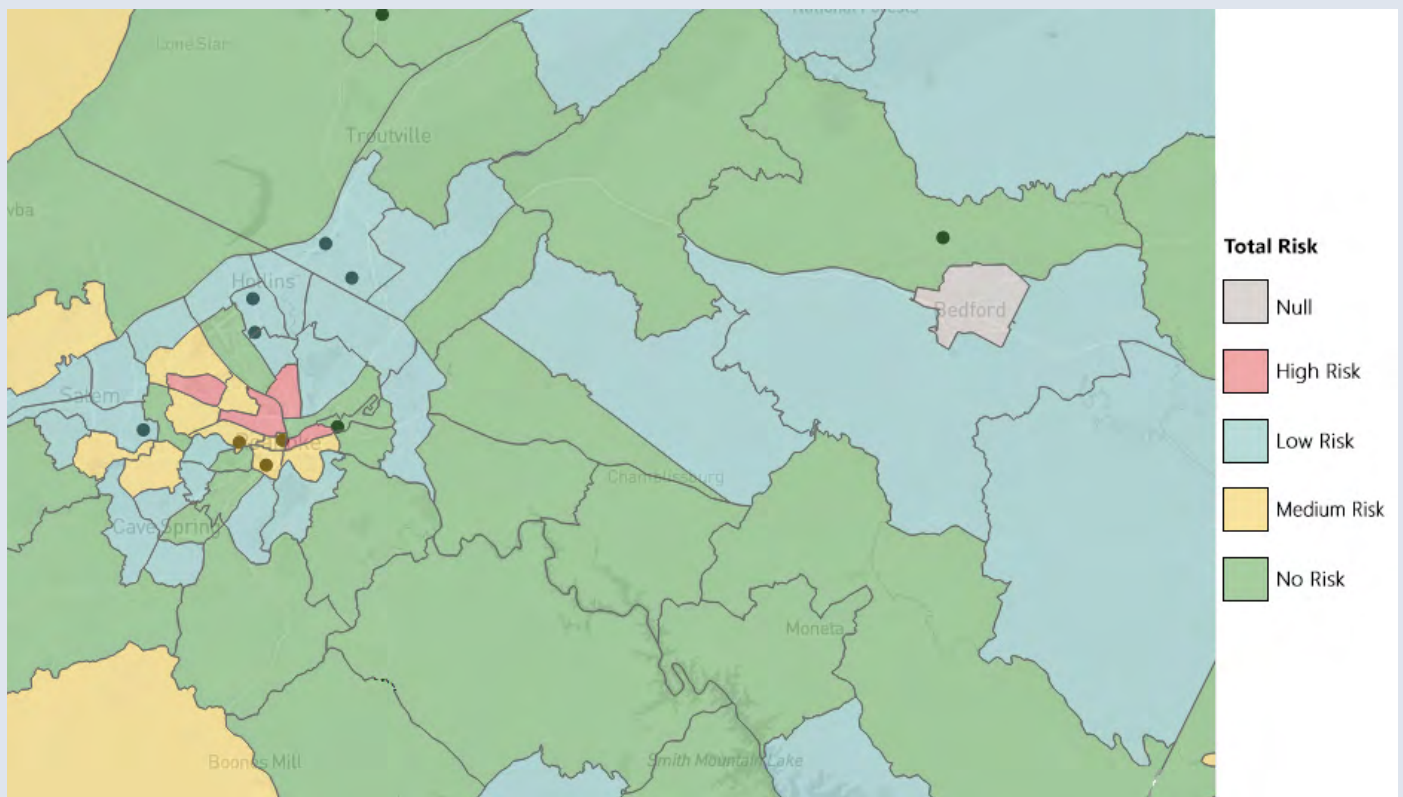- High Risk
- Low Risk
- Medium Risk
- No Risk

Figure - E CENSUS TRACT

Census tracts, part of the standard hierarchy of census geographic entities, are small areas that subdivide counties with an average of around 4,000 people (ranging from 2,500 to 8,000 people).

