

**Cardiovascular Disease and Stroke Disparities in Delaware Healthcare**

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## **Gaps in Cardiovascular and Stroke Care in Delaware**

An American Heart Association article states, “More than half of U.S. adults do not know heart disease is the leading cause of death, despite 100-year reign” (Lewis, 2024). Heart disease, formally known as coronary heart disease, is when there is a build-up of plaque in the heart’s arteries or blood vessels, which can cause heart attacks or stroke (American Heart Association [AHA], 2024). A stroke occurs when a blood vessel that transports oxygen to the brain becomes blocked by a blood clot or ruptures (AHA, 2024). Due to the blockage or rupture, no oxygen travels to the brain, killing brain cells and possibly disabling brain function (AHA, 2024). A 2022 health statistics survey by the Centers for Disease Control and Prevention (CDC) revealed stroke as Delaware’s fifth leading cause of mortality (CDC, 2022). The CDC also showed a 56.9 death rate due to stroke, with Delaware’s established second leading cause of death being heart disease (CDC). The astonishing national ranking reinforces the urgency for public health initiatives and interventions to reduce heart disease risk and mortality rate. Along with promoting healthier habits and physical activity, this gap analysis will delve into Delaware’s foundational lack of stroke and cardiovascular disease awareness and education. Through thorough research and interviews with an interventional clinical cardiologist and internal medicine specialist, the following analysis will cover methods to revamp and update Delaware’s cardiovascular disease and stroke education. The proposed programs’ effective strategies for Delaware public health will work to eliminate the gap between uninformed and informed Delawareans.

### **Public Access to Blood Pressure Screenings**

Known as the “silent killer” by the FDA (2024), hypertension is a crucial driver of cardiovascular disease. Through an interview with an internal medicine physician of First State Medical Associates, potential approaches to combating hypertension came to light. The physician expressed how “What makes hypertension the most common cause of death in America for ages over 40 is due to people who knowingly or unknowingly have hypertension ignoring it until it kills them. Ninety-five percent of patients with high blood pressure feel normal and, therefore, do nothing about it. The first symptom is a heart attack, stroke, or sudden death. Over time, they develop complications such as heart disease, peripheral arterial disease, kidney failure, diabetes, blindness, and sexual dysfunction.” He then discussed how beneficial

Delaware health fairs or health expos could be for Delawareans by providing free blood pressure screenings and raising awareness of hypertension risks and health wellness. “Whether it be the Christiana Mall, local sporting events, or any public event setting, blood pressure screenings should be implemented and available.” By implementing health wellness and blood pressure screenings in public events, Delawareans can become aware if they have high blood pressure and prompt themselves to check in with their primary care doctor and potentially reduce their risk of heart disease and stroke. Following public blood pressure screenings, the physician encouraged public education and increased campaigns to make the issue more prevalent in the public, potentially pushing patients to talk to their doctor about it.

For Delawareans with high blood pressure, both the internal medicine specialist and Dr. Parikh, clinical cardiologist and founder of the Heart and Vascular Clinics in Newark, Middletown, and Wilmington, Delaware, strongly urged routine self-monitoring of blood pressure at home. Dr. Parikh expressed, “It is effective for those with hypertension to check their blood pressure once or twice a week to know they are going in the right direction. Checking three or four times a day will cause unnecessary nervousness and anxiety since blood pressure is easily affected throughout the day by external factors.” He also discussed how patients should always contact their physician if they have concerns with their recent blood pressure readings, whether abnormally higher or lower than usual.

### **Successful Hypertension Programs**

The Wyoming Chronic Disease Program overcame the state’s rural and vast geography and poor accessibility to primary care by establishing the Wyoming Library Blood Pressure Cuff Checkout Program. Through the Wyoming County Library system, locals can check out self-measured blood pressure kits as if they were checking out a book (Wyoming Department of Health, 2024). The English or Spanish kit includes a clinically certified and automatic blood pressure cuff, blood pressure logbook, and American Heart Association booklets demonstrating how to take blood pressure, what the numbers mean, and strategies to reduce blood pressure (Wyoming Department of Health, 2024). Most rural areas of Delaware, Sussex, and Kent County, and even northern counties, would benefit from adopting a Library Blood Pressure Cuff Checkout Program by increasing the awareness of Delaware resident’s health, providing public

blood pressure screenings, and empowering Delaware residents to take preventive measures or reach out to a primary care physician.

