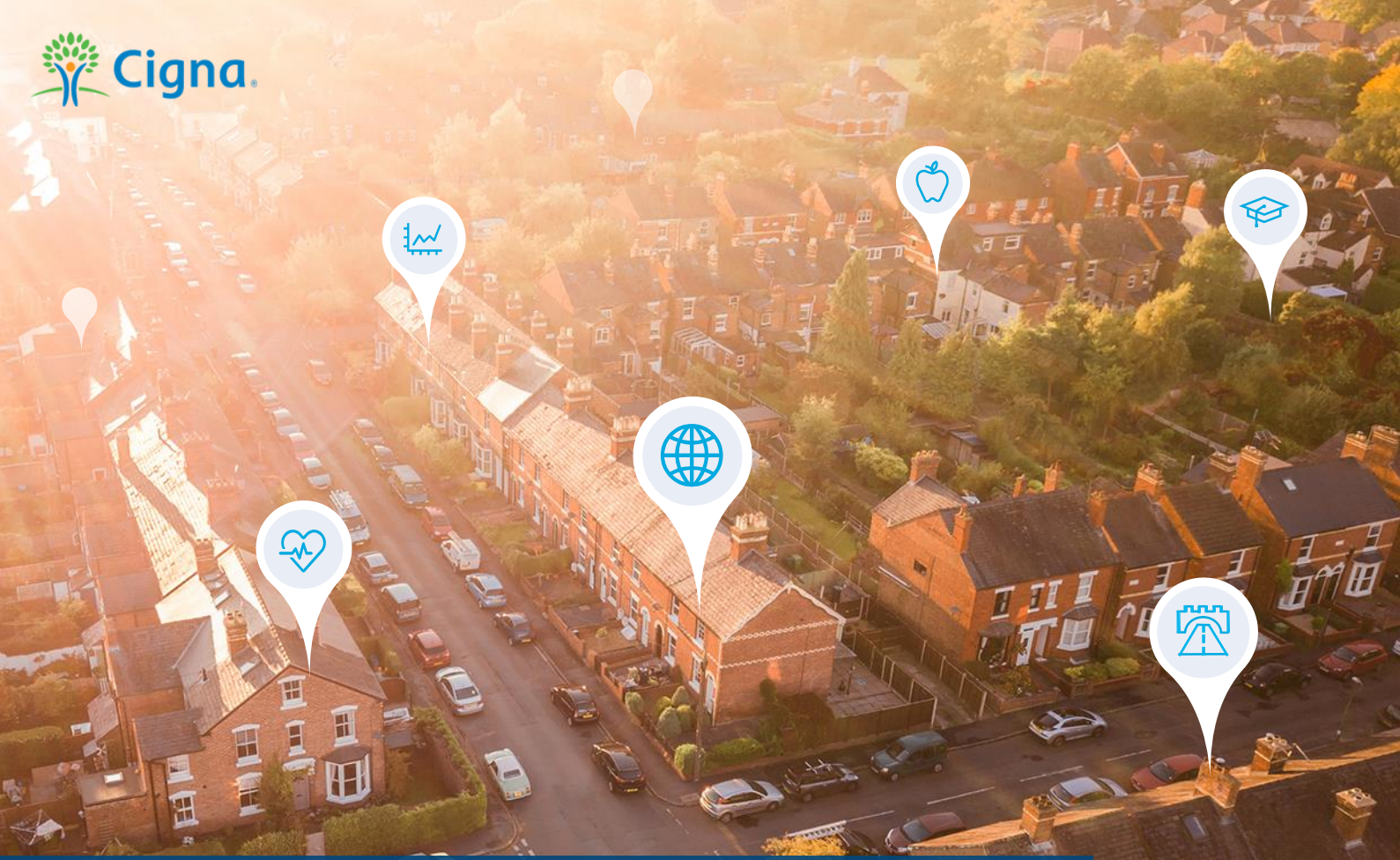


SOCIAL DETERMINANTS

INDEX

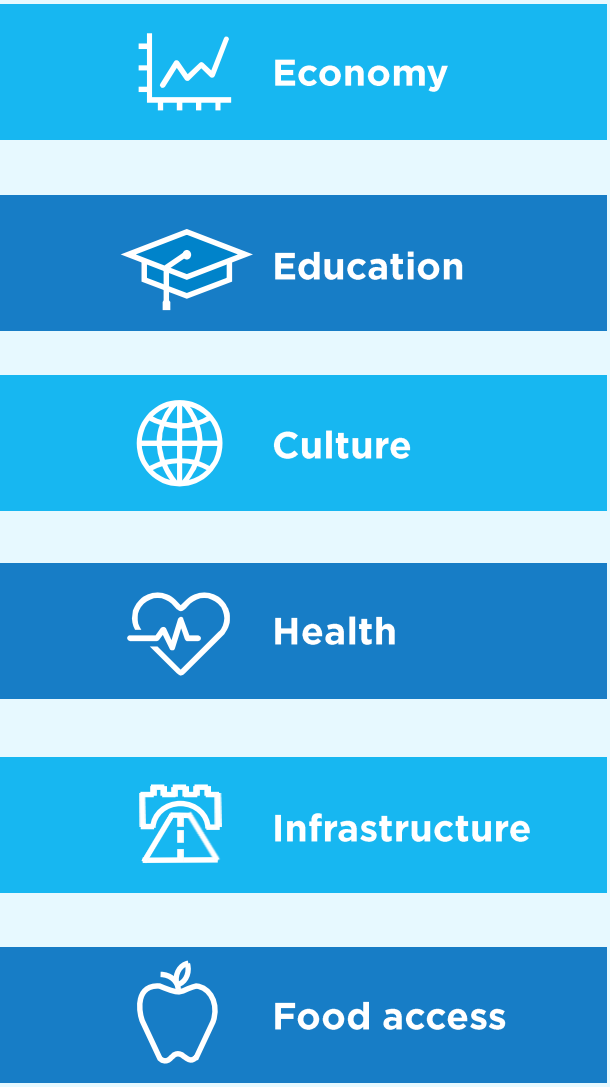
Background

As a global health service company dedicated to whole-person services and solutions; Cigna is vested in identifying and mitigating barriers to optimal health. In this vein, Cigna developed a proprietary Social Determinants Index. Social determinants of health are conditions, in which people are born, grow, work, live, and age, and the wider set of forces and systems shaping the conditions of daily life[1]. Studies have shown that people with unmet needs are more likely to have chronic conditions, higher rates of depression, more frequent emergency room visits, and more frequent 'no-shows' to clinics[2].

Cigna built the Social Determinants Index (SDI) to help understand the potential health disadvantages an individual may experience based on their geographic residence. A health disadvantage is defined as the inability to meet the basic human needs required for full social participation and optimal health and well-being. These basic needs include, but are not limited to economic security, food, shelter, transportation, and education. An individual's geographic residence often is an accurate predictor of whether these basic needs are currently being met. Once unmet basic needs are identified, opportunities can be created to better engage customers in programs and services that address those needs and support optimal health[2].

Overview of Cigna's Social Determinants Index (SDI)

