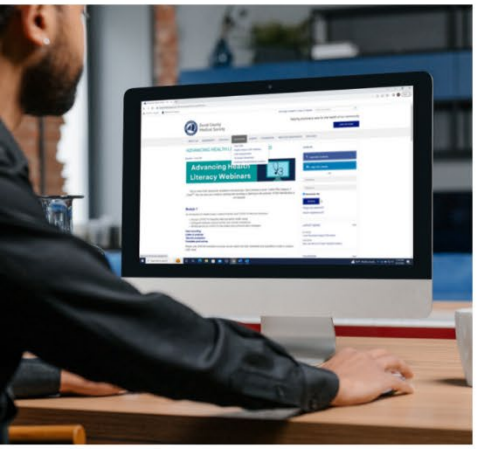
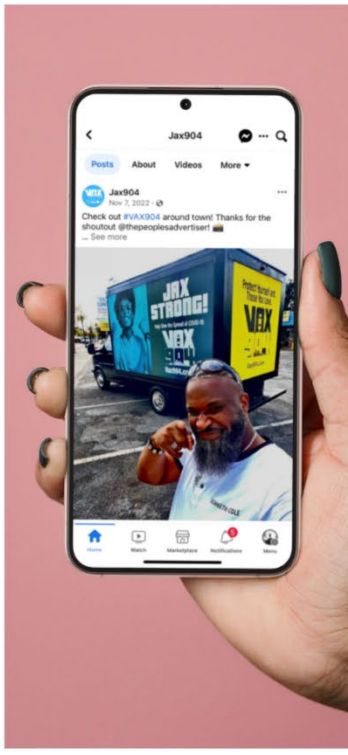
Advancing Health Literacy

to Enhance the Equitable Response to COVID-19 in Jacksonville's Health Zone 1

Final Report: June 2023





Health Planning Council of Northeast Florida

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DISCLAIMER

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For more information, please visit https://www.hhs.gov/ash/index.html.

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EXECUTIVE SUMMARY

In 2021, the City of Jacksonville recognized that the COVID-19 pandemic would not affect all populations similarly. Community leaders were concerned about the impact of COVID-19 on the city's most vulnerable populations.

To better protect its residents from the pandemic, the city secured funding from the U.S. Department of Health and Human Services Office of Minority Health for the *Advancing Health Literacy to Enhance the Equitable Response to COVID-19 in Jacksonville's Health Zone 1* Initiative (AHL Initiative). The Health Planning Council of Northeast Florida, Inc. spearheaded the AHL Initiative, working with collaborative partners to plan, implement, and assess the critical role that health literacy could play in providing vital resources and mitigating measures to vulnerable communities during times of crisis.

The AHL Initiative had ambitious goals:

- Reach 80% of the population of Health Zone 1 through the activation of community health workers and a multimedia approach that addresses vaccine hesitancy in the target populations
- Train 1,500 providers of health services in health literacy, linguistic competency, cultural humility, trauma-informed care, and basic principles of communication with high risk-low trust populations
- Improve Healthy People 2030 objectives of training professionals to increase the number of providers that check understanding and involve more adults in health care decisions (HP 2030 HIT/HC-01, -02, and -03)
- Demonstrate the impact of the work to a similar Comparison Area that did not receive AHL Initiative interventions

The results of the work have been impressive—each goal was exceeded.

The AHL Initiative, through its implementation partners and communications team, reached over 80% of Health Zone 1 with trustworthy, culturally and linguistically appropriate, easy-to-understand materials using face-to-face community engagement as well as multiple traditional and social media channels.

To gauge improvement in the Healthy People 2030 objectives (HP 2030 HIT/HC-01, -02, -03), a Patient Survey was conducted to assess whether physicians trained in health literacy scored higher than the National Targets for these indicators. The results indicate the following:

- **HP 2030 HIT/HC-01:** 97.34% of patients surveyed felt their health care provider checked their understanding by using health literacy methods compared to the National Target of 32.2%
- **HP 2030 HIT/HC-02:** 5.39% of patients surveyed reported poor communication with their health care provider compared to the National Target of 8%
- **HP 2030 HIT/HC-03:** 93.71% of patients surveyed indicated their health care provider involved them in decisions as much as they wanted compared to the National Target of 62.7%

Finally, to demonstrate the impact of AHL Initiative, a geographic analysis was conducted to compare pre- and post-outreach hospitalization data of deidentified COVID-19 Emergency Department (ED) and inpatient cases from January to December 2021 (Baseline Period) and from January to July 2022 (Intervention Period). In this analysis, “outreach” refers to the health literacy interventions provided by the AHL Initiative partners. The contributions of other projects underway at the same time as the AHL Initiative cannot be discounted in the analysis, nor can they be measured. As such, the analysis recognizes there may be confounding variables, yet differences are noted in areas where the AHL Initiative outreach interventions occurred.

The results reveal a difference in hospitalization rates between the Baseline and Intervention Periods for communities that received AHL Initiative outreach interventions compared to those that did not. ZIP Codes With Outreach experienced a 12.85% greater decrease in hospitalization case rates compared to areas Without Outreach. Additionally, the analysis indicates that the outreach interventions played a meaningful role, particularly in High Social Vulnerability Index (SVI) ZIP Codes where the case rate decreases were most prominent in ZIP Codes With Outreach and High SVI. These specific ZIP Codes exhibited a 21% greater decrease in COVID-19 cases from the Baseline to the Intervention Period compared to High SVI ZIP Codes Without Outreach. These findings underscore the vital importance of targeted outreach efforts guided by the Health Literacy Plan in contributing to the reduction of COVID-19 cases in high-risk areas.

The successes of the City of Jacksonville’s AHL Initiative demonstrate ways to bridge the gap between social vulnerability and health literacy through the thoughtful utilization of evidence-based practices and culturally appropriate outreach. These results provide valuable insights informing future efforts to strengthen community engagement, education, and response strategies in times of crisis. The AHL Initiative highlights the impact of health literacy in promoting positive health outcomes.

PROCESS

In 2021, Department of Health and Human Services (HHS) Office of the Assistant Secretary for Health (OASH) and the Office of Minority Health (OMH) announced a funding opportunity for projects to demonstrate the effectiveness of local governments to implement evidence-based health literacy strategies that are culturally appropriate to enhance COVID-19 public health prevention practices and vaccinations in racial and ethnic minority populations and other socially vulnerable populations.[1] This initiative was based on national data from the Centers for Disease Control and Prevention (CDC), that demonstrated disparities among those testing positive for COVID-19[2] and the importance of improving health outcomes using health literacy related to COVID-19 within racial and ethnic minority populations and communities experiencing high social vulnerability index (SVI) scores.[3]

To address the goals of the funding opportunity, the AHL Initiative:

- Identified health disparate communities and researched evidence-based interventions to increase trust in vulnerable populations
- Developed new and strengthened existing partnerships among non-profit organizations, providers of health services, and community-based assets
- Created plans to ensure the community engagement, outreach, and education were steeped in health literacy principles and focused on vulnerable populations
- Implemented evidence-based strategies
- Evaluated outcomes
- Demonstrated successes and impact

Figure 1. *AHL Initiative Process*

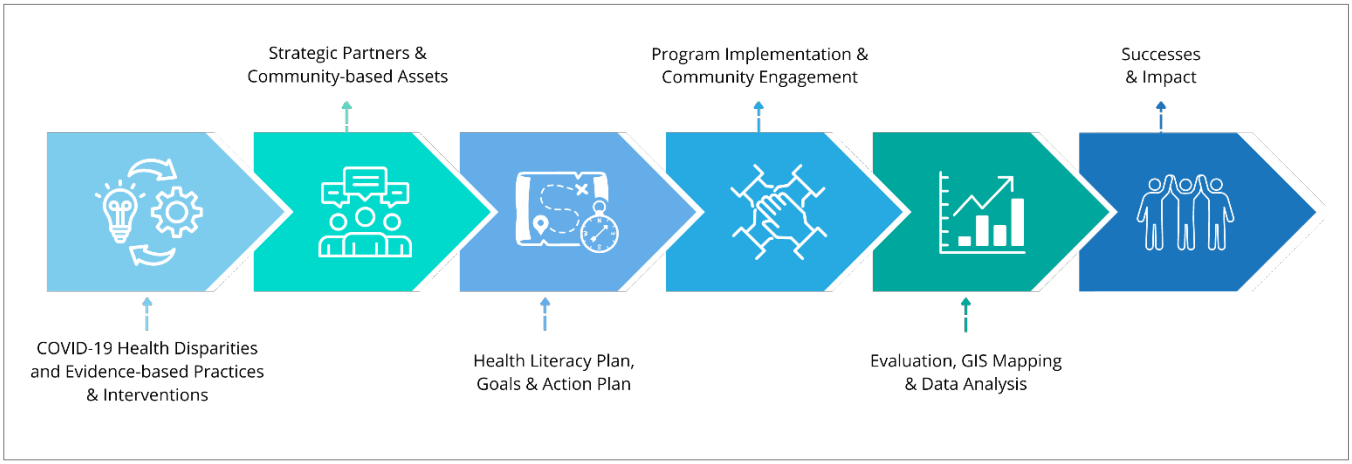


Figure 1 is an infographic illustrating the AHL Initiative Process. The arrows are used throughout this report to signal the steps in the process.

IDENTIFICATION OF OPPORTUNITIES

Health Disparate Communities and Vulnerable Populations

When the COVID-19 pandemic began to spread to communities in Northeast Florida, the City of Jacksonville (COJ) and community leaders recognized the urgent need to address the disproportionate impact it would have on its vulnerable populations.

