



THE STROKE BURDEN IN THE MID-
ATLANTIC REGION: POLICIES AND
IMPLICATIONS
2017 POLICY BRIEF

ABSTRACT

In this brief, we will summarize the heavy burden stroke levies on each of the states in the Mid Atlantic, and discuss the role of public policy in reducing the burden. We will conclude by offering observations about the outlook for a future where strokes are rare.

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2017 POLICY BRIEF

The Stroke Burden in the Mid-Atlantic Region: Policies and Implications

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Why Stroke Matters

Stroke accounts for about one in every 20 deaths in the USA, and about one death every four minutes.¹ Stroke is a leading cause of disability, and the costs to society are staggering^{2,3}. Average stroke-related costs in the U.S. total approximately \$34 billion a year in the United States, including direct medical costs and lost productivity. Globally, stroke accounts for 10% of all deaths worldwide and is one of the world's leading causes of disability.^{1,4}

The incidence (new cases) of stroke had been on the decline in the last decade and a half or so, but the decline has either stalled or reversed in most of the United States, according to a recent report by the Centers for Disease Control and Prevention (CDC). The goal of this brief is to summarize what the states in the Mid Atlantic (Maryland, District of Columbia, Delaware, Pennsylvania, Virginia and West Virginia) are doing to ensure that the decline continues, given the enormous burden stroke places on patients, communities, health systems, and economies.

In this brief, we will describe the disease, summarize the disease burden in each of the states in the Mid Atlantic, and discuss the role of public policy in reducing the burden. We will conclude by offering observations about the outlook for a future where strokes are rare.

Describing the Disease

Strokes occur when the blood supply to part of the brain is blocked (ischemic) or when a blood vessel in the brain bursts (hemorrhagic). This results in partial or complete restriction of oxygen flow to brain cells, which causes brain cells to die at the astounding rate of 32,000 per second (the average human has 100 billion brain cells).⁶ In either instance, parts of the brain can die or become damaged which can lead to long-term brain damage, disability, or death.⁷ In addition to ischemic and hemorrhagic strokes there is a third classification, according to the Centers for Disease Control and Prevention (CDC) - transient ischemic attack (TIA), known also as a mini-stroke (or warning stroke).⁸

The risk factors for stroke include family history, being overweight/obese, high blood pressure/hypertension, smoking, diabetes, and high cholesterol.⁹ Outcomes associated with strokes include paralysis, cognitive decline, slurred (or complete loss of) speech, impaired vision, inability to swallow, and weakness in the face.

Preventing or Predicting Strokes

Approximately one third of individuals who present with Transient Ischemic Attacks (TIA) will have a stroke within a year.¹⁰ TIAs are therefore an alarm bell worth heeding. National estimates indicate that ER visits for patients with TIA decreased from 2001 to 2011, with the largest decrease seen in individuals between ages 55-74. The percentage of TIAs for which patients arrived by ambulance dropped by 41% for patients under 75 years of age.

Research is emerging about other ways to predict strokes. One study found that the weaker a patient's grip, the greater the likelihood of dying from a stroke¹¹. The authors suggested that grip measurement may be a quick, inexpensive way to assess risk, but further research is needed in this area.

Discharge and Rehabilitation

Recovering from a stroke requires a lot of intense care and ongoing rehabilitation. Rehab therapy usually begins 24-48 hours after a stroke in acute care facilities, according to the National Institutes of Health.¹² The goal is to restore independent mobility, and to mitigate or forestall paralysis of the limbs. The intensity of the therapy will vary with the severity of the stroke, but therapists and nurses are usually trying to prevent (to the degree possible) the disability from becoming permanent. There are disparities in outcomes based on where patients receive rehab services and variations in which facilities survivors are discharged to after inpatient rehab.¹³

Shorter lengths of stay during inpatient rehab are associated with worse functional outcomes and the scientific literature points to significant regional variations in outcome when survivors are discharged from rehab.^{15, 16}

The Disease Burden

National Trends

National stroke data indicate that people of color bear the brunt of stroke mortality and morbidity across the nation. Between 2010 and 2013, stroke mortality for non-Hispanic Black men aged 45 years of age and over was 54% - 68% higher than their counterparts in other racial/ethnic groups.¹⁷ Similarly, the mortality rate for non-Hispanic Black women was between 30% and 61% higher, compared to other women of the same age group within the same period.

There's another worrying trend – stroke among younger people: 28.6% of all the non-Hispanic Black individuals who died of stroke during 2010-2013 were 45-64-year-olds.¹⁷

These national statistics raise important policy questions regarding the factors driving these stark disparities. Answering such questions as – what access do high-risk populations have to affordable, healthy foods and safe spaces for recreation and exercise; how much access do at-risk groups have to primary care of the highest quality that would enable them to quit smoking or properly manage blood pressure and cholesterol levels - seem well worth the investment of time and resources.

The Million Hearts Initiative is an important example of a national policy response. Million Hearts is co-led by the Centers for Disease Control and Prevention (CDC) and the Centers for Medicare and Medicaid Services (CMS), and its main goal is to prevent 1 million heart attacks and strokes over a five-year period. In its first two years of implementation, it prevented about 115,000 cardiovascular events.¹⁸

Final numbers are due out in 2019, but interim numbers look promising. By implementing policies and supporting activities that include a keen focus on the ABCS of stroke (aspirin therapy for appropriate population, blood pressure control, cholesterol control, and sodium reduction and smoking cessation), Million Hearts has, according to its 2012-2016 report^{19,20}, contributed to:

- an increase in the prevalence of US adults 18 years of age and older who have their blood pressure under control;

- an increase in the prevalence of adults 21 years of age and older who take statins based on doctor’s recommendations;
- a reduction in the prevalence of adults 18 and older who use combustible tobacco use;
- and a reduction in the mean sodium intake of adults aged 18 years and older.

See Appendix A for more details.

The graphs below highlight national data on stroke mortality, by race and ethnicity, for the U.S. population over the age 35, as well as the hospitalization rate for Medicare beneficiaries between 2012 and 2014. The data show that more mid-age and elderly non-Hispanic Black individuals die from stroke than any other race/ethnic group. Additionally, the hospitalization rate for Medicare beneficiaries is highest among non-Hispanic Blacks compared to their counterparts.