### **Rural Delaware Access to Health Care and Reliable Transportation**

The faster a stroke patient receives treatment, the greater the chances of no or minimal disability and death (American Heart Association, 2022). For stroke victims, e For every minute that passes, 1.9 million brain cells are killed due to the lack of oxygen-rich blood flow (Drumm, 2024). The most common type of stroke, ischemic strokes, can be treated with a Tissue Plasminogen Activator (tPA) drug, which is available at all primary and comprehensive stroke centers. The tPA drug is only effective when administered within the first three to four and a half hours of a stroke (American Heart Association, 2022). It acts as a clot dissolver for ischemic strokes and reverses the patient's disability (American Heart Association, 2022). The sooner the administration of tPA, the lower the percentage of long-term disability (American Heart Association, 2022). However, if the tPA does not alleviate the stroke symptoms, primary stroke centers will not be able to treat the stroke due to the lack of neurological equipment and health professionals (Drumm, 2024). Unlike primary stroke centers, comprehensive stroke centers treat all types of stroke patients, both ischemic and hemorrhagic strokes, and have 24/7 access to minimally invasive catheter procedures, neuroscience ICU for stroke patients, and 24/7 access to neurosurgery (Penn State Hershey Stroke Center, 2000). Delaware's Christiana Care Stroke Center in Newark is the only comprehensive stroke center in Delaware. For Sussex County residents who experience stroke and live farther from primary stroke centers and Christiana Care, obtaining life-saving and disability-reducing treatment or surgery within the three to four-and-a-half-hour window can be challenging.

Over one-fourth of the Sussex County population is above the age of 65, and this statistic is estimated to increase by more than 50% by 2024 (Novello et al., 2019). Stroke risk increases with age. Compared to other Delaware counties, Sussex County has the highest obese, diabetic, and hypertension rates in the adult populations (Novello et al., 2019). Also, Sussex County residents report lower physical activity rates and poorer nutrition compared to other Delaware counties (Novello et al., 2019). Less than half of the older adult population reported that they regularly exercise, and only 26.5% consume recommended daily servings of fruits and vegetables. Aging, obesity, lack of physical activity, and poor nutrition are all modifiable risk

factors for stroke. The older age and modifiable risk factors significantly predispose the older residents of Sussex County to an increased risk of stroke. In addition, Sussex County has been established as a Health Professional Shortage Area (Novello et al., 2019). Due to the limited number of primary care providers, Sussex County residents have delayed access to physician appointments and preventative screenings (Novello et al., 2019). Delayed or no access to primary care will likely lead to more deaths from heart disease and stroke (Tulane University School of Public Health and Tropical Medicine, 2021). In addition, Sussex County hospital health surveys report that “a lack of reliable transportation was repeatedly highlighted as a considerable barrier to healthcare” (Novello et al., 2019). Older adults who have Medicare have access to covered Uber and Lyft transportation services to and from doctor’s offices, but only 21.9% of Sussex County residents are insured with Medicare (Datawheel, 2022). Another transportation service provider available is DART Paratransit service, but only residents who have physical or mental impairment, require wheelchair assistance, or have a specific impairment-related condition, qualify for the service (DART First State, n.d.). Older residents who are not insured with Medicare or do not qualify for DART Paratransit services face limited access to transportation to doctor’s appointments and hospital visits. As a result, there is a lack of equal access to primary health care and screening for stroke risk factors, such as hypertension, diabetes, and high cholesterol, ultimately increasing this population’s risk of stroke and cardiovascular disease.

### **Stroke Educational Programs**

Research has shown that 33% of Delawareans have difficulty understanding health information and that 61% need assistance reading healthcare materials (Healthy Literacy Council of Delaware, 2024). In addition, Delaware adults with lower educational levels and lower incomes had a higher prevalence of stroke compared to adults with higher education and income (Delaware Health and Social Services, 2021). Studies have also demonstrated an association between low health literacy more hospitalizations and higher mortality rates (Tulane University School of Public Health and Tropical Medicine, 2021). An adult’s literacy and educational level can hinder their awareness of symptoms, preventions, and treatments of health conditions, including stroke and cardiovascular disease. The importance of identifying a stroke is unquestionable, according to Dr. Castro. “Time is tissue life. The faster the transport, the earlier the response time, and the better the outcome for the patient. The medicine works only within a

fixed amount of time. Beyond that, the medicine is useless. Patients need to be aware of their health and certain symptoms that happen to them. Patients should also be conscious that their lives depend on when they get seen in the hospital from the onset of their symptoms. Some of my patients have waited half a day thinking their slurred speech or numbness would go away.” Access to healthcare information that is easy to understand will be beneficial for Delawaernas, who struggles with health literacy. One solution would be implementing educational videos on an easily accessible website.