The SDI is a composite score that characterizes a community for social determinants of health at the census tract level in the U.S. A composite score is derived by combining all relevant measures of hypothesized social determinants of health. There are seventeen measures which fall into six domains of social determinants of health: economy, education, culture, health, infrastructure, and food access. The data associated with the measures in each domain are sourced from public use data such as the U.S. Census and U.S. Department of Agriculture.



Additionally, a weighted sum is assigned to each domain to develop a composite score. A literature review on other available community indices used for understanding the impact on health outcomes was conducted to determine the appropriate weights to apply to each domain. For example, economy is typically weighted more heavily due to the high impact on health outcomes (e.g. people who cannot afford to pay for medications tend to be less compliant to their medications).

The result is a composite score for each census tract that follows a scale from low to very high. A higher index score represents a census tract with a higher level of social determinants, where a community is facing more daily living obstacles, whereas a community with a lower index score faces fewer obstacles. In other words, a high SDI score typically indicates greater risk for unmet social needs. The SDI score is meant to provide a portrait of the census tract – to better describe the challenges faced by residents living in the census tract, relative to other areas across the U.S. It is not meant to accurately depict an individual's actual situation, as the data sourced is not at the individual level but the community level. Instead, the SDI provides a better understanding of the environment in which a customer lives and their risk for obstacles related to social determinants of health.