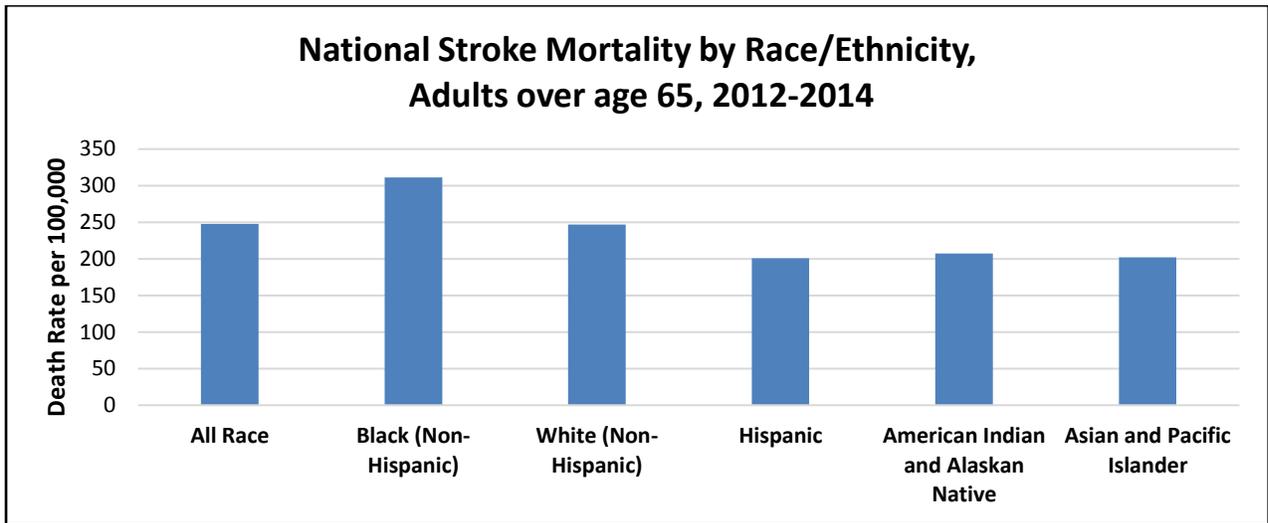


Figure 1: National Stroke Mortality by Race/Ethnicity, Ages 65 and older, 2012-2014^{22,23}

Source: Centers for Disease Control and Prevention, Division for Heart Disease and Stroke Prevention (CDC-DHDSP)

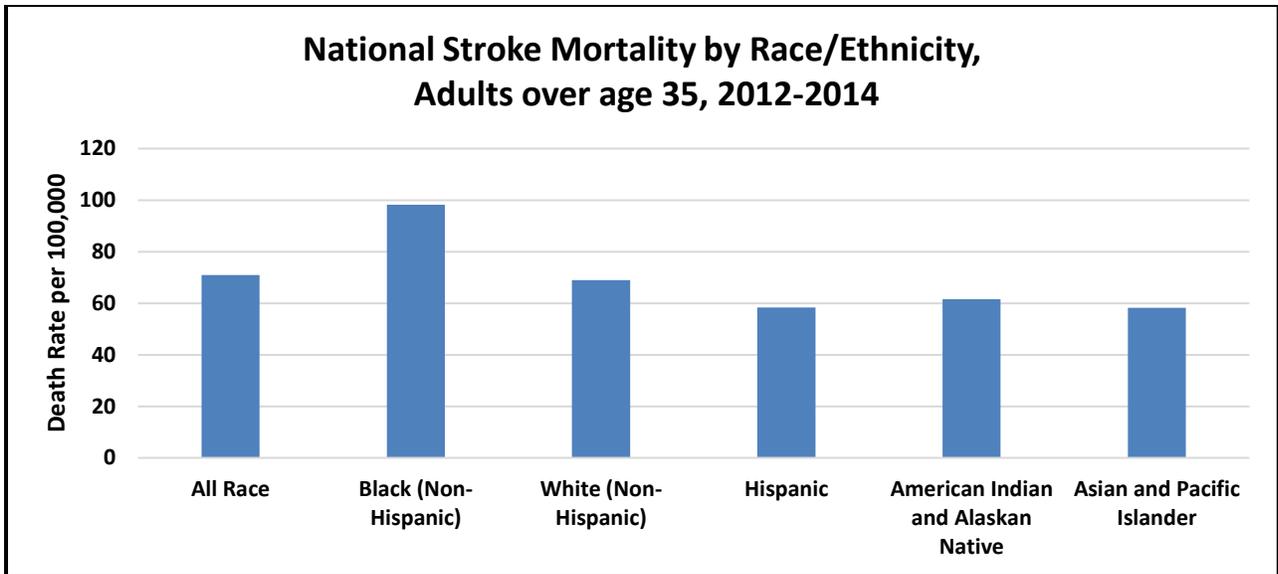


Figure 2: National Stroke Mortality by Race/Ethnicity, Ages 35 and older, 2012-2014^{22,23}

Source: Centers for Disease Control and Prevention, Division for Heart Disease and Stroke Prevention (CDC-DHDSP)

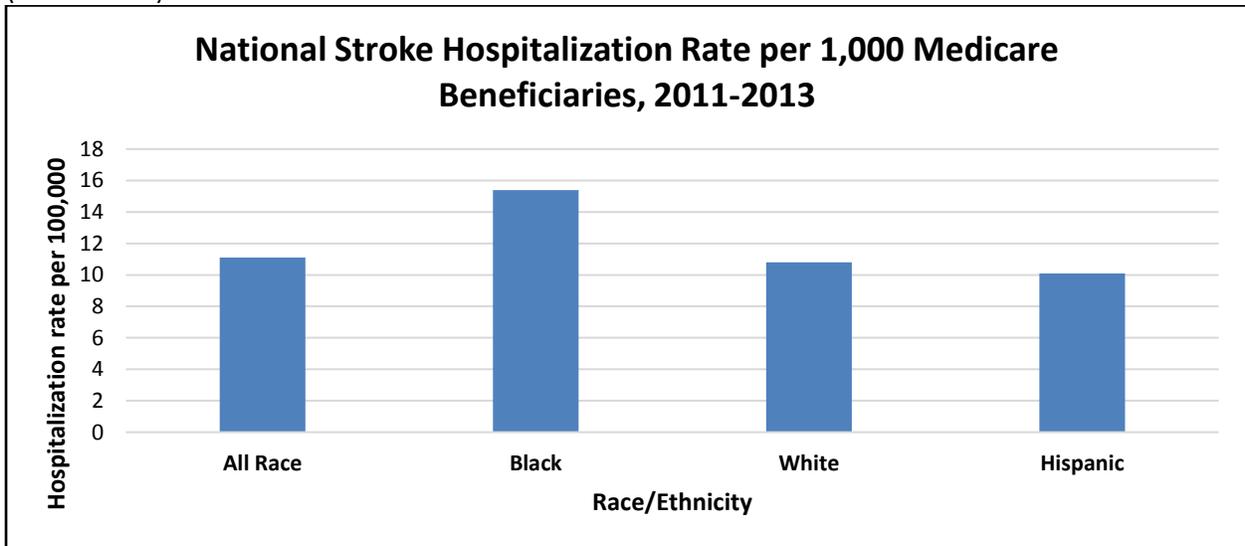


Figure 3: National Stroke Hospitalization Rate by Race/Ethnicity, Medicare Beneficiaries 2012-2014^{22,23}

Source: Centers for Disease Control and Prevention, Division for Heart Disease and Stroke Prevention (CDC-DHDSP)

Regional Trends

We define the Mid-Atlantic region as the six states in CMS' Region 3: Maryland (MD), the District of Columbia (DC), Pennsylvania (PA), Virginia (VA), West Virginia (WV), and Delaware (DE).



Figure 4: Map of the Mid-Atlantic Region, CMS Region 3: Maryland (MD), District of Columbia (DC), Pennsylvania (PA), Virginia (VA), West Virginia (WV) and Delaware (DE).
Source: Info-gram

The burden of stroke in the Mid-Atlantic region reflects national trends. States with smaller populations (and less capacity to collect data at a more granular level) may be more disadvantaged in their attempt to understand the stroke burden in their states. Notwithstanding, this difference in policy capacity should, in our view, be more clearly understood by policy makers and clinicians in the region.