Vulnerable populations and those living with higher than county rates of adverse social determinants of health were identified using the Florida Department of Health in Duval County's existing six Health Zone impact areas. Those living in Health Zone 1 (HZ1), Jacksonville's urban core, were found to experience more acute levels of social vulnerability and health disparities than those living in other parts of the county. Recognizing the crucial role of health literacy in delivering protective resources and mitigating measures to address health disparities, COJ and its partners implemented the *Advancing Health Literacy to Enhance the Equitable Response to COVID-19 in Jacksonville's Health Zone 1* Initiative (AHL Initiative) with funding from the Office of Minority Health (OMH) of the U.S. Department of Health and Human Services (HHS).

Not Everyone is Affected by COVID-19 in the Same Way

Since 2019, the Coronavirus disease 2019 (COVID-19) has affected people all over the world—but it hasn't affected everyone in the same way. Some communities, especially those with more vulnerable individuals and people of color, have been hit harder by the virus. They have had more infections, more hospital stays, and, sadly, more deaths.[4]

The people of color who live in Jacksonville have rich histories, experiences, and identities that include a diverse range of ethnicities, nationalities, and cultural backgrounds. In this report, the following terms are used to respectfully refer to the people of color who were engaged in the AHL Initiative:

- *"Black"* is used to refer to those of African descent
- *"Hispanic/Latino"* is used for those who are Spanish-speaking or have descended from Mexico, Central or South America, or another Spanish-speaking country or territory
- *"Native American"* is used for the Indigenous people of the continental U.S.

Unfortunately, the trends from 2019 continue into 2023. Nationally as well as in Florida, COVID-19 continues to affect some groups more than others. According to the CDC, as of May 2023, Black residents are still more likely to be hospitalized or die from COVID-19 than White residents. Black individuals are two times more likely to be hospitalized and 1.6 times

more likely to die from COVID-19. Native American and Hispanic/Latino populations are also experiencing similar hardships.[5, 6, 7]

Social Determinants of Health and Social Vulnerability

To understand the disparities in COVID-19 outcomes, it is crucial to recognize the influence of social determinants of health and social vulnerability on an individual's overall health and wellness. Social determinants of health (SDOH), shown in **Figure 2**, are the non-medical factors that influence health outcomes. These are the conditions in which people are born, grow, live, learn, work, play, worship, and age, and the wider set of forces and systems shaping the conditions of daily life, including:

- Affordable housing
- Accessible transportation
- Access to healthy food
- Public spaces for physical activity
- Educational and job opportunities
- Clean air and water
- Safe neighborhoods

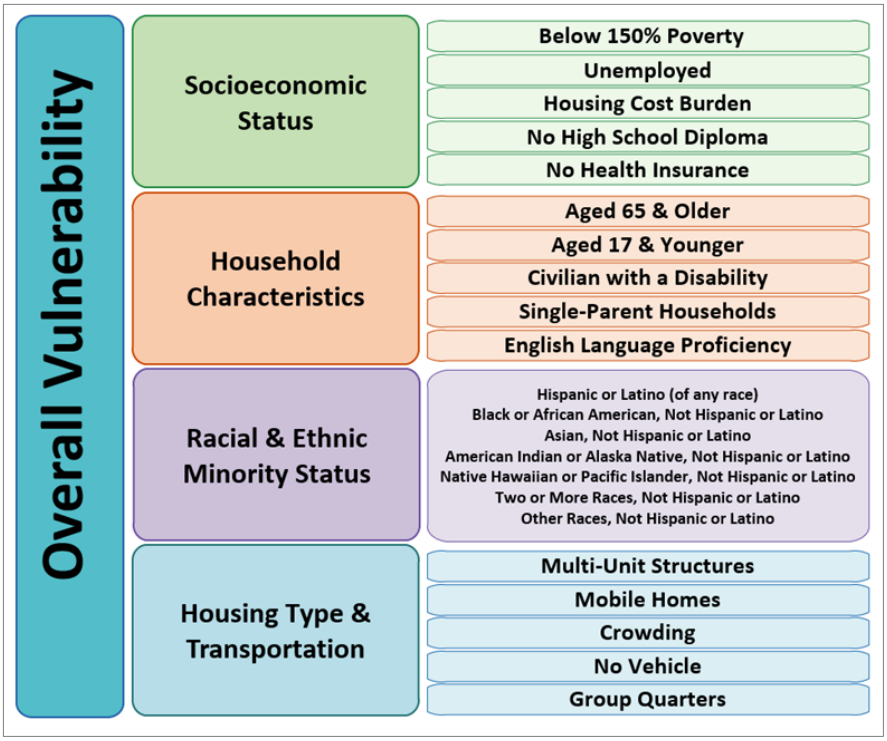
Figure 2. The Social Determinants of Health from Health.gov, Healthy People 2030

Social vulnerability, like SDOH, is influenced by factors such as:

- Socioeconomic status (poverty)
- Minority status (racial and ethnic minorities in a community)
- Vehicle access (lack of transportation)
- Disability (limitations of activities, work, and function)
- Age (the elderly)
- Education level (those who have not completed high school)
- Language proficiency (English as a second language)

Social vulnerability also refers to the potential negative impacts on communities resulting from external stresses on human health, which can stem from both natural and human-caused factors. Together, these factors have been shown to have a greater influence on health than either genetic factors or access to healthcare services.[8]

Figure 3. *The CDC's SVI and its four themes, 2020*



Duval County: A Hotspot for COVID-19 Vulnerability and Low Health Literacy

A Social Vulnerability Index (SVI) score is a combined measure of the four themes seen in **Figure 3**. Each theme and overall SVI are given a score from 0 to 1. A score of 0 means a community is least vulnerable, and a score of 1 means it is most vulnerable. Communities with higher SVI scores are more likely to be affected by public health emergencies, including pandemics. The SVI is available at the census tract level and can be aggregated at the ZIP Code level using Geographic Information Systems (GIS), as was done to assess this initiative.

Duval County stands out as a hotspot of COVID-19 vulnerability due to its high SVI score of 0.79 out of 1, which is in the 90th percentile for social vulnerability nationwide.[9]

It has been noted that areas with higher SVI scores were associated with higher rates of COVID-19 cases and deaths.[10] These communities often face barriers to healthcare access, experience higher rates of chronic conditions and diseases, and have limited access to accurate and culturally and linguistically appropriate health information.

These strong correlations between SVI and COVID-19 metrics have led public health officials to utilize the SVI as a tool for identifying and providing assistance to regions throughout the country that are more likely to be exposed to the highly contagious COVID-19 virus. In this

initiative, the SVI was used to identify HZ1 and other areas in Jacksonville for intervention and to later assess impact.

Why Health Literacy Matters

Health literacy is generally described as the ability of an individual to obtain, process, and understand basic health information and services needed to make informed decisions about one's health. However, health literacy can also be viewed as an asset that can connect and extend an individual's understanding of health information to their families, communities, and healthcare organizations. The AHL Initiative focused on improving individual and community health literacy by joining trusted community member messengers with easy-to-understand materials and supportive health and social services to foster better health outcomes.[11]

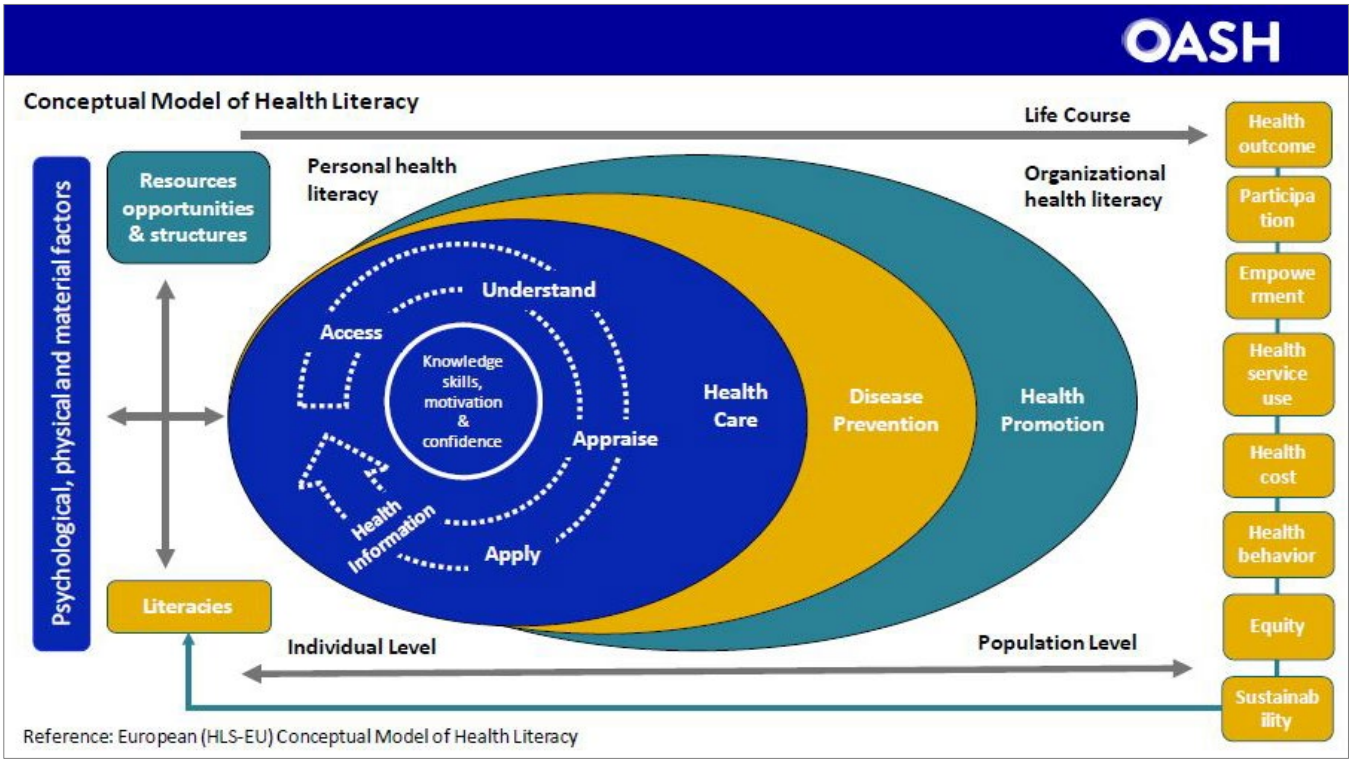
One of the guiding principles of health literacy is the ability of individuals to gain access to trustworthy information that they can readily understand and use to make decisions about maintaining and improving health for themselves, their families, and their communities. This ability is important at any time. In the context of COVID-19, this principle became paramount to keeping residents, especially those suffering with health disparities, healthy, out of hospitals and ultimately alive.