The U.S. Census Bureau and the Centers for Disease Control and Prevention 9, among other federal agencies, generate data at the census tract level. Other sources of SDOH data are not traditionally tracked at the census tract level. In recent years statistical modeling methods have made it possible to develop estimates from these sources at a highly local level.

Census tracts are useful because they are localized enough to represent subtle variations across nearby locations that are lost at higher levels of geographic divisions, like ZIP Codes or counties. Take the example of two coworkers who work side by side doing similar jobs, in the same office, making the same amount of money. They have similar backgrounds but live five miles apart in areas with slightly different socioeconomic profiles. In this example, the two women may be the same age, have similar jobs and income, and even have identical health profiles. Yet their long-term health trends can go in very different directions. A lot of that divergence can be attributed to where they live: whether they live in a low-risk area (based on median income and other factors) like Mary Mitchell in the example shown here, or in a high-risk area, like Nora Newton. Where they live, more than anything else, drives their long term health outcomes. Understanding those local-area differences can help healthcare providers target appropriate interventions towards individuals living in higher risk areas and assist health plans to anticipate future claims and direct resources more appropriately.

10 year projection - *How much does geography drive behaviors?*

	Baseline Health Status	10-Year Health Trend	10-Year Health Status
Lives in higher income area **Mary Mitchell**	• BMI=28 (overweight) • Borderline HTN • Moderately active		• Weight under control • Adherent to HTN meds • Moderately active

Mary and Nora are work friends with exact same job

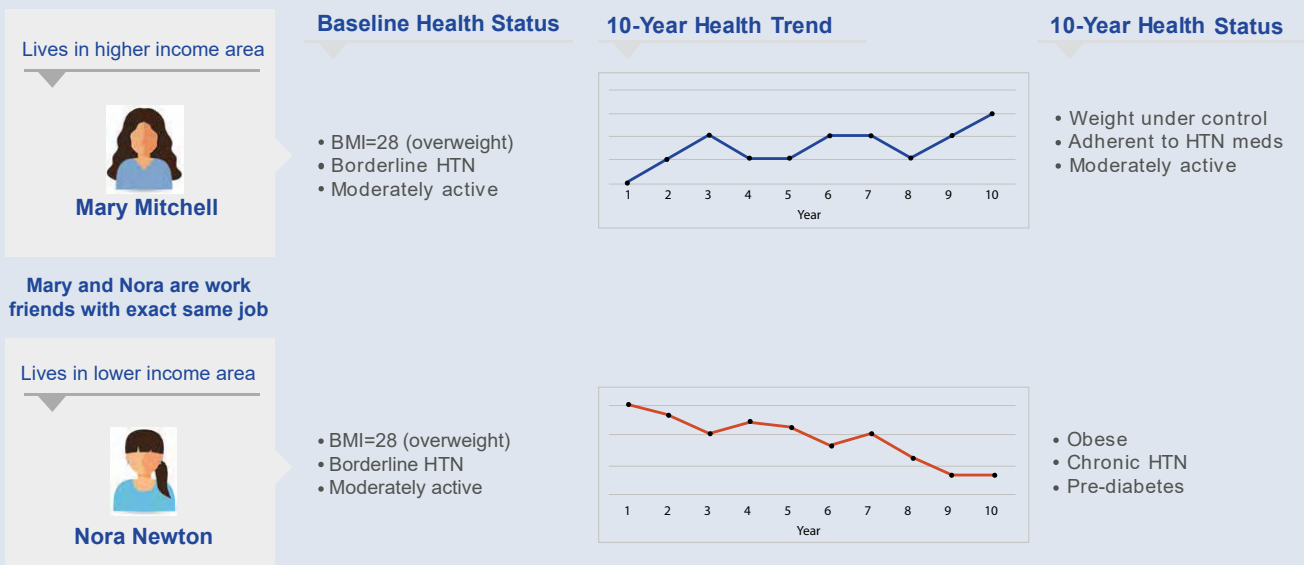|	Baseline Health Status	10-Year Health Trend	10-Year Health Status
Lives in lower income area **Nora Newton**	• BMI=28 (overweight) • Borderline HTN • Moderately active		• Obese • Chronic HTN • Pre-diabetes