The Montana Stroke Initiative demonstrates an engaging, informative, and up-to-date website with illustrative hyperlinks to crucial local resources. This initiative includes Montana’s Stroke Initiative Virtual Auditorium. The “Stroke Auditorium” page contains a free collection of presentation slides and Webex videos from national and local stroke experts (Montana Stroke Initiative, 2024). Topics of Webex presentations consist of treatment of acute ischemic stroke, EMS stroke guide, primary stroke prevention, stroke triage, and improving acute stroke care in rural Montana (Montana Stroke Initiative, 2024). The 20 to 40-minute range of videos provides quick and credible education in an engaging lecture-formatted manner from healthcare professionals. In addition, the virtual auditorium includes cardiac-related Webex education for first responders, nurses, or any medical professionals. The mixture of local stroke experts with nationally recognized stroke experts provides a sense of community connection and comfort while inspiring locals to follow their local healthcare leaders. Implementing a stroke auditorium into the Delaware Stroke Initiative program website would provide an enticing form of education to Delawarean residents and medical professionals. The lack of more than one comprehensive stroke center in Delaware creates a severe mortality risk for Delaware stroke victims, so providing as much accessibility to informative, engaging, and efficient stroke education is critical to prevent strokes. Local Delawarean cardiac and stroke experts could increase the public’s accessibility to stroke prevention and physiology education through a virtual auditorium of presentations and Webex videos.

### **Stroke Programs in Other States**

One possible solution to enhance rural Delaware access to healthcare and reliable transportation includes the adoption of Telestroke. Telestroke is a growing program and is currently practiced in over 25 states. Stroke program coordinator at Logan Health Medical

Center in Montana, Christiana Armstrong, states, “Telestroke has been a game-changer for stroke care in our state. By leveraging technology to bring expert neurological care to rural areas, we’re ensuring that patients across Montana have timely access to life-saving treatments. This program is not just about bridging geographical gaps; it’s about saving lives and preserving the health and well-being of our communities” (Hayes, 2024). Advocated by the American Heart Association and Stroke Association, the Telestroke program provides interactive video conferencing of stroke neurologists with stroke patients presenting at non-comprehensive or certified stroke centers or facilities without available stroke neurologists (American Heart Association, 2022). As a result, neurologists can virtually examine and provide recommendations for the ideal course of treatment for stroke patients anywhere. Some benefits include telestroke hospital reportings of lower 30-day mortality and improved health outcomes compared to non-telestroke hospitals, improved quality of care in rural areas, and a 10.1% increase in utilization of tPA in rural areas (American Heart Association, 2022). In addition, research has proven that telestroke could increase tPA administration in community hospitals by 55% and reduce geographical and racial disparities in stroke treatment (American Heart Association, 2022).

Another solution would be the adoption of a Mobile Stroke Unit. The Jefferson University Hospital implemented a Mobile Stroke Unit to provide emergency transportation and prehospital care designated for stroke patients (Drumm, 2024). Specialized EMS are trained to operate CT scanners, determine if stroke patients meet the criteria for tPA, and administer tPA on mobile stroke units (Drumm, 2024). In addition, for stroke patients who require surgical interventions, mobile stroke units will transfer patients to neurologists (Drumm, 2024). Since every minute counts for stroke patients, the ability of mobile stroke units to immediately provide CT scans and administer tPA rather than wait until arriving in the emergency room is life-changing in terms of long-term disability or death of stroke patients. For rural populations of Delaware who live farther from primary stroke centers and the comprehensive stroke center, the adoption of mobile stroke units would decrease the risks of stroke-related disability and death by providing immediate stroke care and treatment.

### **Health Belief Model**

The Health Belief Model (HBM) was created by the social scientists of the U.S. Public Health Service in the early 1950s (LaMorte, 2022). Social scientists wanted to understand why

people did not participate in disease prevention or screenings to detect disease. The foundation of HBM consists of psychological and behavioral theory, emphasizing that a person's likelihood to participate in preventive strategies or screenings is based on their belief in the disease or illness and their faith in the preventive strategy or treatment. HBM consists of six constructs: perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cue to action, and self-efficacy. Perceived susceptibility demonstrates a person's perception of developing a disease or illness. Perceived severity refers to a person's interpretation of the dangers of developing a disease or illness or not treating the disease or illness. When evaluating the severity, individuals can review the medical consequences, death or disability, social consequences, occupation, or family. Perceived benefits demonstrate the person's belief in the effectiveness of treatments or preventative measures to reduce the severity of the illness or disease. Both perceived susceptibility and perceived benefits impact whether or not a person decides to participate in treatment or preventive strategies. Perceived barriers involve a person's perception of the barriers to executing recommended health treatments or habits. Within perceived barriers, people tend to measure the benefits of the recommended treatment or habits with barriers, such as side effects or inconvenience. Cue to action refers to the external or internal cues that prompt the person to make changes and execute recommended health actions. External cues could include the illness of other family members or friends or even health-based commercials. Internal cues include symptoms the person feels, such as chest pain or wheezing. Lastly, self-efficacy is the belief in a person's self to execute a behavior successfully.