Figure 5 shows stroke death rates among the elderly, and Figure 6 shows stroke death rates among individuals aged 35 and over in the region. Blacks experience the highest rates, by race. West Virginia and Delaware experience the highest rates, by state.^{22,23}

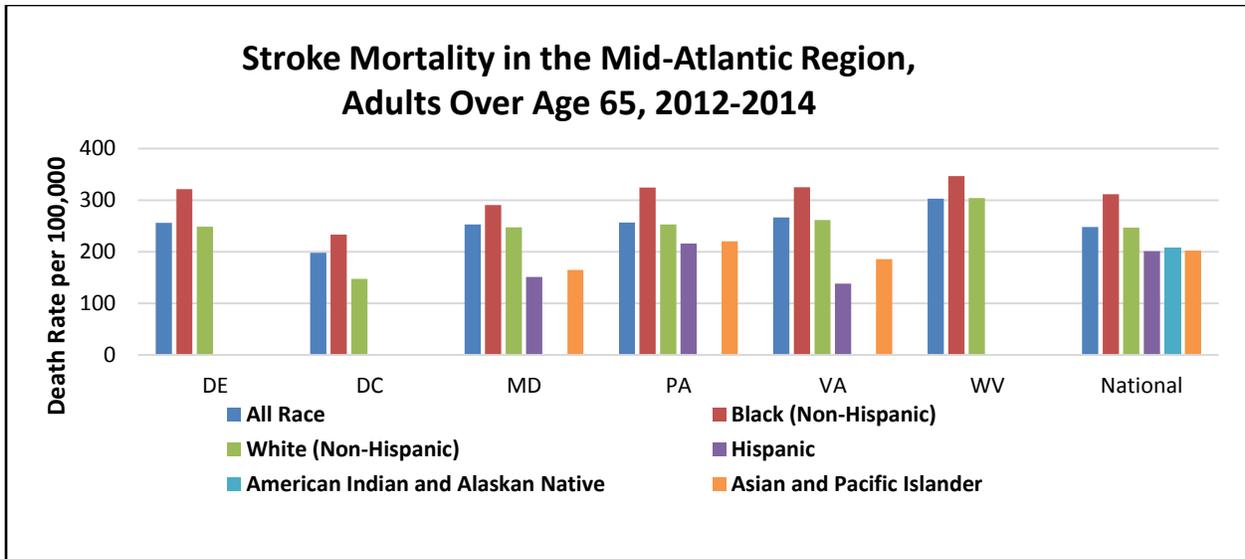


Figure 5: Stroke Mortality Rate by Race/Ethnicity, Ages 65 and older, 2012-2014

Source: Centers for Disease Control and Prevention, Division for Heart Disease and Stroke Prevention (CDC-DHDSP)

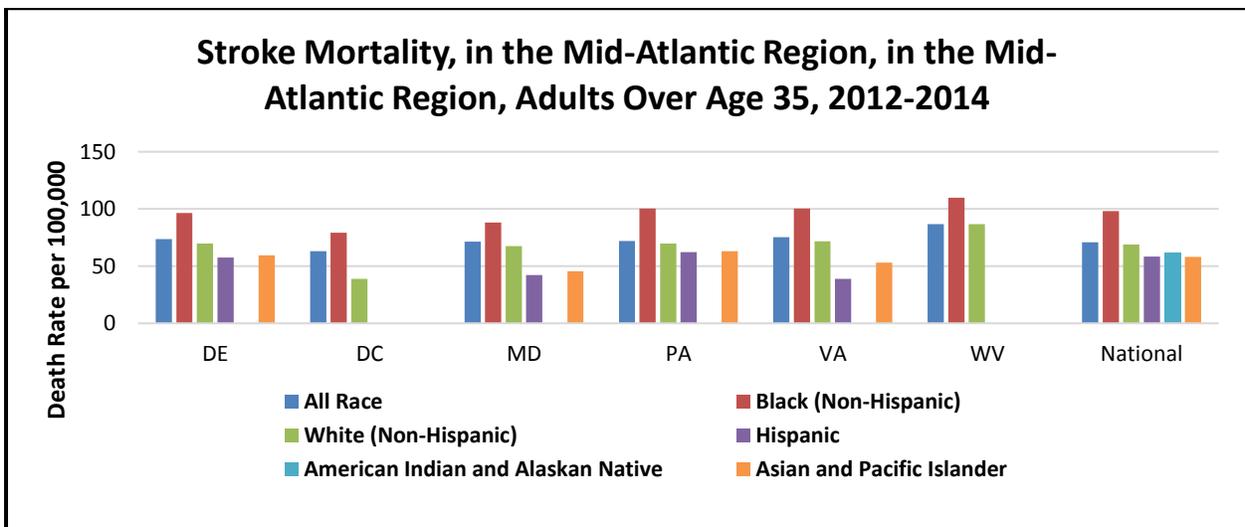


Figure 6: Stroke Death Rate per 100,000 Ages 35 and older, 2012-2014^{22,23}

Source: Centers for Disease Control and Prevention, Division for Heart Disease and Stroke Prevention (CDC-DHDSP)

The Role of Public Policy

Maryland

The Maryland Advisory Council on Heart Disease and Stroke was enacted by the Maryland General Assembly in 1976, under subtitle 2 of the health general articles.^{24,25} The Council highlighted the need to monitor the risk factors of stroke. It has since been re-named the State Advisory Council on Heart Disease and Stroke. The Advisory Council is also responsible for establishing guidelines that deal with prevention, detection, case finding, diagnosis, therapy, long term management and many more

aspects of managing stroke and heart disease. The Council is also required, by statute, to submit a biennial report to the Governor. Policies and programs put forth by the Maryland Advisory Council on Heart Disease and Stroke appear to have impacted the stroke epidemic in the state.²⁶ According to the 2013 report, 11,112 African American Marylanders were educated - via the Council's work - about how to identify the signs and symptoms of a stroke.²⁷ The advisory council will continue to monitor its progress toward meeting its goals and continue to work with partners regarding education and physical activity as a prevention tool for chronic disease. A snapshot of the advisory council's goals follows:

1. Disease Prevention (Physical and Nutrition);
2. Disease Management (Metrics for acute stroke treatment and optimization strategies to enhance acute stroke treatment);
3. Sustainability [Enhance access to patient data through Electronic Health Records (EHRs)].

Furthermore, the advisory council's report of 2015 shows that the council focused on two activities - sodium reduction in Long Term Care, and adult medical day care in Assisted Living Facilities.^{26,27}

District of Columbia

The District of Columbia (DC)'s Cardiovascular Health Programs implement action plans that prevent and control heart disease, obesity, diabetes and other risk factors associated with heart disease.²⁸ The program creates a direct link between community resources and chronic disease self-management. The program focuses on the ABCS of stroke (aspirin therapy for appropriate population, blood pressure control, cholesterol control, and sodium reduction and smoking cessation) to reduce the risk factors of stroke. The city also developed a framework known as DC Healthy People 2020, which mirrors the national initiative. The DC Healthy People 2020 framework recommends 2 strategies to combat heart disease and stroke: 1) increase hypertension care through improved communications and data sharing among providers, nurses, pharmacists, other care givers and patients, and 2) Increase surveillance of early diagnosis of heart disease and stroke.²⁸

The most recent data from the implementation of the 2020 framework indicates that heart disease and stroke account for 32.3% of deaths in the District of Columbia. Heart disease and stroke are the first and the third leading causes of death, respectively, in the District of Columbia.²⁸ Data published by the DC 2020 framework show that the stroke mortality rate in the District is higher than the national number on stroke mortality.²⁸

The District has set various targets to reduce the effect of stroke and heart disease. For instance: in 2010 the DC 2020 framework established a baseline score of 4.5 ER visits per 100,000 population for heart disease and stroke.²⁸ The reported rate for 2014 was 5.4 ER visits per 100,000, which represents an unwelcome increase. The DC framework established a baseline of 32.0 stroke deaths per 100,000 population, but by 2014, that rate had decreased to 33.0 per 100,000.²⁸

The city has also convened the DC Stroke Collaborative, which, according to local health officials, engages in awareness and outreach activities.