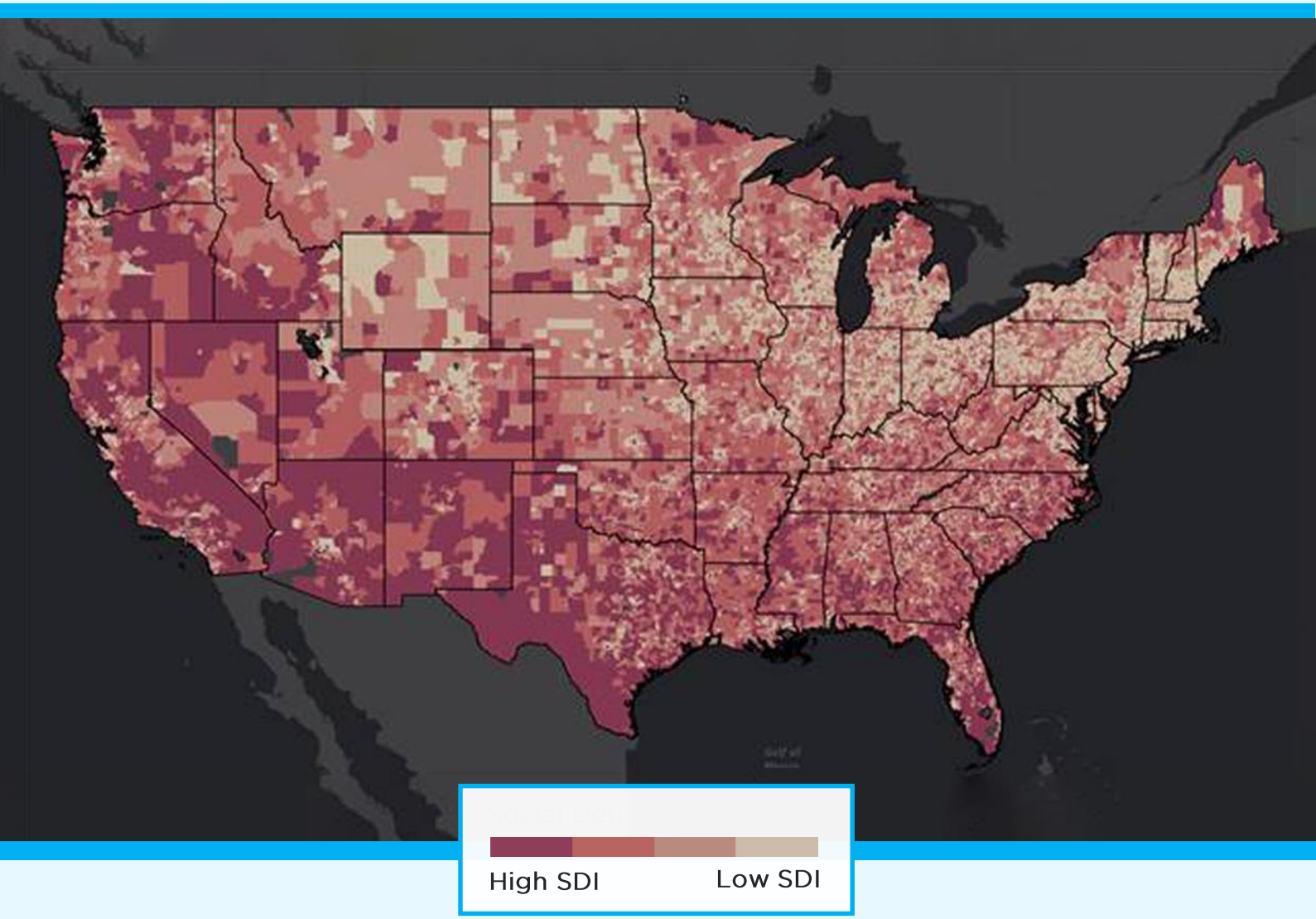
Cigna is currently using the SDI in two ways:

1. **to identify under-resourced communities within Cigna markets where overall health status and utilization are impacted by SDoH, and additional resources may need to be deployed in the community; and**
2. **to improve identification of customers who are at increased risk for poor health status and utilization based on their residence, and increase engagement in programs to support customers with the resources they need to obtain optimal health.**

Identifying Under-Resourced Communities

One method for identifying under-resourced communities or at-risk customer populations is through the use of Geographic Information Systems (GIS), a computer application used for storage, retrieval, mapping, and analysis of geographic or spatial data. Through the use of GIS, Cigna is able to produce maps that create a deeper understanding of the volume of Cigna customers living in areas of high SDI and their health status in comparison to communities with lower SDI.