### **HBM in Practice**

Guided by the Health Belief Model, the Delaware Heart Healthy Ambassador Blood Pressure Self-Monitoring Program is designed to effectively reinforce the constructs of perceived barriers and perceived benefits. It is a free, virtual program that assists adults with hypertension in lowering their blood pressure through education on blood pressure management, awareness of high blood pressure triggers, and healthy meals and lifestyles (Delaware Cancer Consortium, 2024). By first emphasizing a "low-pressure approach" to controlling high blood pressure in the virtual program layout, the website immediately acknowledges perceived barriers by encouraging an accessible and feasible approach to lower blood pressure. In addition, the program's website reinforces the feasibility of lowering blood pressure by repeating the phrase



“Easier than you think” throughout and guaranteeing support from trained heart-healthy ambassadors. Encouraging the program's feasibility and breaking perceived barriers of intimidation, hardship, and inconvenience will increase a person's self-efficacy in attempting and completing the program. The Delaware Heart Healthy Ambassador program also addresses a person's perceived severity by outlining the urgency and reasoning for controlling high blood pressure. The program accomplishes this by including a summary of high blood pressure physiology, consequences, statistics, and a link leading to further education about high blood pressure. By demonstrating the severity of hypertension, a person's belief in a personal threat will increase as well as drive the person to adopt the program. HBM predicts that a person's belief in personal danger and the success of the treatment will determine the likelihood of the person adopting the program. In combination with a person's belief in personal threat, the program establishes the perceived benefits of the person through empowering testimonials of past program participants. The participants' empowering quotes emphasize the program's success, the significant lifestyle and meal habits they learned and adopted, and the overall gained self-efficacy throughout their time in the program.

Although the Delaware Heart Healthy Ambassador program has limitations regarding its qualifications, the qualifications include an age requirement of 18 or above, a diagnosis of hypertension, taking prescription medication to manage high blood pressure, no irregular heartbeat, no edemas in any limb, and no cardiac episodes within the past 12 months. Although the program efficiently addresses the attainability and effectiveness of the program, the program fails to include Delaware adults who may have hypertension and have not been diagnosed. The creation of a new program, the Delaware Cardiovascular and Stroke Awareness Program, will be beneficial in revamping and expanding the Delaware Heart Healthy Ambassador program. The new program will follow the constructs used by the Delaware Heart Healthy Ambassador program to set educational goals and increase community engagement to increase Delaware residents' awareness and knowledge of cardiovascular disease and stroke. In terms of community engagement, launching in-person free blood pressure screenings at popular events or locations in different cities of Delaware would target substantial and diverse populations of Delawareans, leading to a more inclusive approach to public health. In addition, in-person screenings would generate more awareness of the program, increase the program's participation, and potentially promote a person's cue to action regarding seeking treatment from their primary care physician.

By implementing in-person health wellness and blood pressure screenings in public events, Delawareans can become aware of their high blood pressure, prompting them to check in with their primary care doctor, and potentially reduce their risk of heart disease and stroke at an earlier stage. Simply attending a free blood pressure screening would potentially be a small but impactful start for a person's self-efficacy regarding exercising control of their health.

**Logic Model of Delaware Cardiovascular and Stroke Awareness Program**

Goal		Implementation Activities/Objectives	Short Term Deliverables	Mid Term Outputs	Long Term Outcomes
	1	Create heart health dietary brochures	11/15/2024 Brochures created		Brochures updated as needed
	2	Create stroke prevention brochures	11/15/2024 Brochures created		Brochures updated as needed
Education	3	Distribute brochures to doctor's offices		12/30/2024 Brochures distributed to 1000 offices	3/30/2025 Brochures distributed to 5000 offices
	4	Establish an individualized nutritional counseling program	12/15/2024 Nutritional Counseling Department established and funded	1/15/2025 Counselors interviewed and onboarded	Additional staff added as necessary
	5	Provide individualized nutritional counseling via Zoom	1/15/2025 Outreach to participants	2/15/2025 20 participants join the counseling program	12/15/2025 Counseling for 50+ patients ongoing
	6	Create a virtual auditorium for webinars	11/5/2024 Auditorium created		
	7	Create webinars for CVD, stroke, and other topics	11/5/2024 1st Webinar	12/5/2024 2nd webinar	1/5/2025 webinars