Delaware

Delaware's stroke care system promises excellence in stroke care that meets the needs of the population. This policy is designed to follow the guidelines established by the Joint Commission.²⁹ The

Joint Commission is an independent non-profit organization that accredits and certifies nearly 21,000 healthcare organizations in the United States. The Joint Commission's mission is "to improve health care for the public" in collaboration with various stakeholders in their respective communities.³⁰

The state has developed the Delaware Stroke Initiative (DSI), a not for profit association whose mission is to improve stroke prevention, reduce risk factors, and provide a recovery service for the residents of Delaware. DSI's services focuses on low-income and other minority populations. The initiative is funded by the Center of Disease Control and Prevention (CDC), and helps physicians use electronic health records (EHRs) to report on the National Quality Forum (NQF) 0018 measure for hypertension and heart disease.³¹ This measure monitors the percentage of patients in a practice that suffer from hypertension, and educates the patients on the necessary steps needed to prevent hypertension and other heart diseases. This approach serves as a preventive measure to reduce risk factors related to stroke.³¹

The Delaware state legislature has amended the Delaware code to add the Office of Cardiovascular Disease and Stroke Prevention, whose primary objective is to conduct health education, public awareness, and community outreach activities which can prevent cardiovascular diseases and stroke. In addition, the bill creates a stroke database which will compile information and statistics in relation to stroke care. The stroke database will adhere to metrics established by the CDC and The Joint Commission.³² The Delaware Emergency Medical Service Oversight Council (DEMSOC) was created to monitor the effectiveness of the policies implemented by the Delaware Legislature.³² The DEMSOC has developed an inclusive comprehensive system of stroke care to integrate hospitals and all health professionals to provide the patients the best outcomes.

Pennsylvania

The Pennsylvania legislature amended The Stroke System Act (adopted in 2012) during the 2017 legislative session. The law created a stroke care system by establishing primary stroke centers, emergency medical services training, and transportation programs for stroke patients. It also established protocols related with prehospital assessment, treatment and transportation, and clarified the state's definition of "acute stroke-ready hospital", "comprehensive stroke center", and "primary stroke center".^{33,34,35}

The effectiveness of the policy (per the 2017 amendment)³⁶ will be evaluated and chronicled in a biennial report that would include the number and location, by county, of certified comprehensive stroke centers, primary stroke centers, and acute stroke ready hospitals.

The Pennsylvania Department of Health's 'Chronic Disease in Pennsylvania' report³⁷ - published in 2011 prior to the enactment of The Stroke System Act - indicated a decline in stroke mortality for both genders during the period between 2000 and 2008. Males continued to experience consistently higher mortality rates however. More specifically - the mortality rate among Black males consistently ranked the highest for all racial/ethnic/gender groups, followed by Black women. The 2008 mortality rate for Blacks was 59.7 per 100,000, compared to 24.9 per 100,000 for Hispanics, and 40.5 for Whites.³⁷ The relatively low mortality rate for Hispanics may be due to the relatively young average age for that population in Pennsylvania. The relatively low mortality rate notwithstanding, Hispanics were hospitalized for strokes more than Whites (but less than Blacks) from 2000-2008.³⁷

Virginia

Approximately 3 percent of the population in Virginia have had a stroke, and many are living with the effects.³⁸ The Virginia Department of Health (VDH) along with the Joint Commission on Health Care (JCHC) has created the Virginia Stroke System. In 2008 Virginia amended the Statewide Emergency Medical Care System. This amendment added a Prehospital and Inter-Hospital Stroke Triage Plan, designed to provide quick access to necessary care for stroke patients. The Statewide Emergency Medical Services Plan provides a comprehensive system that incorporates facilities, licensed medical professionals, law-enforcement agencies, hospitals, transportation, and many other components. Furthermore, Virginia established a Virginia Stroke System Task Force that consists of neurologists, emergency medical system (EMS), stroke centers coordinators, pharmacists, and nurses.³⁹

Stroke care in Virginia is driven by the Virginia Department of Health “Virginia Stroke Systems Work Plan”.³⁸ The plan, created in 2008, is a dynamic working document designed to adapt to conditions on the ground. The plan focuses on primary prevention, emergency medical services, acute stroke care and rehabilitation (rehab), and, crucially, access to care issues. The prevention component of the plan involves awareness, education and empowerment for elevated risk populations, with an emphasis on using trusted voices and care providers (such as the INOVA system) in the community to advocate for prevention. They also depend on the work of the National Institute of Neurological Disorders and Stroke (NINDS).³⁹

The prevention strategy also involves employers and worksites. Wellness programs developed in conjunction with businesses, churches, and schools include fitness campaigns and a medical emergency response plan.

To evaluate how these initiatives are working the Virginia Stroke System Task Force (VSSTF) collects information from hospitals through a Readiness Assessment Survey, which includes the following questions:

1. Do you administer Endovascular Care?
2. Do you provide IVTA?
3. Do you provide 24/7 access to Neurologists, Stat Labs and Brain MRI’s?

According to the Virginia Department of Health, Division of Population Health Data, the rates of hospitalization and death from stroke in Virginia vary across populations (2017 data). The data shows that both hospitalization and death rates are higher for males in the commonwealth.³⁹

West Virginia

The West Virginia Cardiovascular Health Program is the state’s main vehicle for implementing the Paul Coverdell National Acute Stroke Registry Program.⁴⁰

The Paul Coverdell National Acute Stroke Registry Program is designed to increase the quality of care and consequently save lives and prevent disability and death from stroke.⁴⁰ It also connects health care professionals across the system of care. There 9 states currently participating (funded) in the Paul Coverdell Program are California (CA), Georgia (GA), Massachusetts (MA), Michigan (MI), Minnesota

(MN), New York (NY), Ohio (OH), Washington (WA), and Wisconsin (WI). Pennsylvania has applied, but they are yet to be funded.

Policy Approaches for Further Consideration

Transportation Solutions

Direct medical costs, transportation, stroke center guidelines, risk factor prevention, and aftercare are all aspects of stroke care that warrant more attention. Transportation is a particularly useful example, given the need to respond within minutes to a stroke event before irreversible disability (or even death) occurs.⁴¹

States in the Mid-Atlantic region could, for example, consider policies that create a mobile stroke unit (MSU) for areas that might not have access to a hospital or a primary stroke center. An MSU is a specialized ambulance that provides time sensitive care to individuals suffering from stroke.^{42,43} The mobile stroke unit is equipped with a computer tomography scanner that allows diagnosis and treatment on scene. For example, MSUs have been deployed in Ohio, Texas, Colorado, and Tennessee. Since the deployment of MSUs in these states, stroke care has improved. A study conducted in Cleveland, Ohio highlights how the utilization of MSU's reduced treatment time by 30 minutes for individual suffering from any type of stroke.^{42,43}

Acute and Comprehensive Stroke Centers

Pennsylvania has taken steps to create access to stroke units by ensuring that hospitals that have been designated as acute/comprehensive stroke centers be certified and compliant with all guidelines put forth by the Joint Commission. This year, Pennsylvania enacted the (Primary Stroke Center Recognition) Stroke System of Care Act of 2017. This is a significant step to reduce the stroke prevalence rate in Pennsylvania. The bill establishes a process that would recognize each facility designation, require a biennial report to identify any changes in the number or location of each facility, and ensure that protocols related to treating stroke patients is current and followed. No data are available about how well this has worked thus far. To the degree this policy intervention can demonstrate success other states in the region should consider adopting similar measures.