In the context of Duval County's high social vulnerability, the work of the AHL partners took on an even greater importance. Health literacy principles, community-based outreach, and one-on-one education were emphasized when addressing the challenges socially vulnerable populations faced in understanding and responding to COVID-19. The partners also worked to help break down barriers to gaining trustworthy, relevant information to empower individuals to make informed decisions about their health.

The interventions and strategies utilized during the implementation of the AHL Initiative were focused on elements from both the *Conceptual Model of Health Literacy* provided by HHS-OMH and the *Health and Human Services, Office of Disease Prevention and Health Promotion (HHS-ODPHP) National Action Plan to Improve Health Literacy*.

The *Conceptual Model of Health Literacy* [**Figure 4**] provided the framework by which to ensure health care, disease prevention, and health promotion were addressed in the implementation of the AHL Initiative. Additionally, the model provided the continuum of Personal and Organizational Health Literacy as well as Individual to Population Levels of health outcomes, participation, healthy behaviors, equity, and sustainability.

Figure 4. *European Conceptual Model of Health Literacy provided by HHS-OMH*



The use of both the model and the *National Action Plan* is evidenced in the initiative's work, which focused on:

- **Health care:** Health care providers were engaged in training to improve their communication skills with patients, use plain language, and incorporate the Teach-Back Method in their practices. By doing so, these providers were able to ensure patients could understand the medical information that was shared, make informed decisions about their health, and comply with the medical advice provided.
- **Disease prevention:** Outreach efforts included community engagement and dissemination of up-to-date COVID-19 guidance from community health workers (CHWs) who reflected the populations they served.
- **Health information:** Information was disseminated by trusted healthcare messengers, community members, and community leaders. These points of contact provided residents with accurate, easy-to-understand information about the risk factors for COVID-19, ways to reduce risks including vaccinations, refuted misinformation/disinformation, and ensured residents had the information needed to make informed decisions about their health and that of their families.
- **Health promotion:** Best practices in health were promoted by training materials and education presented to providers of health services and residents regarding the social

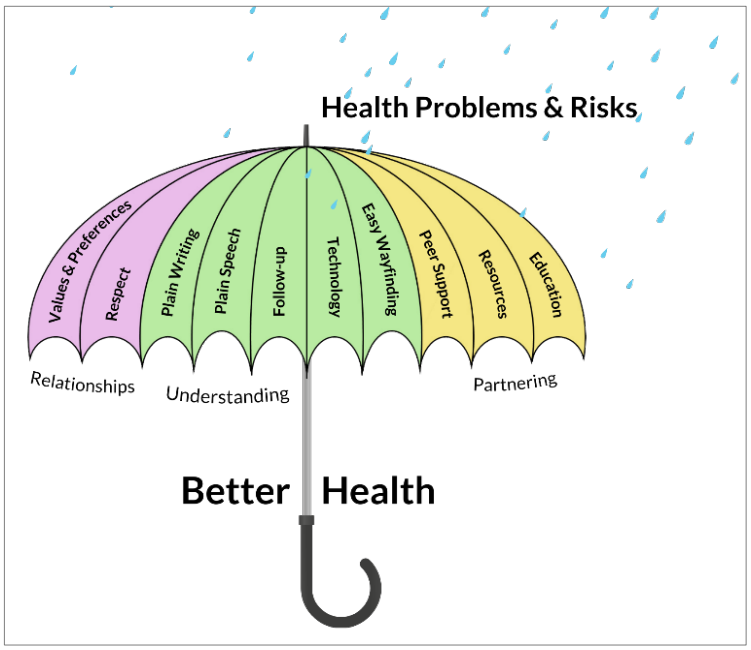
determinants of health and comorbidities that may contribute to more severe cases of COVID-19.

- **Building sustainability:** Multi-sector partnerships and inclusion of the National Standards for Culturally and Linguistically Appropriate Services (NCLAS) in health care and community serving organizations ensures the sustainability of health literacy within the community.

Another useful way of conceptualizing health literacy is through the following image of "The Health Literacy Umbrella" [**Figure 5**]. Developed by the Patients as Partners program of the Province of British Columbia, this visual representation provides a model for the initiative's commitment to empowering residents to actively participate in their healthcare journey in the midst of the pandemic.

The graphic also serves as a powerful illustration to demonstrate how health literacy provides protective factors to promote personal and organizational health literacy to ensure effective communication, decision making, and patient-centered healthcare practices.

Figure 5. *The Health Literacy Umbrella from Davis, C, and McQuillen, J. (2009). BC Health Literacy Prototype*



In summary, the intersections of social vulnerability and health literacy are critical to understanding and addressing the impact of COVID-19. By recognizing and addressing the unique challenges faced by socially vulnerable populations and improving health literacy in these areas, the AHL Initiative partners informed, educated, and empowered individuals, providers of health care services, and systems of care to work towards improving health outcomes.

STRATEGIC PARTNERSHIPS

Strong partnerships and collaborations are vital to overcoming challenges faced by vulnerable communities—both during the COVID-19 pandemic and future public health emergencies.

Strategic partnerships were developed and expanded throughout the AHL Initiative to bridge the gap between social vulnerability and health literacy. In all, there were over 100 community-based organizations (CBOs) that partnered and collaborated to advance health literacy throughout the grant period.

The strategic partnerships included those who provided face-to-face outreach to community members in their neighborhoods. These partnerships capitalized on relevant community cultural events and celebrations to reach residents where they live, work, learn, worship, play, and retire. The core group of strategic partners included: Duval Safety Net Collaborative, WeCareJax, JaxCareConnect, Community Health Outreach, Muslim American Social Services, and Mission House.

These strategic partners mobilized CHWs, outreach personnel, and health educators who represented the communities they served. CHWs addressed low health literacy by providing easy-to-understand materials, education and information about healthy behaviors, risks and prevention of COVID-19, and mitigating measures such as mask-wearing and hand-washing. Information was also provided about locations of community-based clinics, mobile clinics and pop-up opportunities for COVID-19 testing and vaccinations in HZ1 and nearby communities.

The educational offerings that introduced many Jacksonville residents to health literacy principles were made possible through strategic partnerships with: Partnership for Child Health, The Voices Institute, Duval County Medical Society, Medical Society of Northeast Florida, Hope Street, Alpha and Omega Healthcare Education, and their respective Health Equity Educators and CHWs.

Additionally, the AHL Initiative's health services providers instituted NCLAS in their work and provided outreach, education, and vaccinations in HZ1 and other vulnerable communities. These health services providers included: UF Health Jacksonville Shands Medical Center, Agape Family Health Clinic, Sulzbacher Center, Volunteers in Medicine, Federally Qualified Health Centers (FQHCs), and other community-based clinics that offer low- to no-cost (to the individual) health care options.

Finally, for those who did not have health insurance, the AHL Initiative provided referrals and warm handoffs to partner organizations. These partner organizations specialized in access to care resources by providing information about the Affordable Care Act and offering enrollment services for the Health Insurance Marketplace®.

These partnerships were vital to reaching people who were adversely affected by SDOH, lived in areas with high SVI scores, and had low health literacy. The partners were able to address social vulnerability and provide outreach that empowered community members to protect themselves against COVID-19. The use of clear and simple language, multiple formats of information dissemination, and collaboration with community-trusted messengers and organizations were essential strategies to reach isolated or marginalized populations. By considering health literacy as an asset that could be used to address social vulnerability, outreach efforts ensured that both individuals and entire communities had access to trustworthy information, reliable resources, and improved healthcare access needed to safeguard against COVID-19.

PLANNING THE WAY

Overview of Vulnerable Communities in Jacksonville

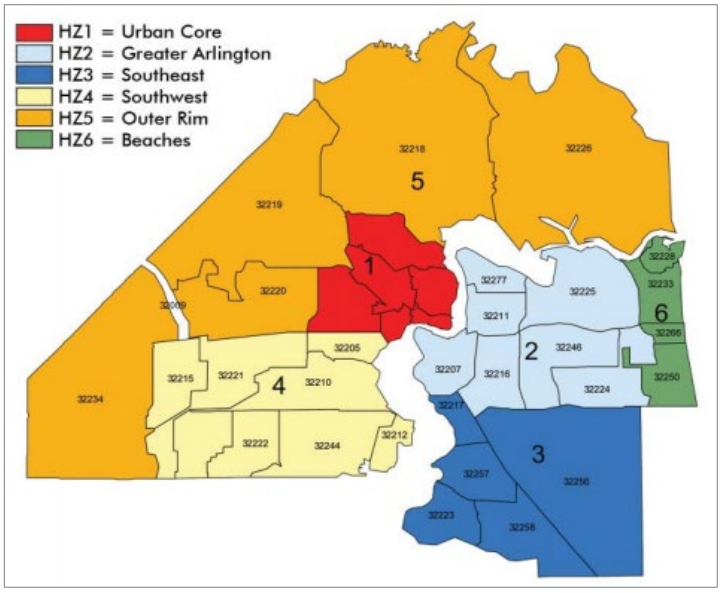
Jacksonville is the largest city by square mileage in the contiguous United States. In 1968, the City of Jacksonville and Duval County merged, creating a consolidated city/county government over all of Duval County except for Baldwin, Atlantic Beach, Jacksonville Beach, and Neptune Beach. Its public safety, health, and educational resources are shared by almost one million residents across 900 square miles.