			published	published	published every month
	8	Reach out to schools via email or in-person to promote lesson plans on cardiovascular disease and stroke in their health education.	10/25/2024 Determine areas with higher prevalence of cardiovascular disease and stroke	11/25/2024 Reach out to 3 elementary, middle, and high schools in these areas	2/1/2025 Follow up with schools
Social Promotion	1	Create an engaging, accessible, and professional website to promote the program.	10/20/2024 Website created	11/5/2024 Website uploaded and viewed by the public	Updated as needed
	2	Create social media accounts to promote the program and attend local American Heart Association Events.	10/15/2024 Instagram, Facebook, and Twitter created	10/20/2024 Program description and local American Heart Association Events uploaded	11/15/2024 Posts made 1-2 times a week about the program and local events
Community Engagement	1	Organize public monthly blood pressure screening pop-ups in densely public areas, such as malls and sporting events.	11/10/2024 Reached out to and secured screening events	11/30/2024 First blood screening event at Christiana Mall	3/15/2025 Monthly pressure screenings established at malls continue
	2	Implement free blood pressure cuff rentals in public libraries for access to free screenings.	12/15/2024 Stakeholders or local government fund collection of automatic blood pressure cuffs	1/30/2025 Blood pressure cuffs are distributed to 10 libraries	3/15/2025 Blood pressure cuffs are distributed to all 36 libraries in Delaware
	3	Establish monthly meetings of support groups for stroke caretakers and stroke victims.	12/10/2024 Secure locations and meeting	1/05/2025 Promote monthly meetings via	1/30/2025 Host first meeting

			times of support groups	social media and brochures in inpatient hospital centers or rehabilitation centers	
Support	1	Contact stakeholders to ask if they are interested in joining the program	8/20/2024 Outreach to Five key stakeholders to determine interest	9/15/2024 Continue to reach out to other stakeholders to continue program funding and establishment	10/05/2024 Stakeholders are added as needed
	2	Meet with stakeholders to establish the mission statement and vision of the program	8/30/2024 Meeting to discuss the mission statement and vision of the program	9/10/2024 Mission and vision are created and agreed upon	
Financial support	1	Advocate with stakeholders for funding of billboards to promote the benefits of daily physical activity and healthier diets	10/15/2024 Secure funding	11/15/2024 Design and create engaging and educational billboards	12/25/2024 Construction of billboards on key highways with a focus on areas with a high prevalence of cardiovascular disease and stroke
	2	Communicate with local government to allocate funds for uninsured stroke patients' inpatient care, rehabilitation, and follow-up care.	12/15/2024 Advocate for benefits of funding	4/15/2026 Secure funding	7/15/2025 Offer funding to uninsured stroke patients who lack the financial resources.

	3	Collaborate with stakeholders to fund research that targets Delaware populations with higher rates of cardiovascular disease and stroke prevalence and initiate social services or clinical support programs	1/30/2025 Create a proposal for a research grant for stakeholders to review	3/15/2025 Stakeholders review and approve of research grant	5/15/2025 Research begins
	4	Seek funding from stakeholders, hospitals, and local government to fund the implementation of Telestroke and a Mobile Stroke Unit.	2/15/2025 Create a proposal for funding for the Telestroke and Mobile Stroke Unit	4/10/2024 Obtain approval and funding for both initiatives	8/10/2025 Implementation of Telestroke and MobileStroke Unit within Christiana Hospital
	5	Reach out to stakeholders and local government to allocate funding for the construction of accessible roads and public transportation to hospitals or cab services for Kent and Sussex County residents	12/20/2024 Communicated with stakeholders or local government about potential funding	3/20/2025 Determine specific areas of counties with unreliable and unaccessible transportation	5/15/2025 Construction begins or cab service established for counties