Conclusion

Strokes continue to impose a heavy burden on individuals, families, communities, economies, and the U.S. health system. Successes in preventing stroke continue to mount, but the long-term trajectory of prevention, timely treatment, and rehabilitation that returns patients to their preferred standard of living requires ongoing effort from patients, policymakers, providers, and society as a whole.

We note the promise of comprehensive programs such as Million Hearts and the Paul Coverdell program, but the insights that could be gleaned from successes in individual states, or individual hospitals and health systems, would go a long way in advancing evidence-based policy making.

It seems to us that Medicaid expenditures on stroke-related care would be very helpful as each state attempts to learn from their neighbors, especially within the context of a contiguous region such as Region 3. How much does one jurisdiction spend on emergency transport versus inpatient critical

care? How much does another spend on short term rehab versus long term nursing home care for those that are permanently disabled as a consequence of suffering a stroke? There are data in the literature that could shed light on this in other regions, but the more granular the understanding of local and state policymakers, the more likely it is that stroke prevention and treatment policy will be effective enough to make stroke an increasingly less frequent occurrence.

Appendices

APPENDIX A

Million Hearts

Million Hearts, a U S Department of Health and Human Services initiative co-led by the Centers for Disease Control and Prevention (CDC) and the Centers for Medicare & Medicaid Services (CMS), aimed to prevent 1 million heart attacks and strokes in the United States over the course of 5 years.

The Million-Hearts initiative has:

- 120 official partners.
- 20 federal agencies.
- 50 states participating as-well as The District of Columbia.

Million-Hearts focuses on various heart prevention strategies such as:

- ABCs control (Aspirin when appropriate, Blood pressure control, Cholesterol management and Smoking cessation).
- Quality improvement.
- Community approaches to eliminate artificial trans-fat.
- Reduce Sodium intake and smoking.

²²Million Hearts® supports activities and policies that:

Keep People Healthy

-Reduce Smoking

-Reduce Sodium Intake.

-Eliminate Trans Fat Intake

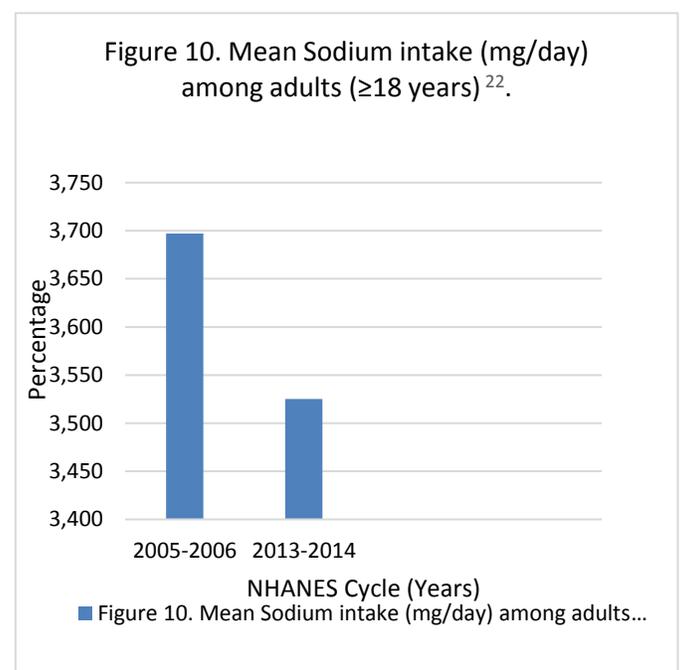
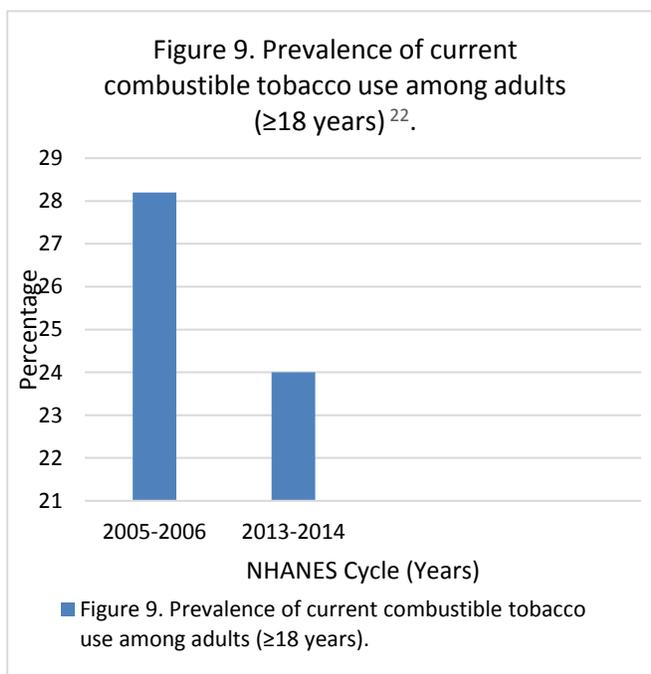
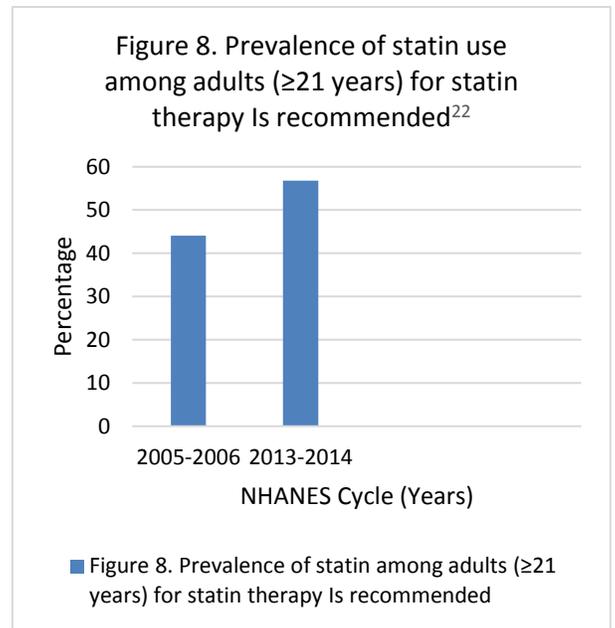
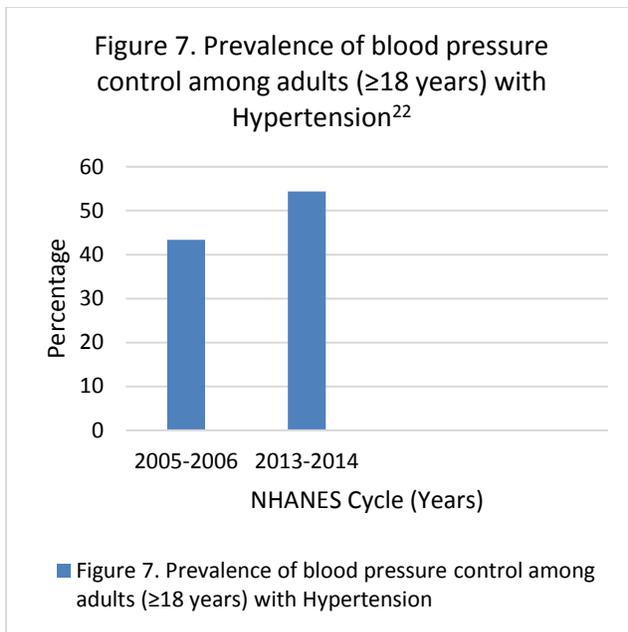
Optimize Care

Million Hearts mobilized health care systems to deliver high-value care for people who have or are at risk for CVD. Which is highlighted below.