Cigna's U.S. Commercial Medical Book of Business was mapped using SDI at the census tract level and identified ~18K census tracts with a very high SDI equating to roughly 18% of Cigna customers (shown in Image 1.) As health status, outcomes, utilization and engagement rates for customers living in communities with high SDI are measured, it becomes clear that there are many communities where additional resources may need to be deployed in order for customers to attain optimal health.



Dallas – a case study

The metropolitan region of Dallas, Texas was mapped using GIS to identify under-resourced communities. Census tracts in red represent those with very high SDI scores; 103K or 25% of customers in the Dallas metro region shown in the map reside in a census tract with a very high SDI score. Further analysis showed that customers living in these neighborhoods had higher rates of chronic disease like diabetes and prediabetes compared to customers living in areas of lower SDI (shown in Table 1).

It was also found that diabetic customers living in these areas of very high SDI had a lower rate of annual physicals and a higher rate of avoidable emergency room (ER) visits per customer (shown in Table 2). All results were statistically significant at 0.01 significance level.

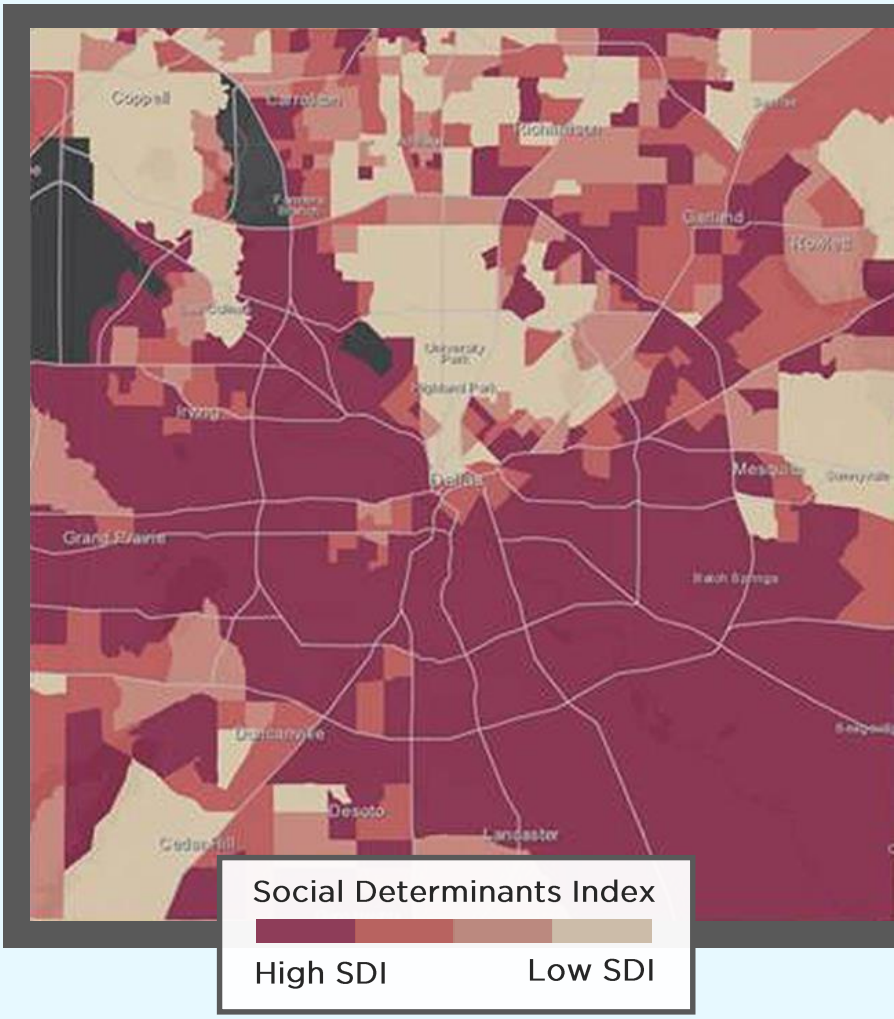


Table 1. Diabetes and Prediabetes Prevalence in Dallas County by SDI

	Very High SDI	*Low SDI*
Diabetes Rate	7.1%	4.9%
Prediabetes Rate	3.0%	2.6%

Table 2. Annual Physicals and Avoidable emergency room (ER) Visits in Dallas County by SDI