**Program Description of the Delaware Cardiovascular and Stroke Awareness Program**

The proposed program, Delaware Cardiovascular, and Stroke Awareness will effectively serve Delaware communities affected by cardiovascular disease and stroke. Through educational, social promotion, community engagement, executive organization, and financial support goals, the proposed program will transform Delaware public health by creating an informed and healthy Delaware. The program’s educational goals will acknowledge and reduce the lack of cardiovascular and stroke awareness within Delaware’s educational system and general public health knowledge. The first educational goal of the program includes creating brochures that explain heart-healthy diets and their importance, as well as prevention strategies and symptoms of stroke. These brochures will be distributed to physicians' and specialists' offices around Delaware, and patients will be adequately educated about the importance of a healthy diet and

preventive measures they can take daily. By providing free informational brochures at highly accessible locations, Delaware residents can become informed and control their health efficiently. The second educational goal of the program includes creating a virtual auditorium for webinars that cover cardiovascular disease, stroke, and other relevant medical conditions. The virtual auditorium will provide free online access to medical webinars produced by local physicians. By creating a virtual auditorium, the program raises inclusivity for Delawareans who may be illiterate or do not visit or have the opportunity to see the doctor regularly. The third educational goal ties back to the heart-healthy diet by establishing and providing individualized nutritional counseling programs via Zoom. Through the individualized nutritional programs, Delawareans will learn the importance of healthy and balanced meals and how to create a meal plan customized to their palate. Taking these steps to elevate their diet will significantly change their overall health and assist in efficiently preventing cardiovascular disease and stroke. The final goal accounts for the root of the informed residents: the lack of health education within the schooling systems. Although cardiovascular disease and stroke are uncommon among school-aged children and adolescents, it is essential to provide early exposure to health and medical education. Earlier exposure to stroke education could make significant differences in Delawarean stroke prevalence mortality rates by preventing stroke and cardiovascular disease. The American Heart Association has published numerous elementary lesson plans, including classroom activities, activity worksheets, creative art activities, physical activity games, and body wellness lessons for kindergarteners through middle school. Delawarean teachers, club leaders, parents, and the general public will have access to engaging and playful methods by reaching out to schools to promote cardiovascular disease and stroke lesson plans in their health education. As a result, children can gain foundational healthy habits and knowledge and encourage parents and family members to engage in heart-healthy activities and nutrition. Through educational changes in the school systems, Delawareans can foster a united culture of health and wellness promotion and ultimately reduce heart disease as the second cause of mortality.

In addition to educational goals, the proposed program will be promoted socially through an engaging, accessible professional website and social media platforms. The website will display the program's mission and vision, helpful links to the virtual auditorium, downloadable and printable versions of health brochures, registration for individualized nutritional counseling, American Heart Association health lesson plans, and many more resources. The program's social

media accounts will promote the website and program on the following platforms: Instagram, Facebook, and Twitter. The social media accounts will promote local American Heart Association events like the Wilmington Heart Walk, Southern Delaware Heart Walk, and the Delaware Heart & Stroke Ball. Promoting regional events will increase support and fundraising for the American Heart Association's scientific discoveries and research and improve health outcomes. Promoting the program, in general, will spur a movement for cardiovascular disease and stroke awareness within Delaware's education and public health.

Along with social promotion goals, the program will uphold community engagement through monthly blood pressure screening pop-ups, free blood pressure cuff rentals in libraries, and monthly support groups for stroke caretakers and victims. Free monthly blood pressure screening pop-ups in densely public areas, such as the mall, will allow Delaware residents to check their blood pressure and learn more about the importance of maintaining a healthy blood pressure. By implementing health wellness and blood pressure screenings in public events, Delawareans can become aware if they have high blood pressure and prompt themselves to check in with their primary care doctor and potentially reduce their risk of heart disease and stroke. In addition to blood pressure screening pop-ups, the implementation of free self-monitoring blood pressure cuffs within public libraries increases the availability of blood pressure checks. It empowers residents to be aware of their health. Residents who do not have or visit a physician regularly could benefit from the blood pressure screenings and cuff rentals by allowing them to be aware of possible symptoms of hypertension and prompt them to take the step and see a doctor. Apart from blood pressure monitoring, establishing monthly meetings for stroke victims and caretaker support groups will provide a sense of belonging and acceptance to residents with similar experiences. The support groups will create a positive and encouraging environment for the Delaware community.

Uniting the community through cardiovascular disease and stroke awareness will build a healthier, stronger, and united Delaware.

Furthermore, the foundations of the program's stakeholders and board are essential to move forward with the program's goals. Contacting stakeholders such as the American Heart Association, American Heart Association, Million Hearts Organization, American Stroke Foundation, and the American College of Cardiology will provide a basis for executive support and leadership and also crucial funding for igniting the proposed public health improvements.