To help ensure public health services are agile and ready to address crises, the Florida Department of Health in Duval County divided the city's ZIP Codes into six (6) Health Zones. These Health Zones (HZs) are used to better identify vulnerable populations with health disparities so the health department, government agencies, and CBOs can respond with needed resources. Those living in HZ1, Jacksonville's urban core, experience more acute levels of social vulnerability and adverse social determinants of health than other areas of the County.

Duval County's Health Zones

Duval County is divided into six Health Zones [**Figure 6**], each with unique health characteristics and challenges. The layout of these health zones was set up by the Florida Department of Health in Duval County to organize and address the health needs of the local communities effectively.

***Figure 6**. Duval County's Health Zones by KisJx*



Health Zone 1: [red area] Primarily covers downtown Jacksonville and the surrounding urban areas. It is known to have the highest health disparities, with residents often facing challenges related to socioeconomic factors their health. This area tends to have the highest SVI scores.

Health Zone 2: [light blue area] Comprises largely suburban areas with a relatively higher socioeconomic status and better health outcomes, on average.

Health Zone 3: [dark blue area] Incorporates parts of the Southside and Mandarin areas. This zone generally demonstrates better health outcomes, similar to Health Zone 2.

Health Zone 4: [yellow area] Covers the Westside and parts of the Northside. It's a mix of urban and rural areas, and due to its proximity to HZ1, its services and health outcomes can vary greatly.

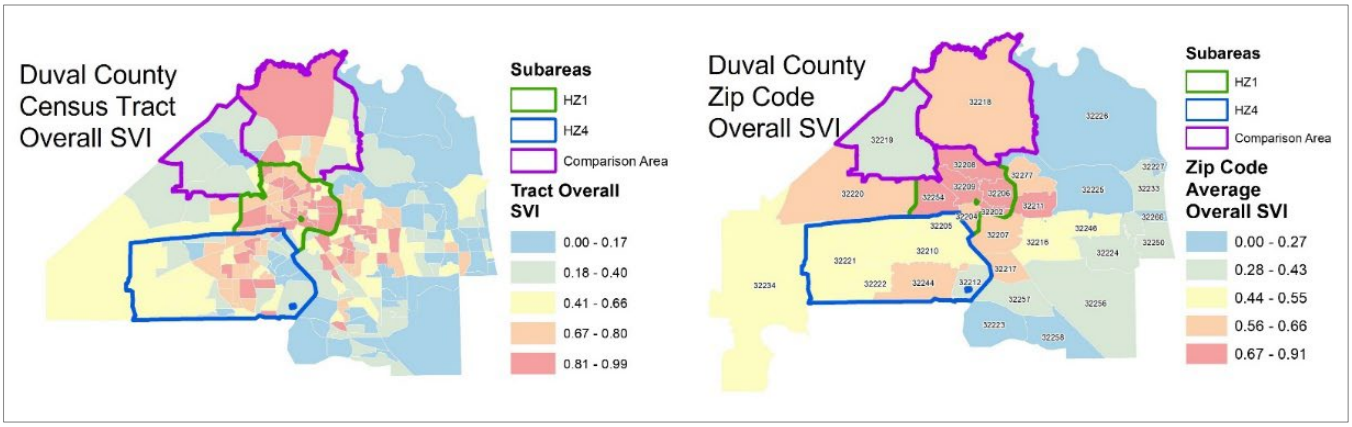
Health Zone 5: [gold area] Includes the outer rim of the urban core, which often faces similar health challenges as HZ1, as well as some rural areas to the north and west.

Health Zone 6: [green area] Covers Jacksonville Beach, Atlantic Beach, and Neptune Beach. This zone is somewhat more suburban and rural, with its health outcomes varying by location.

SVI and Health Zone 1

In **Figure 7**, the SVI is shown as shaded colors for Duval County by census tract, and then averaged by ZIP Code Tabulation Areas (ZCTAs), which are ZIP Code-like areas created by the U.S. Census Bureau. ZCTAs are meant to approximate the land area covered by each ZIP Code for the purpose of census data collection and analysis. Note how the SVI is highest in HZ1 at both the census tract and ZCTA geographic levels.

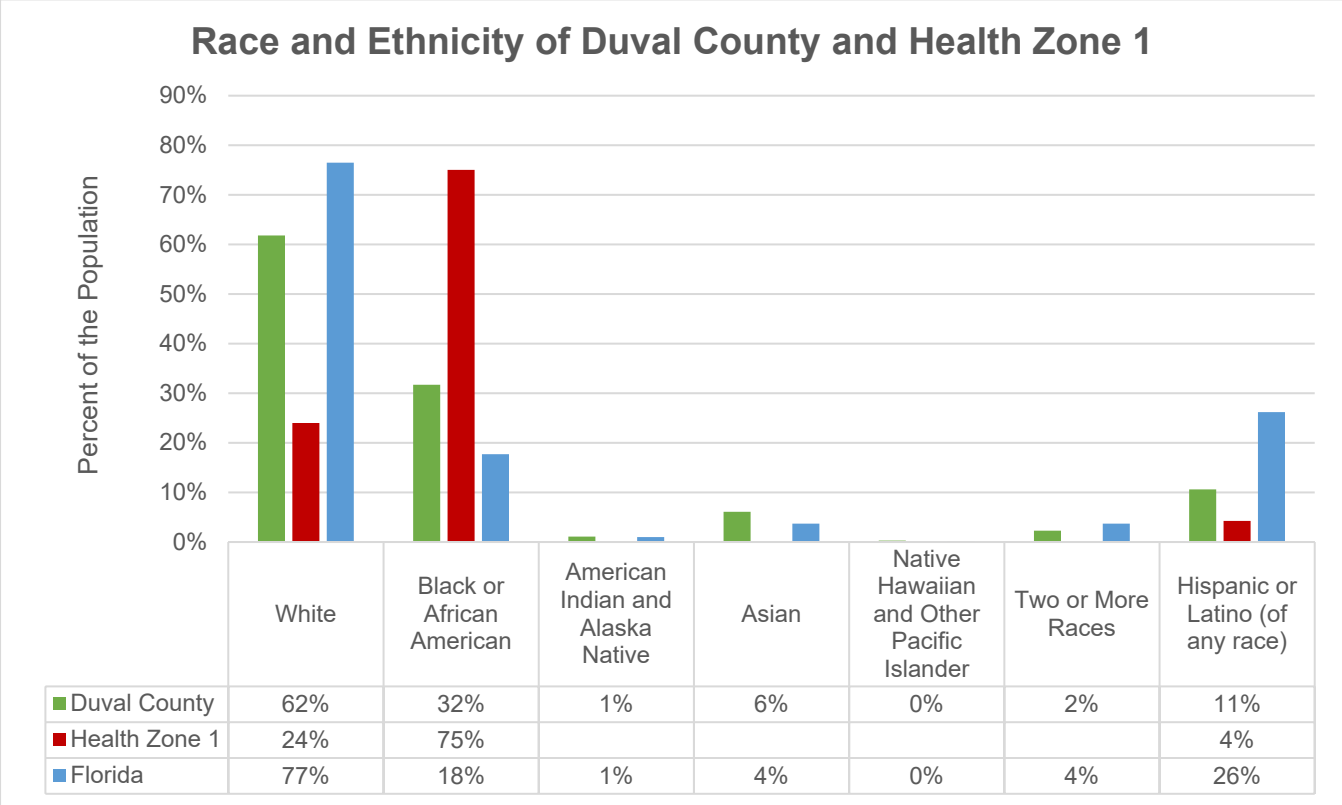
Figure 7. *Maps showing Duval County Overall SVI Scores by Census Tract and ZIP Code average of Census Tract Scores, 2020*



City of Jacksonville Demographics

Figure 8 compares the demographics of Duval County in relation to HZ1 and the state.

Figure 8. *Race and Ethnicity of Duval County, United States Census Bureau, 2022*



	White	Black or African American	American Indian and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Two or More Races	Hispanic or Latino (of any race)
Duval County	62%	32%	1%	6%	0%	2%	11%
Health Zone 1	24%	75%					4%
Florida	77%	18%	1%	4%	0%	4%	26%

The studies identified previously in this report suggest an association between an elevated SVI ranking and a substantial Black population with an increased risk of COVID-19 infection and mortality.[2, 5, 7, 9] In HZ1, there is a confluence of prevalent social vulnerability themes, elevated rates of adverse SDOH, a Black population of approximately 75%, and comorbidities for severe COVID-19 infections such as diabetes. Additionally, the highest concentrations of SVI tracts in the county are found in HZ1, with some SVI census tract scores reaching 0.99 out of 1. Official reports and maps going back to the early and mid-2000s consistently show that HZ1 has had a high concentration of adverse SDOH that make it more susceptible to higher rates of COVID-19 hospitalizations.

Planning for Success

HPCNEF used the Health Zone framework, the mapping of areas experiencing high SVI scores, and the Health Disparity Impact Statement developed by Edward Waters University to lead the AHL Initiative. To ensure goals were achieved, HPCNEF managed the development of a series of plans to guide the implementation of the AHL Initiative.