Figure - F DIVERGENCE OF HEALTH BEHAVIORS AND OUTCOMES

Exploring the Benefits of a Population Management SDOH Approach

Fully integrating SDOH data into a population health management system has many benefits for providers, health plans, and most importantly, patients. Patients benefit from providers and health plans that are more fully informed and able to offer targeted interventions, not just in clinical care settings but through a new, SDOH-driven continuum of care that includes improved risk assessment, prevention, and social intervention. Health plans and providers can offer this improved care thanks to many benefits derived from SDOH data.

Health plans can use SDOH data to identify and stratify population risk for various conditions and prioritize internal operations and resources to match those risks. They can use this information to plan and better align programs to help high-risk patients and the much larger pool of low- and medium-risk individuals. Ten percent of a health plan's population may be high-risk and in need of immediate care, but the other 90 percent can benefit from programs targeted at improving SDOH indicators and overall health and wellness.

This sort of approach can also help health plans apply value-based care models by assisting patients closer to their own homes in order to reduce the frequency of hospital or clinic visits. Assisting patients with unmet social needs — by connecting them with temporary housing or food banks — can reduce readmission rates, improve overall health outcomes, and simultaneously reduce financial costs per member.

Healthcare providers can use SDOH data in several ways. By integrating community-level SDOH data to conduct risk assessments they can identify emerging trends and potential health issues across populations. Community-level indicators can be combined with individual SDOH data to make more informed care decisions and direct patients towards necessary services, ultimately improving health outcomes. Healthcare providers can identify and assist high-risk members while also applying lessons learned to improve long-term care for medium- and low-risk members.

ZeOmega's Social Determinants of Health Approach: Empowering New Health Insightsand Interventions for Communities and Individuals

ZeOmega is now integrating public SDOH data into a whole-person care program to improve health and wellness for individuals and populations throughout the care continuum.

Healthcare providers and plans can currently collect SDOH data from individual patients to help plan their care. While useful, this kind of individual SDOH screening doesn't always identify at-risk patients. The length of time a nurse or doctor in the clinical setting has with the patient may limit data collection. Even when healthcare providers ask patients to complete questionnaires ahead of time, patients may not take the time to do so. To address this information gap, ZeOmega is pioneering a new approach by integrating public SDOH data into its population health management platform.

The ZeOmega SDOH Social Care Platform is a set of Social Determinants of Health (SDOH) analytics and workflow tools. This groundbreaking platform aggregates data from a wide variety of government, claims, and assessment sources to provide accurate indications of social risk at a community and personal level. The data comprising these indications are presented in detailed dashboards that allow hypotheses to be tested through inquiry and visualization.

The actionable results drive evidence-based strategy and measurable interventions using the intelligent orchestration of a rules-based engine that automatically drives next best practice workflows, closing gaps in physical, behavioral, and social care and reducing health disparity. The ZeOmega SDOH Social Care Platform benefits your organization by identifying SDOH risks and needs across geographic areas, populations, and at an individual level. It helps define and design SDOH campaigns, informs corporate strategy, and mitigates health disparities to ensure health equity.

Only the ZeOmega SDOH Social Care Platform informs the organization's leaders with actionable insights to craft strategy, create better patient outcomes, and improve ROI for your healthcare organization.