After reaching out to stakeholders to fund and establish the program, a meeting will take place to discuss the mission statement and vision. Collaborating with the stakeholders to determine a strong mission statement will define the program's direction, inspire and attract future stakeholders and fundraisers, and initiate a united program. When acquiring funding for the program's goals, program members will advocate with financing stakeholders for billboards to promote the benefits of daily physical activity and healthier diets. The creation of billboards on Delaware's populous and main highways will serve as daily reminders to residents to take care of themselves through physical exercise and healthy nutrition. With daily reminders every day, residents can be educated and influenced to make healthier decisions and prevent their risk of developing cardiovascular disease and stroke. In addition to advocating for the funding of billboards, program members will communicate with local government officials to allocate funds for uninsured stroke patients' inpatient care, rehabilitation, and follow-up care. According to the American Stroke Association, the lifetime cost of ischemic stroke care, including inpatient care, rehabilitation, and follow-up care, is about 140,048 dollars (n.d.). Uninsured stroke victims may be excluded from receiving long-term and quality stroke treatment due to the financial barrier of the overwhelming cost of stroke care. By advocating for the allocation of funds to provide for uninsured stroke victim's treatment, there will be increased inclusion and equality for residents of lower socioeconomic classes who do not have insurance. An additional financial goal of the program includes collaborating with stakeholders to fund research targeting Delaware populations with higher rates of cardiovascular disease and stroke prevalence and initiate social services or clinical support programs. The conduction of cardiovascular disease and stroke research within Delaware will assist in identifying possible socioeconomic, locational, or other causes of high cardiovascular disease and stroke prevalence and resolving the root of the issues. An up-to-date comprehensive review of stroke and cardiovascular disease prevalence within Delaware will seek to eliminate disease and medical disparities within Delaware and promote healthcare equality. Thorough scientific research will clarify which regions of Delaware need the most medical support or financial resources, establish social services and clinical support programs, and decrease Delaware's high cardiovascular disease and stroke rates overall. By funding research, program members will seek funding from stakeholders, hospitals, and local governments to fund the implementation of Telestroke and a Mobile Stroke Unit.



Since Delaware only has a comprehensive stroke center in New Castle County, stroke victims who live in Sussex or Kent County are at higher risk for long-term disability or fatality since stroke surgical and medical treatment must be given within a three to four-and-a-half-hour window. Telestroke and a Mobile Stroke Unit will allow for faster detection and treatment of rural Delaware County stroke victims and communication between neurologists and first responders. Adopting these two resources would provide quality and comprehensive care and improve health outcomes for residents, regardless of their location in Delaware. Also, constructing accessible roads and public transportation to hospitals or cab services for Kent and Sussex County residents will further improve accessibility to quality healthcare for rural Delaware residents. Research among rural Delaware county hospitals has demonstrated that the lack of reliable transportation and road accessibility is a significant factor in attending doctor's appointments or receiving follow-up care. By reaching out to stakeholders and local governments to allocate funding for reliable road accessibility, transportation, or free cab services, rural county residents will be prompted to take care of their health by regularly visiting their doctor and attending follow-up appointments. Advocating for rural resident's public health will promote equal opportunity in healthcare and lead to better health outcomes in Delaware.

Overall, addressing disparities in cardiovascular disease and stroke healthcare is a crucial first step to initiating statewide public health improvements. Statewide research on gaps within Delaware health and national research of successful health initiatives will provide the foundations for the proposed program. To efficiently guide and execute the improvements, the Delaware Cardiovascular and Stroke Awareness will be established following the Health Belief Model's constructs of perceived severity, perceived barriers, and perceived benefits. A focus on increasing educational awareness, eliminating transportation barriers, and adopting other's state's efficient health initiatives will lead to healthier outcomes, awareness, and empowerment for Delaware residents to make decisions about health. The proposed program will work to eliminate the identified gaps in cardiovascular and stroke healthcare, while also financially supporting Delaware residents and promoting healthy community engagement. Through the implementation of the program, Delaware residents can foster a united culture of health and wellness promotion and ultimately reduce heart disease and stroke prevalence and mortality.

References

*American Stroke Association.* (2024). *About stroke.* <https://www.stroke.org/en/about-stroke>

American Heart Association. (2020a). Elementary school lesson plans.

[https://www2.heart.org/site/SPageServer?pagename=khc\\_resources\\_elementary\\_lesson\\_plans](https://www2.heart.org/site/SPageServer?pagename=khc_resources_elementary_lesson_plans)

American Heart Association. (2020b) <https://newsroom.heart.org/news/more-than-half-of-u-s-adults-dont-know-heart-disease-is-leading-cause-of-death-despite-100-year-reign>

American Heart Association. (2022). *Telestroke - connecting patients to quality treatment.* . <https://www.heart.org/-/media/Files/About-Us/Policy-Research/Fact-Sheets/Stroke/Telestroke-Fact-Sheet.pdf>

American Heart Association. (2024c, Jan 10). *Coronary artery disease - coronary heart disease.* [www.heart.org](http://www.heart.org). <https://www.heart.org/en/health-topics/consumer-healthcare/what-is-cardiovascular-disease/coronary-artery-disease>

Castro, S. (2024, June 17). Interview with Dr. Parikh. personal.