-Focus on the ABCS.

-Health Tools and Technology.

-Innovations in Care Delivery.



Source: Million Hearts: Meaningful Progress 2012-2016. A Final Report

Measuring Progress Million-Hearts uses National Health and Nutrition Examination Survey (NHANES) data to track key indicators such as patients' progress in managing their ABCS.

Appendix B - District of Columbia

State at a Glance	
State Ranking	NA ²
National Age-Adjusted Death Rate Per 100,000	37.6 ²
Age- Adjusted Death Rate Per 100,000	NA ²
Paul Coverdell Funding Status	Not Funded ³

Stroke Deaths have reversed from decreasing to increasing in the District of Columbia.

Primary Stroke Care Centers

- ⁵There are 6 Primary Stroke Centers in the District of Columbia.

Individual Laws

⁴B20-0327 Stroke System of Care Act of 2013

⁴This law establishes a comprehensive system of stroke care to authorize the department of health to designate certain hospitals in the region as stroke care centers. This bill also requires in conjunction with department of health and fire and emergency medical service to establish response and treatment protocols and a plan for the continuous improvement in the quality of care provided to a person experiencing a stroke. Requires stroke care centers and other emergency medical service to report data to the Department of Health, and require the construction of a database of information relating to stroke treatment.

Notes

1. The information provided is current as of December 15th, 2016.
2. The District of Columbia did not have any data on the [CDC Stroke Mortality](#) website.
3. [The Paul Coverdell Program](#).
4. [Stroke System of Care Act of 2013](#).
5. The Joint Commission.

Appendix C - Delaware

State at a Glance	
State Ranking	15 th ²
National Age-Adjusted Death Rate Per 100,000	37.6 ²
Age- Adjusted Death Rate Per 100,000	39.4 ²
Paul Coverdell Funding Status	Not Funded ³

²Stroke Deaths have slowed down over time in the state of Delaware.

Primary Stroke Care Centers

- ⁴There are 6 Primary Stroke Centers in the State of Delaware.

Individual Laws

⁵Public Awareness of Heart Disease and Stroke

⁵**DE SCR 34 (2010, adopted)** - Recognizes the week of June 1-7, 2010 as National Cardiopulmonary Resuscitation (CPR) and Automated External Defibrillator (AED) week in Delaware. Encourages citizens to seek training in CPR and learn how to operate AED devices.

⁵**DE SCR 18 (2009, adopted)** - Recognizes the week of June 1-7, 2009 As National Cardiopulmonary Resuscitation (CPR) and Automated External Defibrillator (AED) Awareness Week in Delaware.

⁵Increase Early Detection and Treatment of Risk Factors

⁵**DE S 66 (2009, enacted, Chapter 1, Title 16, Section 138-139)** - Establishes Heart Disease and Stroke Prevention Program within the Division of Public Health of the Department of Health and Social Services. The program is established to address heart and cardiovascular disease and stroke-related health issues for the following purposes: (1) to conduct health education, public awareness, and community outreach activities that relate to primary and secondary prevention of cardiovascular disease and stroke; (2) to assist the division director in identifying, coordinating and establishing priorities for programs, services and resources the State should provide for cardiovascular disease and stroke prevention; (3) to serve as a resource for information regarding cardiovascular disease and stroke data, prevention strategies, treatment services and programs that address cardiovascular disease and stroke-related health issues; (4) to provide health care providers, employers, schools, community health centers and other groups with innovative and effective programs that achieve the objectives of improved treatment, prevention

and public awareness; (5) to provide guidance regarding the roles and responsibilities of government agencies, health care providers, employers, third-party payers, patients and families of patients of best practices in the treatment, primary and secondary prevention, and public awareness of cardiovascular disease and stroke; (6) to improve access to treatment for primary and secondary prevention of heart and cardiovascular disease and stroke through public awareness programs, including access for uninsured individuals and individuals living in rural or underserved areas; (7) to assist communities in developing comprehensive local cardiovascular disease and stroke prevention programs; (8) to establish appropriate forums, programs or initiatives designed to educate the public regarding the impact of heart disease and stroke on women's health, with an emphasis on preventive health and healthy lifestyles; (9) to coordinate the activities and programs of the department with other entities that focus on cardiovascular health or cardiovascular disease prevention or control, including but not limited to other state agencies; and (10) to evaluate and enhance the implementation and effectiveness of the department and to seek funding from private or governmental entities to carry out the purposes of this section.

Notes

1. The information provided is current as of December 15th 2016.
2. [CDC Stroke Mortality](#).
3. [The Paul Coverdell Program](#).
4. The Joint Commission.
5. [National Conference of State Legislature](#).

Appendix D - Maryland

State at a Glance	
State Ranking	23 rd ²
National Age-Adjusted Death Rate Per 100,000	37.6 ²
Age- Adjusted Death Rate Per 100,000	37.8 ²
Paul Coverdell Funding Status	Not Funded ³

²Stroke Deaths have reversed from decreasing to increasing in the state of Maryland.

Primary Stroke Care Centers

- ⁴There are 34 Primary Stroke Centers in the State of Maryland.

Individual Laws

⁵Congenital Heart Disease

⁵**MD HB 714 / MD SB 786 (2011, enacted, Chapter No. 553/ Chapter No. 552)** – Requires that the Department of Health and Mental Hygiene adopt certain federal recommendations about screening newborns for congenital heart disease. Requires the State Advisory Council on Hereditary and Congenital Disorders to develop recommendations for critical congenital heart disease screening of newborns; requires the Advisory Council to convene experts and examine the impact of implementing mandatory critical congenital heart disease screening measures; requires the Advisory Council to submit a report to the General Assembly.

⁶COMAR 10.09.49.01-.12 Regulation to combine the Maryland Medicaid Telemedicine Program and Maryland Medicaid tele-mental health program to the telehealth services.

Notes

1. The information provided is current as of December 15th 2016.
2. [CDC Stroke Mortality](#).
3. [The Paul Coverdell Program](#).
4. The Joint Commission.
5. [National Conference of State Legislature](#).
6. [Maryland State Legislature](#)

Appendix E - Pennsylvania

State at a Glance	
State Ranking	17 th ²
National Age-Adjusted Death Rate Per 100,000	37.6 ²
Age- Adjusted Death Rate Per 100,000	38.8 ²
Paul Coverdell Funding Status	Applied, yet to be Funded ³

²Stroke Deaths have reversed from decreasing to increasing in the state of Pennsylvania.