Conclusion: Integrating SDOH With Population Health Management

The SDOH care continuum cycles through three stages: prevention and risk management, clinical treatment, and social intervention. ZeOmega's population health management approach uses SDOH data to help payers and providers:

- Assess individual and community-level risk
- Offer interventions in both clinical and social settings
- Measure the effectiveness of those interventions

Measure Intervention Outcomes and Effectiveness

SDoH Care Continuum

Assess Individual and Community Risk

Clinical and Social Interventions

Figure - G SDOH CARE CONTINUUM
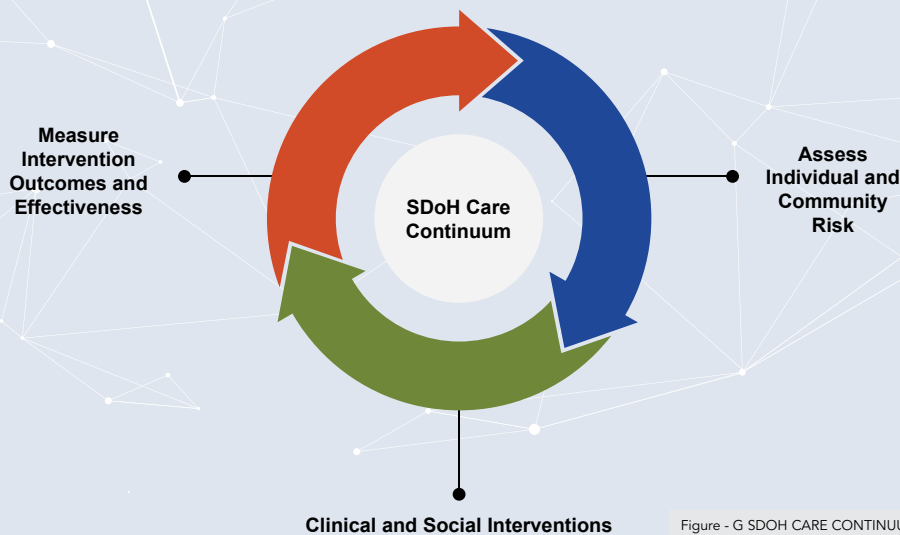
We're at the beginning of a revolution in population health management, made possible by several advances happening at once. Federal, state, and local government agencies are making more public SDOH data available, and new statistical approaches are making it possible to apply that data at a highly localized level. New AI and machine learning models are combining this public data with individual-level data to derive new insights for better, more proactive patient care. And healthcare providers and payers are increasingly committed to addressing their populations' social needs as part of an overall care plan.

The future of healthcare will be a form of social medicine — integrating knowledge about the social determinants of health as much as information from medical tests and genome analysis. ZeOmega and CODE are committed to helping advance this new paradigm. We welcome your insights, inquiries, and opportunities to work together.

For More Information

About ZeOmega

ZeOmega empowers health plans and other risk-bearing organizations with the industry's leading technology for simplifying population health management. Clients using ZeOmega's Jiva Healthcare Enterprise Management Platform experience superior workflow and proven results due to exceptional integration capabilities, unmatched clinical content, and a powerful rules engine. With deep domain expertise and a comprehensive understanding of population health challenges, ZeOmega serves as a true partner for clients with personalized deployment and delivery models. By consistently exceeding customer expectations and project benchmarks, ZeOmega has earned a reputation for being proactive, reliable, and dedicated to improving the health of its clients' members. ZeOmega was named Best in KLAS for Payer Care Management Solutions in 2023 and 2022.

About CODE

The Center for Open Data Enterprise (CODE) is an independent nonprofit organization based in Washington, D.C. whose mission is to maximize the value of open government data for the public good. CODE believes that open government data is a powerful tool for economic growth, social benefit, and scientific research. Over the past several years, CODE has worked with numerous private-sectorpartners, the White House, and federal agencies to help them improve how they collect, publish, and apply data to better meet the needs of data users. For information on CODE's many health-related projects, including a white paper on the social determinants of health, please visit www.odenterprise.org/publications/.

To Learn More, Contact

Sales@ZeOmega.com - or Joel Gurin, President of CODE, at joel@odenterprise.org

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