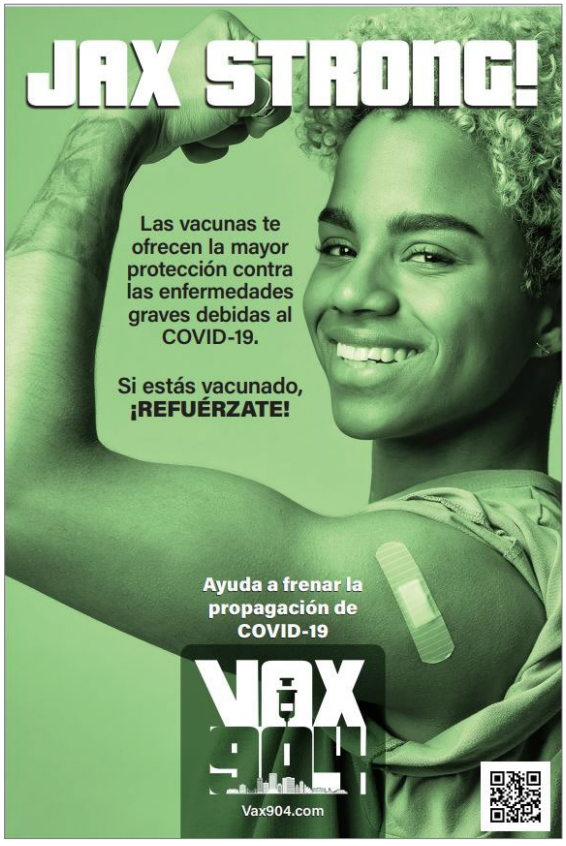
The Health Literacy Plan (HLP), created by Selena Webster-Bass of the Voices Institute, provided evidence-based practices and demonstrated the ways to use culturally and linguistically appropriate health information during community engagement, outreach, and education/training offerings for both residents and health service providers. The HLP highlighted the need to expand the use of NCLAS in health and health care. It also assisted the strategic partners to identify and develop a wide range of potential community-based partnerships to extend community engagement, educational offerings, and outreach to vulnerable populations.

The HLP brought together the Personal and Organizational Health Literacy components through the formation of the Advancing Health Literacy MOSAIC (Multicultural Outreach Supporters Addressing Inequities and COVID-19) Community Advisory Council and the involvement of the Population Health Consortium Health Equity, Education, and Training Workgroup (PHC Workgroup). These entities consisted of community members, community leaders, CHWs, Health Equity Educators, outreach personnel, partner organizations, CBOs working with vulnerable populations, hospital systems, and healthcare providers. The MOSAIC, PHC Workgroup, and HPCNEF provided forums for the vetting and assessment of training offerings, potential and planned interventions, and educational materials.

Discussions among these organizations and residents from HZ1 made it possible to ensure materials created were high-quality, written using plain language, easy to understand, and effective in conveying messages related to COVID-19 mitigation measures, vaccinations, and health promotion. With this insight, HPCNEF and collaborative partners were able to design interventions to best meet the needs of the target audience identified in the Health Disparity Impact Statement.

Next, the HLP also informed the Communications Plan, which was developed in concert by the City of Jacksonville, Eighth & Whitner, and Indelible Solutions. The Communications Plan used traditional, multi-, and social media platforms as well as community-based advertising, website-based resources, and innovative, eye-catching graphics to spread trustworthy information and dispel misinformation. The developed materials were produced in the most common languages spoken and

Figure 9. *Example of Poster in Haitian Creole that states: Vaccines offer you the strongest protection against severe illness due to COVID-19. If you're vaccinated, GET BOOSTED*



read by the ethnic populations found in HZ1: Spanish, Haitian Creole, and English. Equipped with these materials, the AHL Initiative partners conveyed information to and built trust with vulnerable populations and health disparate communities in Jacksonville.

The Work/Action Plans were created by HPCNEF in coordination with the strategic partners. These Plans provided specific, measurable, achievable, realistic, and time-phased (SMART) objectives and goals that aligned with the Health Disparity Impact Statement and to ensure the effective deployment of resources. The Evaluation Team created the Evaluation Plan to measure progress and assess goal attainment. The Monitoring Plan was utilized to review monthly progress and determine ways to reallocate resources as the COVID-19 infection rates, disinformation, and vaccinations changed over the 24-month course of the initiative. The Quality Improvement Plan was operationalized to assess the ability of the initiative to engage the target population, determine the types of services offered through the initiative, and track the implementation of evidence-based health literacy strategies. Together, these plans allowed the AHL Initiative partners to accomplish and exceed their goals.

IMPLEMENTATION

The AHL Initiative was guided by evidence-based strategies aimed at advancing health literacy and promoting improved health outcomes within HZ1.

These objectives were designed to address Healthy People 2030 goals of improving both Personal Health Literacy and Organizational Health Literacy, recognizing the importance of community outreach and provider training in achieving meaningful and long-lasting impact.

GOAL I

Reach 80% of the population of HZ1 through the activation of CHWs and a multimedia approach that addresses vaccine hesitancy in target populations

The first goal focused on Personal Health Literacy, with the objective of reaching 80% of the population in HZ1 through community outreach efforts. This goal emphasized the need for widespread dissemination of culturally appropriate health information to improve health literacy within vulnerable communities. Individuals in areas with high social vulnerability may also have low health literacy. This may lead to difficulty understanding complex health information, including information about the risk of COVID-19 infections and recommendations for vaccines and boosters. Additionally, there are historical instances of medical mistrust which may have contributed to vaccine hesitancy and reluctance to accept information from the “government” and community “outsiders”.[12]

To achieve this goal, CHWs recruited from the communities in which they served were deployed to connect directly with vulnerable populations where they live, work, learn, play, worship, and retire. The CHWs provided trustworthy, equity-enhancing health information to individual community members and at community gatherings and events.

From the beginning of the initiative, it was important to quickly counter misinformation and skepticism regarding the safety and efficacy of vaccines, particularly among communities with low health literacy that relied on informal sources of information, such as social media or word-of-mouth.

Furthermore, medical mistrust, particularly among HZ1’s Black community members, was addressed with one-on-one conversations, discussions with healthcare providers from the community, and education sessions designed to help reduce health literacy gaps offered in neighborhoods by local CHWs. By addressing the potential mistrust directly, the AHL Initiative partners were able to influence the willingness of individuals to engage with healthcare providers, seek accurate information, and make informed decisions about vaccinations and their health.

Figure 10. *Film, Tuskegee Legacy Stories, created by director Deborah Riley Draper, production company Coffee Bluff Pictures and creative agency JOY Collective in conjunction with Voices for Our Fathers Legacy Foundation and Black Coalition Against COVID-19.*

An example of the initiative partners' efforts to react to legitimate medical mistrust can be viewed in this short video, The Tuskegee Legacy Stories, promoted by the Ad Council for their COVID-19 Vaccine Education Initiative. The video acknowledges the legacy of medical mistrust and explores how it shapes hesitancy towards getting vaccinated for COVID-19. By highlighting the historical context and experiences that have contributed to mistrust over time, the video fostered a deeper understanding and empathy in viewers while improving confidence in getting vaccinated.

By bridging the information gap, empowering individuals to make informed decisions about their health, and promoting equitable access to COVID-19 resources, efforts such as these can be made to increase opportunities that vulnerable populations have to protect themselves and their communities from the impacts of COVID-19 and other future public health crises. Through direct engagement with residents, providing education, and promoting informed decision-making, the initiative partners encouraged individuals in HZ1 to take proactive steps towards protecting their health (HP 2030: HC/HIT RO1).

In conjunction with the personal outreach by strategic partners' CHWs and Health Equity Educators, a multimedia Communications Plan was executed to reach across HZ1 using multiple media platforms and social media. The result of the Communications Plan was the Vax904.com messaging campaign [**Figure 8** and **Figure 11**].

The accompanying images provide a glimpse of the extensive face-to-face outreach that took place in diverse settings. These efforts were complemented by media messaging in multiple languages, utilizing platforms such as radio and social media.

The goal of engaging 80% of the residents in HZ1 required the AHL Initiative to reach approximately 90,000 residents. Through multiple levels of community engagement, including face-to-face interactions, educational offerings at community centers, and attendance at relevant community cultural events and celebrations, CHWs met residents where they live, work, learn, and play—over 133,000 residents were reached. Additionally, the communications interventions received over 1.3 million media impressions from HZ1. Together, these

approaches to improving Personal Health Literacy extended throughout HZ1 and surpassed the goal of reaching over 80% of the population.

Figure 11. *Examples of face-to-face outreach events, and Vax904 Vaccination messaging methods with lists of resources*

GOAL 2

Train 1,500 providers of health services in health literacy, linguistic competency, cultural humility, trauma-informed care, and basic principles of addressing high risk-low trust populations

In the vulnerable populations engaged by the AHL Initiative, the intersection of low health literacy and medical mistrust further compounded the barriers to engagement with healthcare providers, contributed to vaccine hesitancy, and perpetuated disparities in access to timely and appropriate care.[12, 13] To address these challenges, trainings for providers of health services were developed to promote Organizational Health Literacy, linguistic competency, cultural humility, trauma-informed care, meeting the needs of high risk-low trust populations, and better understanding the historical context that contributes to community members' mistrust of healthcare systems.

To tackle some of the root causes of COVID-19 disinformation—especially concerning vaccines—the AHL Initiative partners provided opportunities for discussions and informal educational offerings between healthcare providers, community organizations, trusted

community leaders, and community members to acknowledge the legacy of medical mistrust and promote accurate information about COVID-19 and vaccines.

Additionally, the trainings and outreach work with healthcare providers was guided by the HHS-ODPHP *National Action Plan to Improve Health Literacy*, which provides a comprehensive approach to building trust, fostering cultural understanding, and promoting equitable healthcare practices. Partnering with medical societies in Duval County, hospital systems, clinics, and FQHCs created opportunities for the healthcare-centered trainings and educational offerings to be widely shared. Feedback from health care providers and hospital system personnel who participated in the health literacy trainings indicated that they came away with greater understanding and acceptance of health literacy principles and NCLAS.

Moreover, hospital systems, clinics, and physicians have expressed that health literacy trainings provided them with tools to more effectively check that patients have understood the health information that has been shared, especially by using the Teach-Back Method. They have also realized the importance of providing high-quality materials that are respectful, easy-to-understand, and when possible, provided in multiple languages in their offices and waiting rooms.

By June 2023, the initiative partners successfully trained over 5,700 current and future providers of healthcare services, far surpassing its initial training goal of 1,500.