Primary Stroke Care Centers

- ⁴There are 104 Primary Stroke Centers in the State of Pennsylvania.

Individual Laws

⁵Public Awareness of Heart Disease and Stroke

⁵PA SR 236 (2010, adopted) - Recognizes the month of February 2010 as "American Heart Month."

⁵PA HR 598/PA SR 240 (2010, adopted) - Recognizes February 5, 2010 as "Wear Red Day" to show support for women and the fight against heart disease.

⁵PA HR 683 (2010, adopted) - Recognizes May 1, 2010 as "Childhood Stroke Awareness Day."

⁵PA HR 782/PA SR 310 (2010, adopted) - Recognizes the month of May 2010 as "Stroke Awareness Month."

⁵PA HR 909 (2010, adopted) - Recognizes the month of October 2010 as "Sudden Cardiac Arrest Awareness Month."

⁵PA HR 4 (2009, adopted) - Recognizes February 6, 2009, as "Wear Red Day for Women" in Pennsylvania and encourages all citizens to wear red to raise women's awareness of cardiovascular disease.

⁵PA HR 54 (2009, adopted) - Designates the month of February 2009 as "American Heart Month" in Pennsylvania and urges all citizens to recognize the critical importance of tools and skills that will increase survival rates from cardiac arrest, so that thousands of lives can be saved each year.

⁵PA SR 112 (2009, adopted) - Recognizes May 2009 as "National High Blood Pressure Education Month" in Pennsylvania to bring awareness to this life-threatening condition and educate citizens about healthy ways to reduce the risk of high blood pressure and return high blood pressure to a normal level.

⁵Prevention of Risk Factors (Nutrition, Physical Activity and Tobacco)

⁵PA HR 692/PA SR 283 (2010, adopted) - Recognizes April 7, 2010 as “National Start! Walking Day.”

⁵PA HR 194 (2009, adopted) - Recognizes April 8, 2009, as "National Start! Walking Day" in Pennsylvania.

Notes

1. The information provided is current as of December 15th 2016.
2. [CDC Stroke Mortality](#).
3. [The Paul Coverdell Program](#).
4. The Joint Commission.
5. [National Conference of State Legislature](#).

Appendix F - Virginia

State at a Glance	
State Ranking	22 nd ²
National Age-Adjusted Death Rate Per 100,000	37.6 ²
Age- Adjusted Death Rate Per 100,000	38.0 ²
Paul Coverdell Funding Status	Not Funded ³

²Stroke Deaths have slowed down over time in the state of Virginia.

Primary Stroke Care Centers

- ⁴There are 18 Primary Stroke Centers in the State of Virginia.

Individual Laws

⁵Public Awareness of Heart Disease and Stroke

⁵**VA HJR 259 (2010, adopted)** - Recognizes the month of February as “American Heart Month,” in 2010 and each year after.

⁵**VA HJR 198/ SJR 124 (2010, adopted)** - Designates April 25, 2010, and each succeeding year as “Youth Fitness Day.” Encourages youth and other citizens to engage in physical activity on this day as a symbol of their commitment to fitness and healthy living.

⁵Improve Quality of Care and Access to Care

⁵**VA HJR 82 (2010, adopted)** - Directs the Joint Commission on Health Care to study the feasibility of health care homes to treat chronic disease. The commission will review information about programs in other states to develop recommendations related to standards for chronic health care homes, including the use of primary care practitioners, care coordinators and other professionals to provide high quality, patient-centered care. This also includes using health information technology; evidence-based health care practices; incorporating quality outcome, and cost-of-care measures; standards for certification of health care facilities as chronic health care homes and ongoing reporting requirements; developing a chronic health care home collaborative to provide opportunities for state agencies to exchange information about quality improvement and best practices; enrolling state medical assistance recipients; and costs associated with implementing a successful demonstration program to determine improvement in health care quality and patient outcomes. Directs the commission to complete its meetings for the first year by November 30, 2010, and for the second year by November 30, 2011 and to submit an executive summary to the Division of Legislative Automated Systems no later than the first day of the next regular session of the General Assembly for each year.

Notes

1. The information provided is current as of December 15th 2016.
2. [CDC Stroke Mortality](#).
3. [The Paul Coverdell Program](#).
4. The Joint Commission.
5. [National Conference of State Legislature](#).

Appendix G - West Virginia

State at a Glance	
State Ranking	9 th ²
National Age-Adjusted Death Rate Per 100,000	37.6 ²
Age- Adjusted Death Rate Per 100,000	43.8 ²
Paul Coverdell Funding Status	Not Funded ³

²Stroke Deaths have continued to decrease steadily the state of West Virginia.

Primary Stroke Care Centers

- ⁴There are 8 Primary Stroke Centers in the State of West Virginia.

Individual Law

⁵**HB 4388** the West Virginia legislature amended the code of West Virginia, 1931 as amended, by adding thereto a new article, designated §16-5X-1 and §16-5X-2, all relating to stroke centers; requiring the Bureau for Public Health to designate hospitals as comprehensive stroke centers, primary stroke centers or acute stroke ready hospitals; providing rule-making authority; requiring the office of Emergency Medical Services to establish protocols to treat and transport stroke patients.

Notes

1. The information provided is current as of December 15th 2016.
2. [CDC Stroke Mortality](#).
3. [The Paul Coverdell Program](#).
4. The Joint Commission.
5. [West Virginia Legislature](#).

Endnotes

¹Centers for Disease Control and Prevention. Stroke Facts. <http://www.cdc.gov/stroke/facts.htm>

²Centers for Disease Control and Prevention. Stroke Facts. <http://www.cdc.gov/stroke/facts.htm>

³Centers for Disease Control and Prevention. Stroke Facts. <http://www.cdc.gov/stroke/facts.htm>

⁴Centers for Disease Control and Prevention. Stroke Facts. <http://www.cdc.gov/stroke/facts.htm>

⁵Addo et al. Socioeconomic Status and Stroke: An Updated Review. *Stroke*. 2012; 1186-1191. Published online February 23, 2012. <http://stroke.ahajournals.org/content/43/4/1186.long>

⁶Stroke Awareness Foundation. Key Stroke Facts. <http://strokeinfo.org/signsandsymptoms/stroke-facts>

⁷Centers for Disease Control and Prevention. Stroke. Types of Stroke. http://www.cdc.gov/stroke/types_of_stroke.htm