Castro, S. (2024a, June 17). Interview with Dr. Castro. personal.

Centers for Disease Control and Prevention. (2024a, May 14). *Signs and symptoms of stroke.* Centers for Disease Control and Prevention. <https://www.cdc.gov/stroke/signs-symptoms/index.html>

Centers for Disease Control and Prevention. (2024b, May 14). *Stroke facts.* Centers for Disease Control and Prevention. [https://www.cdc.gov/stroke/data-research/facts-stats/?CDC\\_AAref\\_Val=https%3A%2F%2Fwww.cdc.gov%2Fstroke%2Ffacts.htm](https://www.cdc.gov/stroke/data-research/facts-stats/?CDC_AAref_Val=https%3A%2F%2Fwww.cdc.gov%2Fstroke%2Ffacts.htm)

Center for Drug Evaluation and Research. (2024, April 11). *High blood pressure—understanding the silent killer*. U.S. Food and Drug Administration.

<https://www.fda.gov/drugs/special-features/high-blood-pressure-understanding-silent-killer>

Cleveland Clinic. (2022, May 15). *Heart disease risk: How race and ethnicity play a role*.

Cleveland Clinic. <https://my.clevelandclinic.org/health/articles/23051-ethnicity-and-heart-disease>

Delaware Cancer Consortium. (n.d.). *Healthy Heart Ambassador program: Healthy Delaware*. Healthy Heart Ambassador Program | Healthy Delaware.

<https://www.healthylouisiana.org/Individuals/Heart/Healthy-Heart-Ambassador-Program#enroll>

Delaware Division of Public Health. (2021). *Delaware Prevalence of Select Chronic Diseases and Conditions*. <https://www.stroke.org/-/media/stroke-files/about-stroke/stroke-in-children/stroke-heroes-toolkit--final--digital.pdf?la=en>

Drumm, C. (2024). Time is brain: Why it's important to get treated for stroke ASAP: Jefferson health. Retrieved from <https://www.jeffersonhealth.org/your-health/living-well/time-is-brain-why-its-important-to-get-treated-for-stroke-asap>

Health Literacy Council of Delaware. (2024, June 28). Home page. <https://healthliteracy.org/>

Hayes, T. (2024, May 22). *Bridging gaps: Logan Health's Telestroke program enhances stroke care in rural Montana*. Logan Health. <https://www.logan.org/bridging-gaps-logan-healths-telestroke-program-enhances-stroke-care-in-rural-montana/>

LaMorte, W. W. (2022, November 3). *Behavioral change models*. The Health Belief Model.

<https://sphweb.bumc.bu.edu/otlt/mph-modules/sb/behavioralchangetheories/behavioralchangetheories2.html>

Lewis, C. (2024b). More than half of U.S. adults don't know heart disease is leading cause of death, despite 100-year reign. <https://newsroom.heart.org/news/more-than-half-of-u-s-adults-dont-know-heart-disease-is-leading-cause-of-death-despite-100-year-reign>

*Montana Stroke Auditorium*. Montana stroke. (2024).

<https://www.montanastroke.org/stroke-auditorium>

Novello, S., CCRN, Bowen, M. E., & Griffioen, M. (2019). A Stroke Reduction Health Plan for Older Adults in Rural Sussex County, Delaware. *Delaware journal of public health*, 5(5), 52–55. <https://doi.org/10.32481/djph.2019.12.014>

Penn State Health. (2000). Primary vs comprehensive stroke center.

<https://www.pennstatehealth.org/sites/default/files/2020-08/Primary-vs-Comprehensive-Stroke-Center.pdf>

Finances, Insurance and What You Need to Know Post-Stroke. (n.d.). Retrieved from <https://www.stroke.org/en/life-after-stroke/recovery/managing-your-stroke/finances-insurance-and-assistance>

State of Delaware - Dart First State. (n.d.). DART First State Home. Retrieved from

<https://www.dartfirststate.com/>

Sussex County Statistics, DE. (2022). Retrieved from <https://datausa.io/profile/geo/sussex-county-de#health>

Tulane University. (2021). Social determinant of health: Education is crucial. Retrieved from <https://publichealth.tulane.edu/blog/social-determinant-of-health-education-is-crucial/>