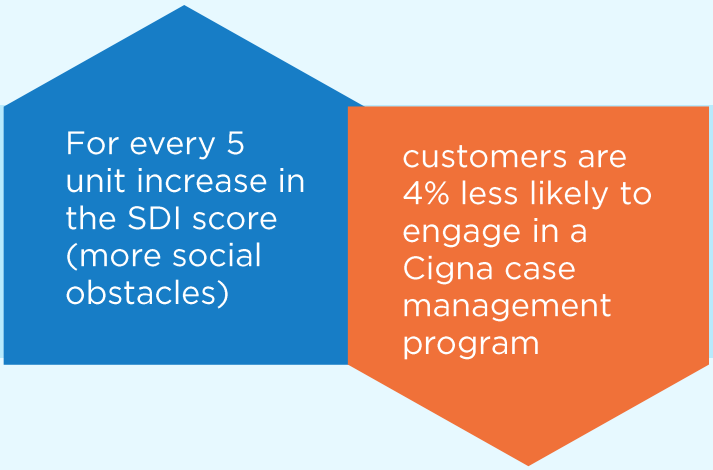
	Very High SDI	*Low SDI*
Annual Physical Rate	34.7%	37.6%
Average Avoidable ER Visits per Customer	0.102	0.061

To improve health outcomes and utilization of care among customers living in communities with high SDI scores, Cigna is piloting different approaches in communities within targeted markets to support customers with unmet basic human needs, at the individual and the community level.

Improving Identification and Engagement of Customers

Social determinants of health not only impact health outcomes, but appear to have a role in how our customers engage with the programs and services provided to them as part of their health plan benefits. An evaluation of Cigna medical case management programs found that customers with chronic disease conditions, such as diabetes, heart/circulatory, gastrointestinal and lower respiratory disease, who lived in a census tract with a high SDI score are more challenging to engage in case management. However, once they do engage, there is a strong correlation with medical cost reduction and ER visit reduction as compared to similar customers who do not engage in case management.

SDI



Once engaged, customers show $663 PMPM savings and 0.80 fewer ER visits*

*Cost savings is an average within first 5 months post engagement and emergency room (ER) reduction is an average within first 6 months post engagement

The development of the SDI allows Cigna to better identify customers who may be facing challenging social circumstances that could impede their ability to take care of their health. Current and future efforts look to leverage the SDI to improve engagement for these customers by tailoring outreach content and using alternative modalities to outreach our customers, such as leveraging our digital capabilities.

Once engaged, Cigna case management programs and services currently assess both the clinical and non-clinical needs of the customer. When a non-clinical need is identified, the case manager assists in identifying resources available within the customer community to meet the psychosocial need and assists the customer in securing those resources. Case managers help a customer cope with complex issues such as physical illness, disabilities of any sort, the aging process, emotional or psychological challenges, family problems, addictive behavior, or problems with school or work. They advocate for the customer to obtain needed services such as food, transportation or financial assistance, and aim at improving the customer's overall quality of life. This support can help to drive lower medical costs by addressing the root cause for a customer's higher health care utilization.

For example, a 49 year old Cigna customer was diagnosed with endometrial cancer. She had been off of work for six weeks and did not qualify for short-term disability because it was too soon after starting her job. She was very concerned that physically she would not be able to continue to work; however, without her income, her family was not able to pay for her treatment or household essentials, including their utilities and mortgage. Cigna's case manager connected with the customer and was able to identify assistance for utilities, multiple local food pantries and two grants totaling $3,000. This assistance is expected to help her complete the needed cancer treatment and prevent homelessness. Addressing these essential needs first is key in impacting overall health of our customers.

*** Based on an analysis of Cigna customer case management engagement and savings data from 07.01.17 to 06.30.18 presented at Academy Health Conference 2019.**

Conclusion

Cigna advocates for addressing whole-person health, including physical, emotional, financial, social and environmental factors. The SDI provides valuable data that is supporting our efforts in partnering across the entire health system to identify and address social determinant factors which fall outside of the traditional health care. The SDI enables Cigna to stimulate evidence-based conversations across varied industries to encourage collaborative efforts to mitigate the social determinants within the local communities they serve.

References & Citations:

1. World Health Organization, http://www.who.int/social_determinants/sdh_definition/en/
2. Berkowitz SA, Hulberg AC, Hong C, et al. Addressing basic resource needs to improve primary care quality: a community collaboration programme. BMJ Quality & Safety 2016;25:164-172. https://qualitysafety.bmj.com/content/25/3/164