GOAL 3

Improve Healthy People 2030 objectives of training professionals to increase the number of providers checking understanding and involving more adults in health care decisions (HP 2030 HIT/HC-01, 02, and -03)

The health literacy trainings were centered on the Healthy People 2030 objectives related to health communication (HP 2030: HC/HIT-01, -02, and -03). These objectives focus on improving communication and understanding between patients and their health care providers and providing opportunities for shared decision-making between patients and their health care providers in the healthcare setting to ensure better health outcomes.

To gauge improvement in the Healthy People 2030 objectives, a Patient Survey was conducted to assess whether physicians who had been trained in health literacy scored higher than the National Targets for these indicators. The results are as follows:

- For the Healthy People 2030 HIT/HC-01 objective, 97.3% of the patients surveyed felt their health care provider checked their understanding by using health literacy methods compared to the National Target of 32.2%.
- For the Healthy People 2030 HIT/HC-02 objective, only 5.4% of the patients surveyed reported poor communication with their health care provider compared to the National Target of 8%.

- For the Healthy People 2030 HIT/HC-03 objective, 93.7% of the patients surveyed indicated their health care provider involved them in decisions as much as they wanted compared to the National Target of 62.7%.

By their commitment to advancing health literacy at both the individual and organizational level, the AHL Initiative partners demonstrated their dedication to addressing COVID-19 disparities through the lens of health literacy. The initiative paved the way for improved healthcare outcomes in Duval County by promoting accurate information, empowering patients, and enhancing capacity within healthcare organizations.

GOAL 4

Demonstrate the impact of the work to a similar Comparison Area that did not receive the AHL Interventions

To demonstrate the impact of the AHL Initiative, a geographic analysis compared pre- and post-health literacy intervention hospitalization case data of deidentified COVID-19 Emergency Department (ED) and inpatient cases from January to December 2021 (Baseline Period) and from January to July 2022 (Intervention Period).[12] The analysis revealed a difference in hospitalization rates between the Baseline and Intervention Periods for communities that received AHL Initiative outreach interventions compared to those that did not. ZIP Codes targeted by the AHL Initiative outreach experienced an approximate 13% greater reduction in hospitalization case rates compared to areas without similar AHL Initiative outreach. In High SVI ZIP Codes that received interventions provided by the AHL Initiative, there was a 21% greater decrease in COVID-19 hospitalizations between the Baseline and the Intervention Periods compared to High SVI ZIP Codes without AHL interventions.

The following section provides additional research and evaluation findings, including information related to the GIS Mapping and data analysis methods used to demonstrate the impact of the AHL Initiative.

GIS MAPPING, DATA ANALYSIS, AND IMPACT

The Evaluation Team researched and evaluated possible methods to demonstrate the changes and impact of the AHL outreach interventions. It was determined that GIS mapping and hospitalization data analysis could provide a better understanding of the effects of the AHL Initiative.

To do so, a geographic analysis of hospitalization case data of deidentified COVID-19 ED and inpatient case rates was used to determine any differences between pre- and post-AHL interventions, specifically community engagement and outreach.

In this analysis, when the terms “outreach”, “With Outreach”, or “Without Outreach” are used, they explicitly refer to the health literacy interventions provided by the AHL Initiative partners. The contributions of other projects underway at the same time as the AHL Initiative cannot be discounted in the analysis, nor can they be measured. As such, this analysis recognizes there are confounding variables and yet there are noted differences between areas where the AHL Initiative interventions occurred and the Comparison Area that did not receive any of the AHL interventions.

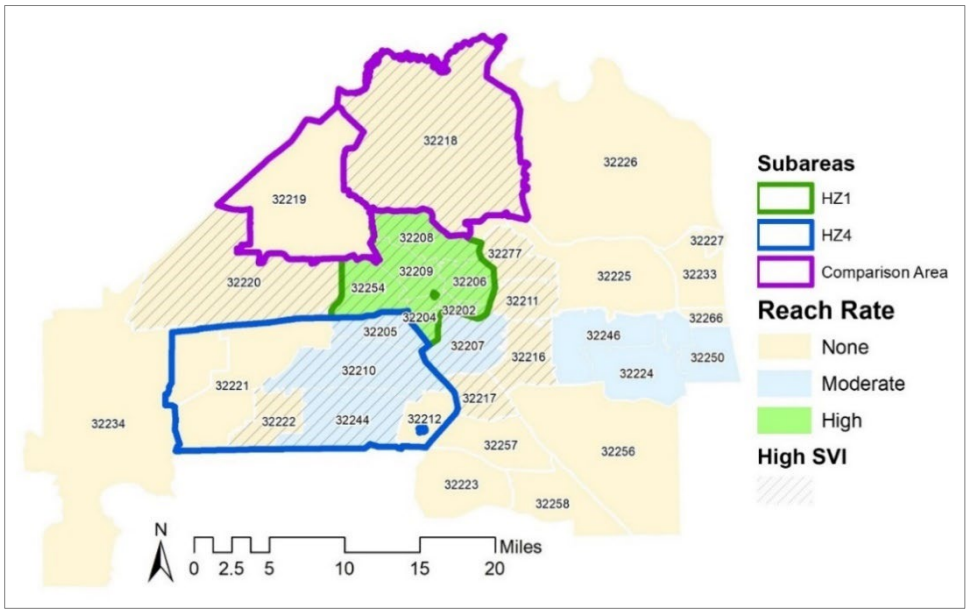
Comparison Area

Initially, the Health Disparity Impact Statement written by Edward Waters University designated Health Zone 4 (HZ4), which encompasses the Westside and parts of the Northside of Jacksonville, as a comparison area to HZ1. However, as the interventions began, it became evident that the proximity and connectivity between HZ1 and HZ4, along with existing services provided by the strategic partners from the Duval Safety Net Collaborative to vulnerable populations in HZ4, compromised its suitability as a true comparison area.

After consultation with the Edward Waters University’s Evaluation Team and the UF Urban Health Alliance, an area adjacent to HZ1 that exhibited similar characteristics in terms of SVI profile, demographics, and COVID-19 comorbidity rates was identified as the Comparison Area.

Figure 12 shows the locations of HZ1 (outlined in green), HZ4 (outlined in blue), and the Comparison Area (outlined in purple). The map also illustrates the Socially Vulnerable areas with hash marks and the geographic distribution of the reach rates by shaded color. The

Figure 12. *Reach Rate per 100K Population per ZIP Code highlighting Health Zones 1 and 4 and the Comparison Area in Duval County for the Intervention Period, Stratified by Three Categories*



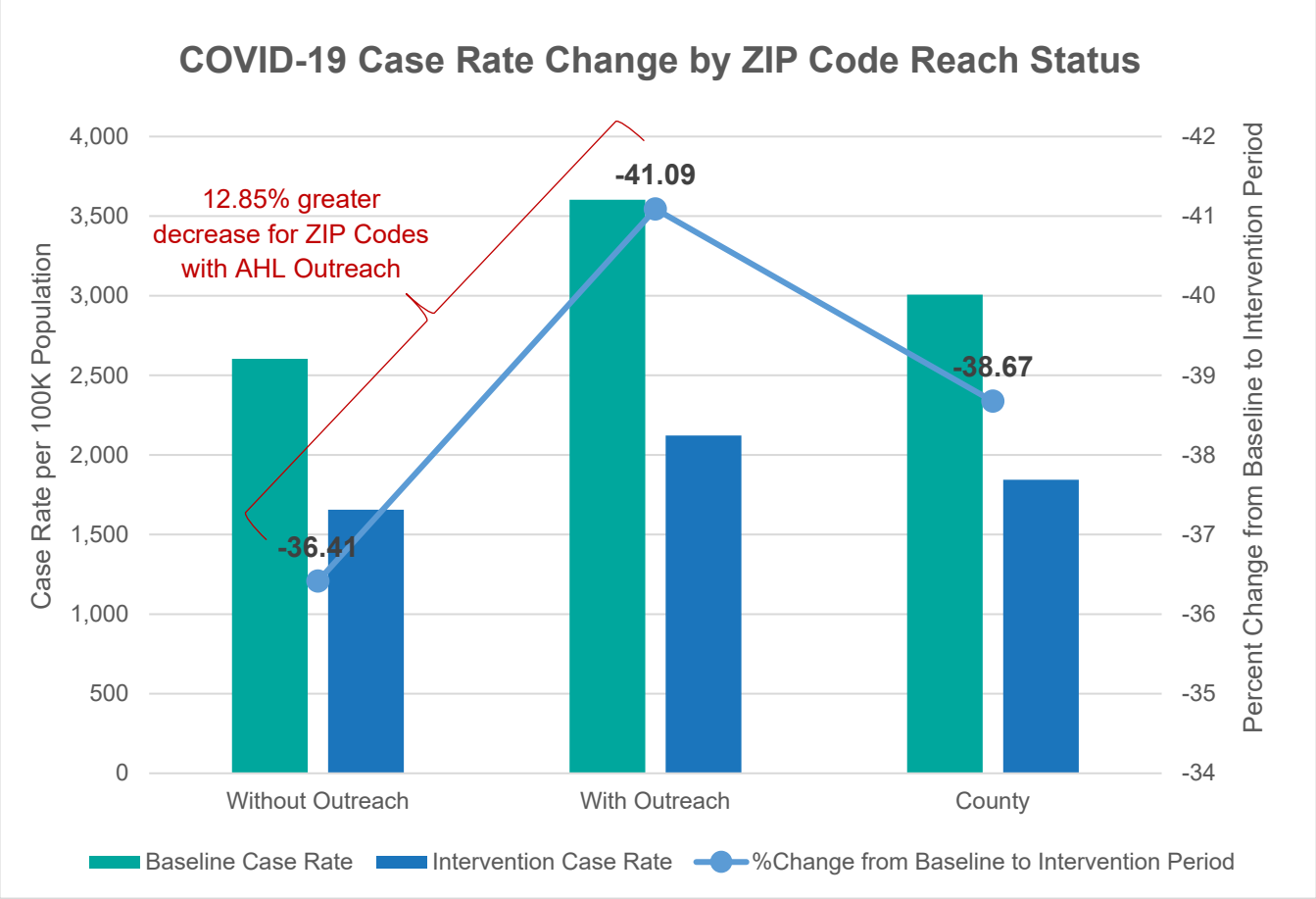
green-shaded areas on the map indicate high reach rates per 100,000 population within the ZIP Codes of HZ1, which align with the identified high SVI areas denoted by the hash marks. The blue-shaded areas represent areas that received moderate outreach efforts, driven by the identification of vulnerable populations by the AHL Initiative partners in their respective service areas. Notably, HZ4 exhibited a large concentration of both moderate outreach and high SVI. Additionally, some moderate outreach extended eastward towards the coast, beyond the boundaries of HZ1 and HZ4. Although these areas may not be classified as "high SVI" at the ZIP Code level, localized tract-level data reveals high social vulnerability within these regions.