- ⁸Centers for Disease Control and Prevention. Division for Heart Disease and Stroke Prevention. Stroke Fact Sheet. http://www.cdc.gov/dhbsp/data_statistics/fact_sheets/fs_stroke.htm
- ⁹Centers for Disease Control and Prevention. Trends in Emergency Department Visits for Ischemic Strokes and Transient Ischemic Attack. NCHS Data Brief, Number 194, March 2015. <http://www.cdc.gov/nchs/data/databriefs/db194.htm>
- ¹⁰Leong, Darryl P., et al. Prognostic value of grip strength: findings from the Prospective Urban Rural Epidemiology (PURE) study. The Lancet, Vol 386, No 9990, p 266-373, 18 July 2015. [http://www.thelancet.com/journals/lancet/article/PIIS0140-6736\(14\)62000-6/abstract](http://www.thelancet.com/journals/lancet/article/PIIS0140-6736(14)62000-6/abstract)
- ¹¹Post-Stroke Rehabilitation. National Institutes of Health. Know Stroke. <http://stroke.nih.gov/materials/rehabilitation.htm>
- ¹²Factors associated with discharge to home versus discharge to institutional care after inpatient stroke rehabilitation. Nguyen, VQ, Prvu Bettger, J, Guerrier, T, Hirsch, MA, Thomas, JG, Pugh, TM, Rhoads, CF. Arch Phys Med Rehab. 2015 Jul; 96 (7): 1297-303. <http://www.ncbi.nlm.nih.gov/pubmed/25823940>
- ¹³Shorter length of stay is associated with worse functional outcomes for Medicare beneficiaries with stroke. O'Brien, SR, Xue, Y, Ingersoll, G, Kelly, A. Phys Ther. 2013 Dec; 3 (12): 1592-602. <http://www.ncbi.nlm.nih.gov/pubmed/23886846>
- ¹⁴Regional Variation in Stroke Rehabilitation Outcomes. Reistetter, Timothy A, et al. Arch Phys Med Rehab. 2014 Jan; 95(1): 29-38. <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4006274/pdf/nihms568687.pdf>
- ¹⁵Geographic and facility variation in inpatient stroke rehabilitation: multilevel analysis of functional status. Reistetter TA, Kuo, YF, Kamarkar, AM, Eschbach, K, Teppala, S, Freeman, JL, Ottenbacher, KJ. Arch Phys Med Rehab. 2015 Jul; 96 (7): 1248-54. <http://www.ncbi.nlm.nih.gov/pubmed/25747551>
- ¹⁶Centers for Disease Control and Prevention. Differences in Stroke Mortality Among Adults Aged 45 and Over: United States, 2010-2013. NCHS Data Brief. Number 207. July 2015. <http://www.cdc.gov/nchs/data/databriefs/db207.htm>
- ¹⁷Centers for Disease Control and Prevention. Differences in Stroke Mortality Among Adults Aged 45 and Over: United States, 2010-2013. NCHS Data Brief. Number 207. July 2015. <http://www.cdc.gov/nchs/data/databriefs/db207.htm>
- ¹⁸About Million Hearts. Centers for Disease Control and Prevention. Retrieved from the Internet, November 2017. <https://millionhearts.hhs.gov/about-million-hearts/index.html>
- ¹⁹Million Hearts: Meaningful Progress 2012-2016. A Final Report. May 2017. <https://ctisinc.sharepoint.com/sites/HPRC/Shared%20Documents/Manuscripts/Stroke/New%20Stroke%20Literature/MH-meaningful-progress.pdf>
- ²⁰Million Hearts. The Initiative. Overview. <http://millionhearts.hhs.gov/aboutmh/overview.html>
- ²¹Centers for Disease Control and Prevention. Publications and Information Products. NCHS Data Brief, Number 95, May 2012. Hospitalization for Stroke in US Hospitals, 1989-2009. <http://www.cdc.gov/nchs/data/databriefs/db95.htm#x2013;2009>
- ²²Centers for Disease Control and Prevention. Stroke. Behaviors that increase risk for stroke. <http://www.cdc.gov/stroke/behavior.htm>
- ²³Centers for Disease Control and Prevention. Stroke. Conditions that increase risk for stroke. <http://www.cdc.gov/stroke/conditions.htm>
- ²⁴The Maryland Burden of Heart Disease and Stroke. Family Health Administration, Office of Chronic Disease Prevention. Maryland Department of Health and Mental Hygiene. 2009 Data Review.
- ²⁵Heart Disease and Stroke. Maryland Department of Health and Mental Hygiene. <http://phpa.dhmh.maryland.gov/hdsp/SitePages/Heart%20Disease%20and%20Stroke.aspx>
- ²⁶Maryland Department of Health and Mental Hygiene Family Health Administration Office of Chronic Disease Prevention. Improving Stroke Care through Telemedicine in Maryland. https://health.maryland.gov/mhqcc/Documents/Appendix_B_DHMH_White_Paper.pdf
- ²⁷Maryland State Advisory Council on Heart Disease and Stroke. House Bill 492. [http://dlslibrary.state.md.us/publications/Exec/DHMH/HG13-206\(c\)_2015.pdf](http://dlslibrary.state.md.us/publications/Exec/DHMH/HG13-206(c)_2015.pdf)

- ²⁸District of Columbia. Department of Health.
<https://doh.dc.gov/sites/default/files/dc/sites/doh/publication/attachments/FINAL%20DC%20HP2020%20Framework%20Report%205-23-16.pdf>
- ²⁹Delaware Heart Disease Prevention.
<https://www.healthylivingdelaware.org/Individuals/Heart/Prevention>
<https://www.healthylivingdelaware.org/Individuals/Heart/Prevention>
- ³⁰Delaware Division of Public Health. DHHS Press Release.
http://www.dhss.delaware.gov/dhss/pressreleases/2017/technologyhelps_03062017.html
- ³¹Heart/Stroke Recognition Program (HSRP). National Committee on Quality Assurance.
<http://www.ncqa.org/tabid/140/Default.aspx>
- ³²Delaware Emergency Medical Service Oversight Council Report.
<http://dhss.delaware.gov/dph/ems/files/demsocreport2016.pdf>
- ³³Pennsylvania Department of Health. Chronic Disease in Pennsylvania, 2011.
<http://www.health.pa.gov/migration/Documents/ChronicDiseaseBurdenReport.pdf>
- ³⁴Pennsylvania Department of Health. Chronic Disease in Pennsylvania, 2011.
<http://www.health.pa.gov/migration/Documents/ChronicDiseaseBurdenReport.pdf>
- ³⁵Pennsylvania Department of Health. Heart Disease and Stroke.
http://www.portal.state.pa.us/portal/server.pt/community/heart_disease_stroke/14283
- ³⁶The General Assembly of Pennsylvania. Primary Stroke Center Recognition Act.
<http://www.legis.state.pa.us/CFDOCS/Legis/PN/Public/btCheck.cfm?txtType=PDF&sessYr=2017&sessInd=0&billBody=H&billType=B&billNbr=0023&pn=0151>
- ³⁷Demographic Profile of Hispanics in Pennsylvania, 2011. Pew Research Center. Hispanic Trends.
<http://www.pewhispanic.org/states/state/pa/>
- ³⁸Virginia Department of Health. Virginia Stroke Systems Work Plan.
http://www.virginiastrokesystems.org/assets/files/1/files/pdf/vss_workplanrev91308.pdf
- ³⁹Virginia Cerebrovascular Disease. <http://www.vdh.virginia.gov/content/uploads/sites/133/2017/05/VDH-Cerebrovasc-Disease-Stroke-Final-02-1-2017.pdf>
- ⁴⁰West Virginia Department of Health and Human Resources. Understanding Stroke in West Virginia.
<http://www.wvdhhr.org/bph/hsc/pubs/other/UnderstandingStroke/CVAfinal.pdf>
- ⁴¹Public Policy Approaches to the Prevention of Heart Disease and Stroke. Thomas A. Pearson, MD, MPH, PhD. <http://circ.ahajournals.org/content/124/23/2560/tab-article-info>
- ⁴²Cleveland Clinic's. Get the right care to stroke patients fast. <https://medcitynews.com/2014/08/cleveland-clinics-mobile-stroke-unit-improving-outcomes-saving-money/>
- ⁴³Mobile Stroke Units. <http://www.jems.com/articles/2017/01/mobile-stroke-units-a-device-in-search-of-an-indication.html>