It is important to note that no outreach activity was observed in the Comparison Area during the Intervention Period.

Hospitalization Data

The ZIP Code level U07.1 case data utilized in the AHL Initiative was obtained from the Broward Regional Health Planning Council's Florida Health Data Warehouse. This web-based data warehouse and analytic engine contains comprehensive information on patient demographics, diagnoses, treatments, quality indicators, and outcomes provided by hospital systems throughout the State of Florida.

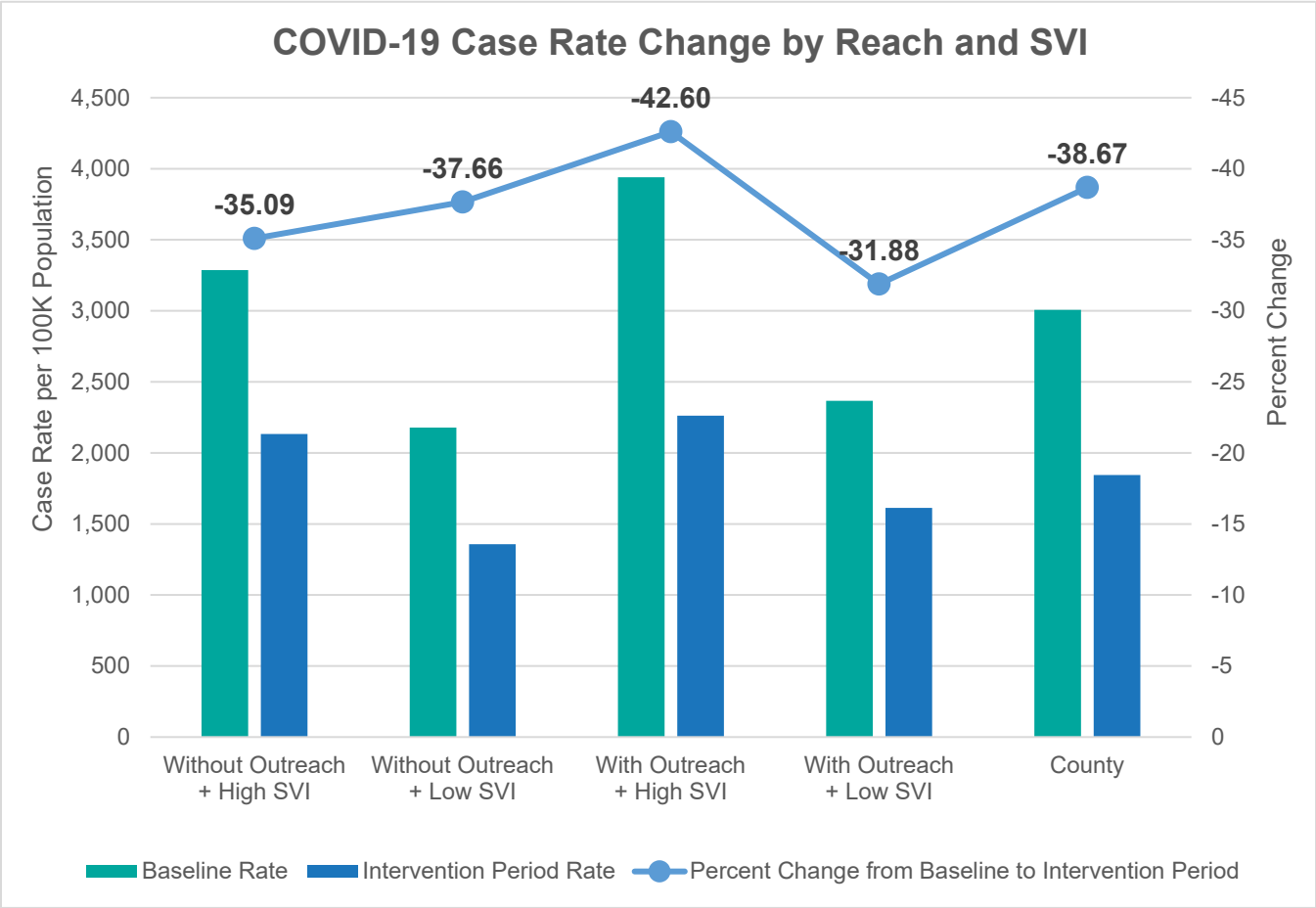
Figure 13. *Hospitalization Case Rate Change Without or With AHL Initiative Outreach Interventions*



Utilizing the COVID-19 inpatient hospitalizations and ED admissions codes at the ZIP Code level (ICD-10 MS-DRG Grouper Code U07.1[15, 16, 17]), the results reveal a difference in hospitalizations between the Baseline and Intervention Periods for communities that received AHL Initiative outreach compared to those that did not. ZIP Codes With Outreach experienced a 12.85% greater decrease in hospitalization case rates compared to areas Without Outreach, as shown in **Figure 13**.

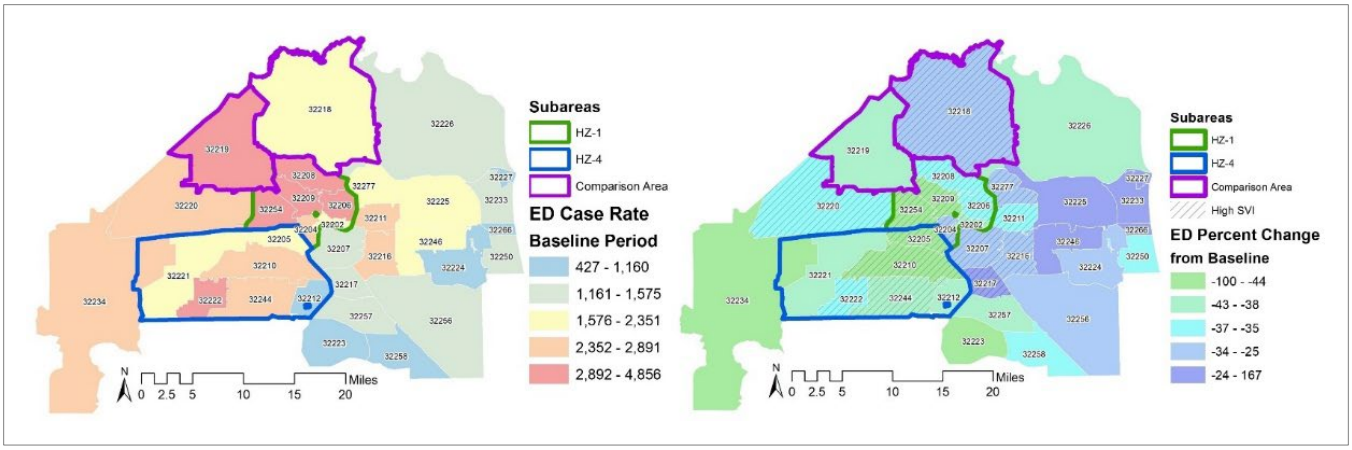
Additionally, the analysis indicates that the outreach interventions played a meaningful role, particularly in High SVI ZIP Codes where the COVID-19 case rates were higher in both the Baseline and Intervention time periods. Notably, the case rate decreases were most prominent in ZIP Codes *With Outreach and High SVI* [**Figure 14**]. These specific ZIP Codes exhibited a 21% greater decrease in COVID-19 cases from the Baseline to the Intervention Period compared to *High SVI ZIP Codes Without Outreach*. These findings underscore the vital importance of targeted outreach efforts guided by the HLP in contributing to the reduction of COVID-19 cases in high-risk areas.

Figure 14. *Hospitalization Case Rate Changes by SVI Without or With AHL Initiative Outreach Interventions*



Finally, the maps in **Figure 15** visualize the spatial distribution of the ED changes from the Baseline to Intervention Period. The areas experiencing the most substantial changes are concentrated in HZ1 and HZ4, where significant outreach efforts took place in high SVI ZIP Codes. Notably, the high SVI ZIP Code in the Comparison Area (32218) demonstrates high SVI, moderate ED cases, but very low rates of ED case rate change.

Figure 15. *Emergency Department Case Rate Changes Interventions*



Often, socially vulnerable populations rely on the ED for care.[18, 19] This reduction in ED case rates is a strong indicator of the success of the AHL Initiative interventions. These findings, while not proving causality, suggest that the AHL Initiative successfully reached these populations, improved their understanding of COVID-19, and thus contributed to a reduction in the number of cases requiring emergency care.

In HZ1, where approximately 10% of the population was reached during the analysis period, the decrease was 37.46% greater in COVID-19 cases for Black ED patients than in the Comparison Area, which did not have any health literacy outreach. Similarly, in HZ4, an area adjacent to HZ1 with similar health disparities that also received substantial outreach, the decrease was 53.97% greater in COVID-19 cases for Black ED patients than in the Comparison Area.

The successes of the AHL Initiative demonstrate ways to bridge the gap between social vulnerability and health literacy through the thoughtful utilization of evidence-based practices and culturally appropriate outreach. These results provide valuable insights that can inform future efforts to strengthen community engagement, education, and response strategies in times of crisis, highlighting the impact of health literacy in promoting positive health outcomes.

CONCLUSION

The AHL Initiative—through HPCNEF's leadership, strategic partners, community engagement, outreach, and education—demonstrates the rationale for and power of using health literacy principles to mitigate some of the unequal impacts of the pandemic on Jacksonville's vulnerable populations.

By equipping individuals and their healthcare providers with the necessary knowledge and resources, vulnerable populations can be empowered to make informed decisions, protect their health, and contribute to the broader goal of achieving health and wellness in all communities.

Strong partnerships are essential to bridge the gaps between social vulnerability and health literacy in order to meet the challenges faced by vulnerable communities, not only during the COVID-19 pandemic, but in future public health emergencies. The AHL Initiative exemplifies the power of tailored interventions and community engagement to promote health literacy, thus serving as a model for future collaborative efforts. Through cooperative efforts and creative approaches to equitable access to information and resources, the AHL Initiative helped bridge some of those gaps in the City of Jacksonville, affording more opportunities for community members to protect themselves and their loved ones.

For more detailed information, please visit the StoryMap on ArcGIS.

GLOSSARY

Disparity impact statement refers to the demographic cultural, and linguistic data that identify the population(s) in which health disparities exist and the quality improvement plan designed to address the noted disparities.

Health disparity refers to a particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion.[20]

Health equity refers to the "attainment of the highest level of health for all people. Achieving health equity requires valuing everyone equally with focused and ongoing societal efforts to address avoidable inequalities, historical and contemporary injustices, and the elimination of health and health care disparities."[20]

Health literacy addresses both personal health literacy and organizational health literacy and provides the following definitions:

- **Personal health literacy** is the degree to which individuals have the ability to find, understand, and use information and services to inform health-related decisions and actions for themselves and others.
- **Organizational health literacy** is the degree to which organizations equitably enable individuals to find, understand, and use information and services to inform health-related decisions and actions for themselves and others.[21]

National Standards for Culturally and Linguistically Appropriate Services (CLAS) in Health and Health Care provide guidance for providing health care and services that are responsive to diverse cultural health beliefs and practices, preferred languages, health literacy and other communication needs. Additional information can be found here: https://thinkculturalhealth.hhs.gov/clas.

Social determinants of health are the conditions in the environments where people are born, live, learn, work, play, worship, and age that affect a wide range of health, functioning, and quality-of-life outcomes and risks.

Socially vulnerable groups refers to individuals, communities or populations that have characteristics that affect their capacity to anticipate, confront, repair, and recover from the effects of a disaster.[22] Such characteristics include:[22, 23, 24]

- Individual and household traits such as low socioeconomic status, being a racial or ethnic minority, having limited English proficiency, being a child or elderly, being

unemployed, lacking access to a vehicle or being dependent on public transportation, having low educational attainment, living in overcrowded conditions, or being homeless

- Systemic and structural factors such as residing in areas that are densely populated, lack healthcare facilities and resources, are rural or urban, or have weak economies

Urban communities refers to U.S. Census Bureau delineated urban areas, which represent densely developed territory, and encompass residential, commercial, and other non-residential urban land use.[25] The Census Bureau identifies two types of urban areas:

- Urbanized Areas (UAs) of 50,000 or more people
- Urban Clusters (UCs) of at least 2,500 and less than 50,000 people

SOURCES

[1] Notice of Funding Opportunity: Advancing Health Literacy to Enhance Equitable Community Responses to COVID-19 Opportunity Number: MP-CPI-21-00 PKG00265801-instructions.pdf (grants.gov).

[2] Centers for Disease Control and Prevention. COVID-19 Hospitalization and Death by Race/Ethnicity. Accessed from: https://www.cdc.gov/coronavirus/2019-ncov/covid-data/investigations-discovery/hospitalization-death-by-race-ethnicity.html. *Note: This webpage has since been archived by the CDC.*

[3] Paasche-Orlow, M. K., & Wolf, M. S. (2007) The causal pathways linking health literacy to health outcomes. Am J Health Behav. 2007 Sep-Oct;31 Suppl 1:S19-26.

[4] Centers for Disease Control and Prevention. (2021). Trends in Racial and Ethnic Disparities in COVID-19 Hospitalizations, by Region — United States, March–December 2020, December 14, 2020–April 10, 2021. *Morbidity and Mortality Weekly Report*, 70(15), 564-569. Retrieved from https://www.cdc.gov/mmwr/volumes/70/wr/pdfs/mm7015e2-H.pdf.

[5] Yancy, C. W. COVID-19 and African Americans. JAMA. 2020;323(19):1891–1892.

[6] Millett, G. A., Jones, A. T., Benkeser, D., Baral, S., Mercer, L., Beyrer, C., & Honermann, B. (2020). Assessing differential impacts of COVID-19 on black communities. Annals of Epidemiology, 47, 37-44.

[7] Raifman, M. A., & Raifman, J. R. (2020). Disparities in the Population at Risk of Severe Illness From COVID-19 by Race/Ethnicity and Income. *American Journal of Preventive Medicine*, 59(1), 137–139. Retrieved from https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7183932/.

[8] Centers for Disease Control and Prevention. Why Is Addressing Social Determinants of Health Important for CDC and Public Health? | About | CDC.

[9] Dasgupta, S., Bowen, V. B., Leidner, A., & Jones, J. L. (2020). Association between social vulnerability and a county's risk for becoming a COVID-19 hotspot—United States, June 1–July 25, 2020. Morbidity and Mortality Weekly Report, 69(42), 1471–1476.

[10] Freese, K. E., Vega, A., Lawrence, J. J., & Documet, P. I. (2021) Social Vulnerability Is Associated with Risk of COVID-19 Related Mortality in U.S. Counties with Confirmed Cases. J Health Care Poor Underserved. 2021;32(1):245-257. doi: 10.1353/hpu.2021.0022. PMID: 33678695.

[11] Office of Minority Health. (2021). Advancing Health Literacy to Enhance Equitable Community Responses to COVID-19. Retrieved April 2021 from New Funding Opportunity:

Advancing Health Literacy to Enhance Equitable Community Responses to COVID-19 - News & Events | health.gov.

[12] Morgan, K. M., Maglalang, D. D., Monnig, M. A., Ahluwalia, J. S., Avila, J. C., & Sokolovsky, A. W. (2022). Medical Mistrust, Perceived Discrimination, and Race: A Longitudinal Analysis of Predictors of COVID-19 Vaccine Hesitancy in US Adults. J Racial Ethn Health Disparities. 2022 Aug 1:1–10.

[13] Bilal, U., Jemmott, J. B., Schnake-Mahl, A., Murphy, K., & Momplaisir, F. (2022). Racial/ethnic and neighborhood social vulnerability disparities in COVID-19 testing positivity, hospitalization, and in-hospital mortality in a large hospital system in Pennsylvania: A prospective study of electronic health records. The Lancet Regional Health - Americas, 10(1), e100220. https://www.sciencedirect.com/science/article/pii/S2667193X22000370?via%3Dihub.

[14] Karaye I. M., & Horney, J.A. (2020). The Impact of Social Vulnerability on COVID-19 in the U.S.: An Analysis of Spatially Varying Relationships. Am J Prev Med. 2020 Sep;59(3):317-325.

[15] Zhang, SS., Gundrum, J., Warner, S., Cao, Z., Babiker, A., Klompas, M., & Rosenthal, N. (2020). Uptake and Accuracy of the Diagnosis Code for COVID-19 Among US Hospitalizations. JAMA, vol. 324, no. 24, Dec. 22, 2020, pp. 2553–2554.

[16] Bhatt, A.S., McElrath, E.E., Claggett, B.L. et al. (2021).Accuracy of ICD-10 Diagnostic Codes to Identify COVID-19 Among Hospitalized Patients. J GEN INTERN MED 36, 2532–2535 (2021).

[17] Smith, A.R., DeVies J., Caruso, E., Radhakrishnan, L., Sheppard, M., Stein, Z., Calanan, R. M., Hartnett, K.P., Kite-Powell A., Rodgers, L., & Adjemian, J. (2020). Emergency Department Visits for COVID-19 by Race and Ethnicity - 13 States, October-December 2020. MMWR Morb Mortal Wkly Rep. 2021 Apr 16;70(15):566-569.

[18] Udalova, V., Powers, D., Robinson, S., & Notter, I. (2022). United States Census Bureau. Retrieved May 2023 from Who Makes More Preventable Visits to the ER? (census.gov).

[19] U.S. Department of Health & Human Services, Office of the Assistant Secretary for Planning and Evaluation. (2021). Trends in the Utilization of Emergency Department Services, 2009-2018. 2021. Retrieved May 2023 from https://aspe.hhs.gov/sites/default/files/private/pdf/265086/ED-report-to-Congress.pdf.

[20] U.S. Department of Health and Human Services. Disparities. Accessed July 2023 from: https://www.healthypeople.gov/2020/about/foundation-health- measures/Disparities.

[21] U.S. Department of Health and Human Services. Healthy People 2030. Accessed July 2023 from U.S. Department of Health and Human Services. Healthy People 2030. Accessed from: https://health.gov/healthypeople.

[22] Centers for Disease Control and Prevention Social Vulnerability Index. Accessed July 2023 from: https://www.atsdr.cdc.gov/placeandhealth/svi/index.html.

[23] Flanagan, B.E.; Gregory, E.W.; Hallisey, E.J.; Heitgerd, J.L.; & JulLewis, B. (2011). "A Social Vulnerability Index for Disaster Management," Journal of Homeland Security and Emergency Management: Vol. 8: Iss. 1, Article 3.

[24] Bergstrand, K., Mayer, B., Brumback, B., & Zhang, Y. (2015). Assessing the Relationship Between Social Vulnerability and Community Resilience to Hazards. Social indicators research, 122(2), 391–409.

[25] United States Census Bureau. Urban and Rural. Accessed July 2023 from: https://www.census.gov/programs-surveys/geography/guidance/geo- areas/urban-rural.html.